Course descriptions

TABLE OF CONTENTS

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF.KJ/01-Mgr/26	**Course title:** Academic English Language Preparation (1)
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: I.II.	
Prerequisites:	
Recommended prerequisites: intermediate level of English	
Course requirements: - active presence at seminars - final test with evaluation scale – A (100 – 91 %), B (90 – 81 %), C (80 – 73 %), D (72 – 66 %), E (65 – 60 %), FX (59 – 0 %) - To complete the course, the student must achieve at least 60%. Scale of assessment (preliminary/final): 100 %	
Learning outcomes: After completing the seminars a student is able to understand professional texts, reproduce their content orally and in writing, using English professional terminology from the field of human body and the profession of a pharmacist. Thanks to professional texts a student can use English professional terminology in both professional and non-professional environments.	
Class syllabus: The lessons concentrate on the following topics: the human body, the body systems and their functions, pharmaceutical care, the role of a pharmacist, services available in a pharmacy, laboratory equipment.	
Recommended literature: Hollá, O., Kližanová, D., Žufková,V.: English for Pharmacists I. Bratislava: Vydavateľstvo UK, 2023. Grammar Workbook I	
Languages necessary to complete the course: English language	
Notes: Academic English Language Preparation (1 - 5) within Master Study Programme is carried out in Slovak study programme in five semesters. The contents of these specialised professional courses closely follow the contents of other professional courses taught in the relevant semesters. It is	

therefore highly recommended to take the courses gradually from the 2nd to the 6th semester (including) of the study, i.e., Academic English Language Preparation (1) in the 2nd (summer) semester of study.

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PhDr. Darina Kližanová, Mgr. Natália Kližanová, PaedDr. Viera Žufková, PhD.

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF.KJ/02-Mgr/26	**Course title:** Academic English Language Preparation (2)
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: I.II.	
Prerequisites:	
Recommended prerequisites: intermediate level of English	
Course requirements: - active presence at seminars - final test with evaluation scale – A (100 – 91 %), B (90 – 81 %), C (80 – 73 %), D (72 – 66 %), E (65 – 60 %), FX (59 – 0 %) - To complete the course, the student must achieve at least 60%. Scale of assessment (preliminary/final): 100 %	
Learning outcomes: After completing the seminars a student is able to understand professional texts, reproduce their content orally and in writing, using English professional terminology from the field of factors influencing health condition. Thanks to professional texts a student can use English professional terminology in both professional and non-professional environments.	
Class syllabus: The lessons concentrate on the following topics: factors influencing our health, pollution of environment, drug abuse and drug addiction, health care, disease transmission.	
Recommended literature: Hollá, O., Kližanová, D., Žufková,V.: English for Pharmacists II. Bratislava: Vydavateľstvo UK, 2020. Grammar Workbook II	
Languages necessary to complete the course: English language	
Notes: Academic English Language Preparation (1-5) within Master Study Programme is carried out in Slovak study programme in five semesters. The contents of these specialised professional courses closely follow the contents of other professional courses taught in the relevant semesters. It is therefore highly recommended to take the courses gradually from the 2nd to the 6th semester	

(including) of the study, i.e., Academic English Language Preparation (2) in the 3rd (winter) semester of study.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Viera Žufková, PhD., PhDr. Darina Kližanová, Mgr. Natália Kližanová

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/03-Mgr/26	Academic English Language Preparation (3)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
intermediate level of English

Course requirements:
- active presence at seminars
- final test with evaluation scale – A (100 – 91 %), B (90 – 81 %), C (80 – 73 %), D (72 – 66 %), E (65 – 60 %), FX (59 – 0 %)
- To complete the course, the student must achieve at least 60%.
Scale of assessment (preliminary/final): 100 %

Learning outcomes:
After completing the seminars a student is able to understand professional texts, reproduce their content orally and in writing, using English professional terminology from the field of basic chemical terminology and disease prevention. Thanks to professional texts a student can use English professional terminology in both professional and non-professional environments.

Class syllabus:
The lessons concentrate on the following topics: disease prevention, healthy way of life, balanced diet, vitamins, minerals, cosmetics, first aid, treatment in various situations and emergencies.

Recommended literature:
Hollá, O., Jurišová, E., Kližanová, D., Žufková,V.: English for Pharmacists III. Bratislava: Vydavateľstvo UK, 2019.
Grammar Workbook III

Languages necessary to complete the course:
English language

Notes:
Academic English Language Preparation (1-5) within Master Study Programme is carried out in Slovak study programme in five semesters. The contents of these specialised professional courses closely follow the contents of other professional courses taught in the relevant semesters. It is therefore highly recommended to take the courses gradually from the 2nd to the 6th semester

(including) of the study, i.e., Academic English Language Preparation (3) in the 4th (summer) semester of study.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Viera Žufková, PhD., PhDr. Darina Kližanová, Mgr. Natália Kližanová

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF.KJ/04-Mgr/26	**Course title:** Academic English Language Preparation (4)
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 28 **Form of the course:** on-site learning	
Number of credits: 1	
Recommended semester: 1., 3., 5., 7., 9.	
Educational level: I.II.	
Prerequisites:	
Recommended prerequisites: intermediate level of English	
Course requirements: - active presence at seminars - final test with evaluation scale – A (100 – 91 %), B (90 – 81 %), C (80 – 73 %), D (72 – 66 %), E (65 – 60 %), FX (59 – 0 %) - To complete the course, the student must achieve at least 60%. Scale of assessment (preliminary/final): 100 %	
Learning outcomes: After completing the seminars a student is able to understand professional texts, reproduce their content orally and in writing, using English professional terminology from the field of pharmacology. Thanks to professional texts a student can use English professional terminology in both professional and non-professional environments.	
Class syllabus: The lessons concentrate on the following topics: common disorders, home medicine cabinet, drug classification, frequently prescribed drugs, their sources, composition and effects, alternative medicine, healing herbs - their structure and functions.	
Recommended literature: Hollá, O., Kližanová, D., Žufková,V.: English for Pharmacists IV. Bratislava: Vydavateľstvo UK, 2020. Grammar Workbook IV	
Languages necessary to complete the course: English language	
Notes: Academic English Language Preparation (1-5) within Master Study Programme is carried out in Slovak study programme in five semesters. The contents of these specialised professional courses closely follow the contents of other professional courses taught in the relevant semesters. It is	

therefore highly recommended to take the courses gradually from the 2nd to the 6th semester (including) of the study, i.e., Academic English Language Preparation (4) in the 5th (winter) semester of study.

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Viera Žufková, PhD., PhDr. Darina Kližanová, Mgr. Natália Kližanová

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/15-Mgr/26	Academic English Language Preparation (5)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
intermediate level of English

Course requirements:
- active presence at seminars
- final test with evaluation scale – A (100 – 91 %), B (90 – 81 %), C (80 – 73 %), D (72 – 66 %), E (65 – 60 %), FX (59 – 0 %)
- To complete the course, the student must achieve at least 60%.
Scale of assessment (preliminary/final): 100 %

Learning outcomes:
After completing the seminars, a student can understand professional texts, reproduce their content orally and in writing, using English professional terminology from pharmacy and medicine. Thanks to professional texts a student can use English professional terminology in both professional and non-professional environments.

Class syllabus:
The seminars follow the deepening of communicative skills and professional vocabulary. In addition to selected texts from textbooks, texts from promotional materials, manuals, and magazines are used. The lessons concentrate on the following topics: regular check-ups, prescriptions, drug dosage, over-the-counter drugs, nutrient supplements, pharmaceutical industry, the healthcare system in Slovakia, a career in the pharmaceutical field.

Recommended literature:
Bates, M., Dudley, T.: Nucleus: General Science. London: Longman, 1992
Havlíčková, I., Dostálová, Š., Katerová, Z.: English for Pharmacy and Medical Bioanalytics. Karolinum Press, 2014.
James, V. D.: Medicine. London: Prentice Hall, 1989

Languages necessary to complete the course:
English language

Notes:

Academic English Language Preparation (1-5) within Master Study Programme is carried out in Slovak study programme in five semesters. The contents of these specialised professional courses closely follow the contents of other professional courses taught in the relevant semesters. It is therefore highly recommended to take the courses gradually from the 2nd to the 6th semester (including) of the study, i.e., Academic English Language Preparation (5) in the 6th (summer) semester of study.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PhDr. Darina Kližanová, PaedDr. Viera Žufková, PhD., Mgr. Natália Kližanová

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/11-Mgr/26	Academic German Language Preparation (1)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
basic level

Course requirements:
- active participation in seminars
- continuous preparation for seminars with a share of autonomous study
- written final examination
- to successfully complete the subject, the student must achieve min. 60%.
- the minimum number of students in the group is 5.

Learning outcomes:
After completing the course, the student can communicate in German and respond to stimuli in everyday life. Can reproduce short texts. They can hold simple conversations and express their agreement and disagreement. Actively controls basic content-related professional vocabulary on the thematic areas covered.

Class syllabus:
1. Developing language competences in the German language acquired through previous studies at schools.
2. Developing communication skills (ability to ask and answer questions).
3. Work with the text aimed at understanding the read and heard text, distinguishing the main thoughts from secondary details, as well as obtaining the necessary information from the text (global and selective reading)
4. Basics of professional language in selected thematic areas (health, diseases and pain, medicines and their use, healthy nutrition, human body, work in the laboratory, periodic table of elements)

Recommended literature:
Deutsch als Fremdsprache : DaF kompakt neu – A1-B1 , Klett, 2019
Prima ankommen im Fachunterricht, Cornelsen, 2016
Fodor M.: Einführung in die pharmazeutische Fachsprache, 2014
Ivanová A, Hromadová K: Deutsch für medizinische Berufe, 2013

Hueber : Menschen im Beruf – Pflege, 2021

Languages necessary to complete the course:
German language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Katarína Batková

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/12-Mgr/26	Academic German Language Preparation (2)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 3., 5., 7., 9.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Academic German Language Preparation 1

Course requirements:
- active participation in seminars
- continuous preparation for seminars with a share of autonomous study
- written examination of the German language
- To successfully complete the subject, the student must achieve min. 60%.
- The minimum number of students in the group is 5.

Learning outcomes:
After completing the course, the student can communicate in the German language and respond to stimuli in everyday life. Can reproduce short texts. They can lead simple interviews and express their agreement and disagreement. Actively controls the basic professional vocabulary content related to the thematic areas covered.

Class syllabus:
1. Developing language competences in the German language acquired through previous studies at schools.
2. Developing communication skills (ability to ask and answer questions).
3. Work with the text aimed at understanding the read and heard text, distinguishing the main thoughts from secondary details, as well as obtaining the necessary information from the text (global and selective reading)
4. Basics of professional language in selected thematic areas (environment, immune protection, vitamins, medicinal plants, anatomy and physiology, package leaflet, alternative treatment methods)

Recommended literature:
Deutsch als Fremdsprache : DaF kompakt neu – A1-B1 , Klett, 2019
Prima ankommen im Fachunterricht, Cornelsen, 2016
Fodor M.: Einführung in die pharmazeutische Fachsprache, 2014
Ivanová A, Hromadová K: Deutsch für medizinische Berufe, 2013

Hueber : Menschen im Beruf – Pflege, 2021

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Katarína Batková

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/13-Mgr/26	Academic German Language Preparation (3)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
B2 level

Course requirements:
- active participation in seminars
- continuous preparation for the seminar with an emphasis on autonomous study
- Written examination of knowledge in the form of a test.
- To successfully complete the subject, the student must achieve min. 60%.
-The minimum number of students in the group is 5.

Learning outcomes:
After completing the course, the student is able to understand continuous professional texts, reproduce their content orally and in writing using professional German terminology from the field of pharmacy. Thanks to working with professional texts, they are able to use professional nomenclature in the German language in a professional environment as well as in spoken form.

Class syllabus:
1. Developing language competences in the German language acquired at secondary schools.
2. Basic characteristics of a professional text written in German.
3. Practice presenting the text in a professional style (pragmatic goal, linguistic and stylistic side of the text, principles of written and oral presentation).
4. Specifics of translating texts in a professional style.
5. Language exercise aimed at forming and strengthening communication competence for the area professional communication in the German language in selected thematic areas.

Recommended literature:
Fodor M.: Einführung in die pharmazeutische Fachsprache, 2014
Ivanová A, Hromadová K: Deutsch für medizinische Berufe, 2013
Hueber : Menschen im Beruf – Pflege, 2021
Gyorffy, M.: Deutsch fur Mediziner. Triton, 2006.
Dreyer D., Schmitt R.: Lehr- und Übungsbuch der deutschen Grammatik, Hueber, München, 2001.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Katarína Batková

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/14-Mgr/26	Academic German Language Preparation (4)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 3., 5., 7., 9.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
B2 level

Course requirements:
- active participation in seminars
- continuous preparation for the seminar with an emphasis on autonomous study
- Written examination of knowledge in the form of a test.
- To successfully complete the subject, the student must achieve min. 60%.
- The minimum number of students in the group is 5.

Learning outcomes:
After completing the course, the student is able to understand continuous professional texts, reproduce their content orally and in writing using professional German terminology from the field of pharmacy. Thanks to working with professional texts, he is able to use professional nomenclature in the German language in a professional environment as well as in spoken form.

Class syllabus:
1. Developing language competences in the German language acquired at secondary schools.
2. Basic characteristics of a professional text written in German.
3. Practice presenting the text in a professional style (pragmatic goal, linguistic and stylistic side of the text, principles of written and oral presentation).
4. Specifics of translating texts in a professional style.
5. Language exercise aimed at forming and strengthening communication competence for the area professional communication in the German language in selected thematic areas.

Recommended literature:
Fodor M.: Einführung in die pharmazeutische Fachsprache, 2014
Ivanová A, Hromadová K: Deutsch für medizinische Berufe, 2013
Hueber : Menschen im Beruf – Pflege, 2021
Gyorffy, M.: Deutsch fur Mediziner. Triton, 2006.
Dreyer D., Shmitt R.: Lehr- und Übungsbuch der deutschen Grammatik, Hueber, München, 2001.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Katarína Batková

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/16-Mgr/26	Academic German Language Preparation (5)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
intermediate to advanced level of German

Course requirements:
Active participation in seminars, midterm test – represents 15% of the total assessment, final written exam – represents 85% of the total assessment. To successfully complete the course, the student must achieve at least 60%.

Learning outcomes:
After completing the course, the student is able to understand coherent professional texts, reproduce their content orally and in writing, using professional German terminology from the field of pharmacy. Thanks to working with professional texts, he/she is able to use professional terminology in the German language in a professional environment and in spoken form.

Class syllabus:
The seminars aim to deepen communication skills and acquire professional vocabulary. In addition to selected texts from textbooks, texts from promotional materials, manuals and magazines are used. The following topics are covered: health check-ups, recipes, medication dosage, over-the-counter medications and nutritional supplements, medicinal plants, pharmaceutical industry, healthcare system in Slovakia, career in the pharmaceutical field.

Recommended literature:
Smerigová, E.: Deutsch fur Pharmazeuten, UVLF Košice, 2014.
Dusilová, D. a kol.: Sprechen Sie Deutsch? Učebnice nemčiny pro zdravotnické odbory. Polyglot, 2004.
Zahradníčková, B.: Textová učebnice němčiny pro studenty farmaceutické fakulty, 1977. Gyorffy, M.: Deutsch fur Mediziner. Triton, 2006.
Soják, K.: Němčina pro vyšší zdravotní školy a bakalářské studium. Eurolex Bohemia Praha, 2004.
Dreyer D., Shmitt R.: Lehr- und Übungsbuch der deutschen Grammatik, Hueber, München, 2001

Languages necessary to complete the course:

German language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Katarína Batková

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/18-Mgr/26	Advanced Cell-Biology Methods

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Mandatory attendance (lectures and laboratories). After successful completion of the laboratory exercises, the subject is finished by an exam in written form.
Scale of assessment (preliminary/final): Evaluation A: 100-93%, B: 92-85%, C: 84-77%, D:76-69%, E: 68-60%.

Learning outcomes:
The subject is designed for students, who want to take part and work independently on scientific projects based on cell culture experiments, as a part of their diploma thesis research. Students will be informed about the safety and sterility of requirements, which are the key factors for cell culture workflow. Students will be taught how to approach and solve common problems in the cell culture media for a certain cell culture, subculture techniques, cell viability assays, cell morphology (inverted microscopes), cell freezing and thawing, follow-up molecular-biological methods.

Class syllabus:
Cell cultures and their benefits, use in the biomedicine studies, practical skills in the cell-culture laboratory, characteristics of different types of cell cultures, stem cells, biology of cell cultures, conditions of cell cultivation (laboratory equipment, sterility requirements), freezing and unfreezing of cells, basic and follow-up procedures using molecular-biological techniques (transfection, overexpression, knockdown, knockout, quantitative Real-Time PCR). Procedures implemented in the solving of usual problems associated with the cultivation of cell cultures, e.g., different types of infections and contaminations. Practical part of the subject is directed to the determination of changes in inflammatory gene expression in the simulated model of inflammation in cell culture.

Recommended literature:
Animal Cell Culture: Essential Methods, edited by John M. Davis, Wiley, 2011. ProQuest Ebook Central, https://ebookcentral.prorequest.com/lib/uniba-ebooks/detail.action?docID=675259

Languages necessary to complete the course:
Slovak language

Notes:

Maximum number of students per course: 1 group

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Ing. Ľudmila Pašková, Dr.rer.nat., PharmDr. Veronika Vyletelová, PhD.

Last change: 25.05.2026

Approved by: Ing. Ľudmila Pašková, Dr.rer.nat.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/20-Mgr/26	Advanced Pharmaceutical Compounding

Educational activities:
Type of activities: practicals
Number of hours:
per week: 1 **per level/semester:** 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of seminars and practical exercises is obligatory. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final oral exam. Assessment: A: 93.00–100.00%, B: 85.00–92.99%, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: 59.99% and less

Learning outcomes:
The course focuses on deeper knowledge of pharmaceutical technology, especially in the field of individually prepared preparations (IPP), which the student acquired in the courses Pharmaceutical Technology 1 and 2. This area is currently getting to the forefront, as individualization of therapy in the form of IPP provides the patient with undeniable benefits and better physician-tailor-made treatment options for the patient. As current practice often requires addressing many of the challenges in the form of formulation and technological problems associated with the nature of drugs or excipients, it is necessary and important to know, how to address them in line with maintaining the efficacy and stability of the formulation. The participation of experts directly from pharmacy practice will keep the topic updated.

Class syllabus:
• Solution design for the preparation of individually prepared preparations supplementing outages in the field of mass-produced drugs.
• Technological problems in the formulation of rectal and vaginal drugs.
• Possibilities of formulation of systemically acting drugs into penetration bases.
• Specifics of the preparation of combined dermal semi-solid drugs.
• individually prepared preparations for pediatric and geriatric patients, the possibility of influencing the sensory properties of the drug or IPP.
• Modern packaging as part of IPP, material properties and their reusability.

Recommended literature:
Sklenář, Z.: Magistraliter receptura v dermatologii, Galén, 2021
European Pharmacopoeia actual edition, Strasbourg: EDQM

Languages necessary to complete the course:
Slovak Language

Notes:
The course is only available: in summer term, if enrolled at least by 5 students, capacity of the course is limited to 40 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Jana Selčanová, PharmDr. Veronika Šimunková, PhD., PharmDr. Daniel Krchňák, DiS

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/14-Mgr/26	Analysis of Substances in Biological System

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Continuous assessment : students prepare a semester work on a given topic.
Final assessment: examination combined with oral defence of the semester work. A minimum of 60% is required to pass the exam. An A rating corresponds to obtaining at least 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The course builds on the basic and advanced knowledge gained in the courses Analytical Chemistry II and New Trends in Analytical Chemistry and is aimed at the practical field of analysis of substances in complex biological systems. The student learns the analytical specifics of biological material, manipulation with biological samples, the process of developing a new analytical method with respect to the analysis of small molecules and biomolecules (natural, chemical, and biological drugs, drug metabolites, biomarkers) in complex biological matrices. Analytical evaluation of the biological system in this regard includes (i) the study of pharmacokinetics, biodistribution, and elimination of the drug, (ii) metabolomics (analysis of selected targeted metabolites and metabolic profiles, non-targeted metabolomics analysis), (iii) proteomics (qualitative and quantitative analysis of short peptides and proteins as potential biomarkers, analysis of large proteins used in pharmaceutical practice in the form of biotherapeutics (monoclonal antibodies)). Such analytical evaluation is essential for studying the mechanisms of drug action in the body, diagnosis of diseases (via known and novel biomarkers), and optimizing a therapy (e.g., by correlating active drug metabolite levels with the patient's condition, i.e., structure-effect relationship). Students also learn the basics of validation of bioanalytical methods according to current guidelines. Laboratory exercises are focused on the use of modern instrumentation techniques (especially selected chromatographic, electromigration, and spectral separation methods) for the analysis of biologically active substances in complex matrices. The knowledge and experience that students will gain after completing the course will be a good basis for successful completion of the thesis, as well as in doctoral studies (PhD.)

Class syllabus:
o Pretreatment of biological samples

o Biological material - characteristics, distribution, correct collection and storage
o Matrix effects and how to prevent them
o Pretreatment of biological samples - basic specifics and selection of a suitable method
o Pre-treatment procedures for isolation and preconcentration of analyte from a complex matrix (homogenization, hydrolysis, filtration, centrifugation, extraction - focusing on their use for small amounts of biological material)
o Deproteinization of biological material
Precipitation and salting out
Membrane techniques
Affinity precipitation
o Specifics of sample pretreatment for analysis of proteomic biomarkers and biotherapeutics
o Validation of the analytical method for bioanalyses.
o Validation parameters of the method with regard to the specifics of validation in biological systems
o Validation protocol for bioanalysis
o Guidelines for bioanalysis
o Enzyme and immunochemical analytical methods
o Enzymes as analytical reagents
o Use of enzymatic methods in diagnostics
o Precipitation immunochemical methods
o Non-precipitation immunochemical methods
o Use of immunochemical methods in diagnostics
o Biosensors
o Characteristics of biosensors
o Classification of biosensors (electrochemical, enzyme, optical, immunoaffinity)
o Biosensors for biomedical research and practice
o Chromatographic separation methods in bioanalysis
o Bioaffinity, immunoaffinity and non-specific affinity chromatography
o Specifics of chromatographic analysis of small molecules in biological samples
o Specifics of chromatographic analysis of biomolecules (proteins, DNA, RNA)
o Multidimensional comprehensive and heart-cut chromatographic procedures for qualitative and quantitative analysis in biological systems
o Electrophoretic separation methods in bioanalysis
o Planar electrophoresis for purification and separation of biomolecules
o Immunochemical methods based on the principle of electrophoresis
o Capillary electromigration methods in the analysis of substances in biological samples
o Multidimensional techniques in bioanalysis
o Microfluidic systems in the analysis of peptides and proteins
o Analytical methods in metabolomics
o analysis of small molecules (metabolites, potential biomarkers) in biological material
o Application of analytical methods in the analysis of peptides and proteins
o Qualitative analysis (analysis of intact proteins, development of proteomic biomarkers, characterization of biotherapeutics)
Quantitative analysis (proteolysis, monitoring of small peptides and proteins as potential biomarkers in biological material, evaluation of biosimilarity in biotherapeutics)

Recommended literature:

• Maráková, K. Analýza látok v biologických systémoch vybrané prednášky a úlohy na cvičenia, Bratislava: Univerzita Komenského, 2021. 160s. (available in the central library's online catalog)

• Mikuš, P., Piešťanský, J., Dokupilová, S.: Kvapalinová chromatografia, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2018. 365s.
• Mikuš, P., Piešťanský, J.: Kapilárna elektroforéza, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, Učebnica pre farmaceutické fakulty a fakulty prírodovedného a technického smeru so zameraním na analytickú chémiu a farmaceutickú chémiu, VEDA, Bratislava, 2014. 312s.
• Tekeľ, J., Mikuš, P.: Vybrané kapitoly z analytickej chémie: Analýza látok v biologických systémoch. UK, Bratislava, 2005.194s.
• Chromý, V., Fischer, J.: Bioanalytika : analytická chemie v laboratórní medicině. Brno : MU, 2002. 267 s.
• Králová, B., Fukal, L., Rauch, P.: Bioanalytické metody. Praha : Vysoká škola chemickotechnologická, 2001. 254 s.
• Mikuš, P., Maráková, K.: Hyphenated electrophoretic techniques in advanced analysis.Bratislava : KARTPRINT, Bratislava, 2012. 217 s. (vedecká monografia)

Languages necessary to complete the course:
slovak and english language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Katarína Maráková, PhD.

Last change: 29.05.2026

Approved by: doc. PharmDr. Katarína Maráková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/01-Mgr/26	Analytical Chemistry (1)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 4 **per level/semester:** 28 / 56
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
Completion of all practical tasks and completion of the assigned task for a sufficient number of points - at least 6 points (60%) out of a possible 10 points (100%).
• verification of the student's readiness for the laboratory exercise carried out in written and oral form at the beginning of each exercise - min. 2 points, max. 4 points (40%)
• fulfillment of the assigned practical task, submitted protocol - max. 6 points (60%)
To successfully complete the exercises in the course, it is necessary to obtain at least 60% of the sum of the maximum number of points from individual exercises. Completion of the exercises is a condition of admission to the final exam.
The final exam is in written form. To pass the exam, it is necessary to obtain at least 60% of possible points. An A rating corresponds to obtaining at least 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
After completing the course the student will gain a solid and sufficiently broad theoretical, methodological basis and practical experimental skills for the detection and identification of inorganic and organic elements based on chemical reactions. The acquired theoretical knowledge and experimental skills will enable the use of gravimetric and titration analytical methods, including the preparation of samples to solve assigned tasks. Chemical analysis of substances, including drugs, pharmaceuticals, nutritional supplements is carried out in accordance with the basic rules and requirements of safety and protection at work. The student will get not only the necessary information about chemical analysis in real conditions of scientific work, but also a demonstration of problem solving and interrelationships within the analyzed systems, which leads to the development of analytical thinking of the student in general.

Class syllabus:
General analytical chemistry
• Analytical chemistry: Principle, its importance in pharmacy, division (purpose, methods, amount of analyzed component).

• Analysis procedure: sample collection and preparation before chemical analysis, (mineralization), analysis protocol.
• Requirements for analytical reactions: sensitivity and selectivity of the analytical reaction, purity of chemical reagents.
Qualitative chemical analysis
• Inorganic analysis
o Group, selective and specific reactions of cations with an emphasis on significant physiological and risky toxic elements.
o Group, selective and specific reactions of anions.
o Analytical protolytic reactions. Buffers in analytical chemistry. Acids and bases in non-aqueous solvents.
o Analytical complexation reactions and their equilibria. Masking of interfering components in the chemical proof of cations and anions. Organic complexing agents
o Analytical precipitation reactions and their equilibria.
o Analytical oxidation-reduction reactions, kinetics. Catalytic and induced reactions.
o Selection of an analytical method and procedure for the analysis of an unknown sample.
• Organic analysis
o Proof and determination of C, H, O, N, S and halogens in organic compounds.
o Classification of organic compounds according to solubility test results as part of organic sample characterization.
o Evidence of functional groups – evidence of hydrocarbons, halogen derivatives, active hydrogen, sulfonic acids.
o Evidence of functional groups – evidence of alcohols (primary, secondary, tertiary).
o Proof of functional groups – proof of phenols (monovalent, aminophenols).
o Evidence of functional groups – evidence of aldehydes and ketones, compounds with an active methyl group - methyl ketones.
o Evidence of functional groups – evidence of carboxylic acids, esters, amides, anhydrides.
o Evidence of functional groups – evidence of amines, nitro- and nitroso-compounds.
Quantitative chemical analysis
• Gravimetry
o Introduction to gravimetry - laboratory technique.
o Gravimetric determination of cations and anions.
• Volumetrics
o Introduction to volumetrics - laboratory technique
o Titration curves, equivalence point, indicators, their properties and classification.
o Types of titration – direct, indirect, reverse
o Acid-base determination. Acidimetry, alkalimetry, titrations in a non-aqueous environment
o Complexometric determination. Chelatometry, mercurimetry
o Oxidation-reduction determinations: permanganometry, iodometry, dichromatometry and bromometry
o Precipitation titrations: Argentometry

Recommended literature:

• Pikulíková, A., Dvořáková, E., Riečanská E.: Laboratórne cvičenia z analytickej chémie I. Chemická analýza. Bratislava : UK, 2007. 273 p. (scriptum)
• Křenek, P.: Analýza organických látok. Bratislava : UK, 2007. 80 p. (scriptum)
• Mikuš, P., Mikušová, V.: Chemical Analysis Qualitative and Quantitative. Bratislava : UK, 2011. 133 p. (scriptum)
• Majer, J. a kol.: Analytická chémia pre farmaceutov. Martin : Osveta, 1989, 363 p. (textbook)

Languages necessary to complete the course:
slovak language

Notes:

Past grade distribution
Total number of evaluated students: 3247

A	ABS	B	C	D	E	FX
15,4	0,0	19,03	25,5	19,8	16,57	3,7

Lecturers: RNDr. Svetlana Dokupilová, PhD., Mgr. Michal Hanko, PhD., doc. Ing. Dáša Kružlicová, PhD., PharmDr. Samuel Varényi, PhD., Mgr. Jana Havlíková, doc. PharmDr. Katarína Maráková, PhD., Ing. Ivan Benkovský, PhD., Ing. Peter Bystrický, PhD., Ing. Miroslav Taranda, Ing. Anton Ťažký

Last change: 29.05.2026

Approved by: Mgr. Michal Hanko, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/02-Mgr/26	Analytical Chemistry (2)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 4 **per level/semester:** 28 / 56
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
Obligatory course.
Continuous assessment:
The condition for successfull passing of the practices is to undertake all practical tasks and to reach sufficient points – minimum 60% out of 10 points (100%):
• Evaluation of knowledge includes written and oral testing at the beginning of each practical - max. 4 points (40%),
• the performance of the individually given practical task and a hand-written completed report – max. 6 points (60%).
Practices are successfully passed only if a total score obtained at the end of the semester is at least 60% (max. 10 points for each practical).
Final assessment:
after passing (reached required score) laboratory practices – examination. Examination is performed in written form. It is necessary to reach at least 60% of a total score for successful passing of the examination. An A rating corresponds to obtaining at least 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.
Scale of assessment (preliminary/final): 20 / 80

Learning outcomes:
The teaching of analytical chemistry has a significant influence on the formation of logical ideas and workflows in the characterization of the composition of samples, which the pharmacist may encounter in laboratory practice. In the field of instrumental analysis, the student obtains an overview and basic information about the types of analytical methods and their use, with respect to the studied analyte and matrix. Within the theoretical basis for each method, the emphasis is placed on (i) the principle of the method, (ii) the basic instrumental scheme, (iii) the methods of identification and/or quantification of the analyte, and (iv) the analytical / application potential of the method with its advantages and drawbacks. As part of the development of the analytical method, attention is focused on the optimization of working parameters, preparation and analysis of the sample, collection and statistical processing of data using computer technology, and interpretation of the results.

We base these aspects on the further focus of the pedagogical process so that the graduate gains a sufficient overview of the theoretical basis and possibilities of using instrumental methods in pharmaceutical practice and acquires a creative approach to work - independence and principles of good laboratory practice.

Class syllabus:

• Sampling and sample pretreatment before instrumental analysis
o Basic methods of sample preparation
o Preconcentration of analyte
o Analyte purification
o Analyte derivatization
• Statistical evaluation of the analytical result
o Basic statistical parameters
o General approaches for determination (quantification) in the instrumental analysis (calibration curve, standard addition method)
o The sensitivity of the method, linear dynamic range, the limit of detection, the limit of quantification, accuracy, precision, selectivity, robustness
• Instrumental analytical methods (evaluation of the basic physicochemical parameters of substances)
o Methods for determining
- boiling point, melting point, optical rotation, refractive index, pK, etc.
• Instrumental analytical methods (evaluation of chemical structure, identity, and quantity)
o Electrochemical methods, basic division, principles, and parameters
- Instrumental arrangement of electrochemical methods
- Potentiometry, potentiometric titrations
- Amperometry
- Polarography and voltammetry
- Titrations with polarizable electrodes
- Electrogravimetry
- Coulometry
- Conductimetry
o Spectral methods, basic division, principles, and parameters
- Optical spectral methods, basic concepts, and division
- Atomic spectral analytical methods: Atomic absorption spectral analysis, atomic emission analysis, flame photometry, X-ray fluorescence spectrometry
- Molecular spectral methods: Molecular absorption spectrometry, fluorescence spectrometry, UV-VIS, infrared spectrometry, Raman spectrometry, nuclear magnetic resonance, mass spectrometry
o Optical methods non-spectral, basic division, principles, and parameters
- Refractometry, polarimetry, light scattering photometry, nephelometry, turbidimetry
o Diffraction methods, basic division, principles, and parameters
- Crystallography, X-ray diffraction
o Nuclear analytical methods, basic division, principles, and parameters
- Identification of β and γ radiation, types of detectors
- Nuclear analytical indicator methods, methods based on natural radioactivity, activation analysis, non-activation interaction analysis, radionuclide X-ray fluorescence analysis
o Separation methods, basic division, principles, and parameters
- Filtration, extraction, distillation, dialysis in analytical chemistry
- Chromatography, planar and column chromatography, gas chromatography, high-performance liquid chromatography, supercritical fluid chromatography, stationary phases and chromatographic

modes (reverse-phase, normal-phase, ion exchange, affinity, chiral, HILIC, mixed-mode, size-exclusion), mobile phases and elution regimes (isocratic and gradient)
- Electromigration methods, electromigration techniques in the planar and capillary arrangement, capillary zone electrophoresis, capillary isotachophoresis, isoelectric focusing, capillary gel electrophoresis, electrokinetic chromatography, capillary electrochromatography, (chiral) selectors and (chiral) (pseudo)stationary phases
o Application of analytical methods to identify and determine substances in pharmacy

Recommended literature:

• Pikulíková, A., Dvořáková, E., Riečanská E.: Laboratórne cvičenia z analytickej chémie I. Chemická analýza. Bratislava : UK, 2007. 273 p.
• Křenek, P.: Analýza organických látok. Bratislava : UK, 2007. 80 p.
• Havránek, E. a kol.: Laboratórne cvičenia z analytickej chémie III. Fyzikálno-chemické metódy. Bratislava : UK, 2007. 91 p.
• Labuda, J. a kol, Analytická chémia, Bratislava, STU v Bratislave, 2019, 682 p.
• Mikuš, P., Piešťanský, J.: Kapilárna elektroforéza, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, 2014. 310 p.
• Mikuš, P., Piešťanský, J., Dokupilová, S.: Kvapalinová chromatografia, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2018. 365 p.
• Světlík, J.: Molekulová spektroskopia a optické metódy. Bratislava : UK, 2006. 81 p.
• Garaj, J., Bustin, D., Hladký, Z.: Analytická chémia. Bratislava, Alfa 1989. 740 p.
• Mikuš, P., Mikušová, V.: Analytical Chemistry: Chemical Analysis. Bratislava : VEDA SAV, 2022. 190 p.

Languages necessary to complete the course:
slovak

Notes:

Past grade distribution
Total number of evaluated students: 3191

A	ABS	B	C	D	E	FX
9,46	0,0	14,76	21,34	21,72	26,14	6,58

Lecturers: RNDr. Svetlana Dokupilová, PhD., doc. Ing. Dáša Kružlicová, PhD., Ing. Ivan Benkovský, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, doc. PharmDr. Katarína Maráková, PhD., PharmDr. Samuel Varényi, PhD., Ing. Anton Ťažký, Ing. Peter Bystrický, PhD., RNDr. Jozef Motyčka, PhD., Ing. Miroslav Taranda

Last change: 29.05.2026

Approved by: RNDr. Svetlana Dokupilová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/16-Mgr/26	Analytical monitoring of drug levels in practice

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Obligatory subject. The condition for recognition of laboratory practice is the completion of all practical tasks with a sufficient number of points - at least 60%. The elaborated protocol from the exercise is evaluated. To successfully complete the exercises from the subject, it is necessary to obtain at least 60% of the sum of points from individual exercises, while an unrecognized exercise is evaluated 0%.
The exam will take place in writing - by test. To pass the exam, you must obtain at least 60% of the possible points. The final grade is the arithmetic average of the score from the exercises and exams, the minimum value is 60%. An A rating corresponds to obtaining at least 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
Reliable identification and quantification of drugs in biological systems are essential steps to understand the mechanisms of their action in a living organism. Drug concentration levels are an important indicator of the therapeutic process at the molecular level, usable in optimizing the treatment management of individual patients.
Therapeutic drug monitoring (TDM) is recommended and performed for (i) drugs with a narrow therapeutic range, (ii) drugs with a well-defined relationship between drug concentration and effect (therapeutic or toxic), (iii) drugs with large inter- or intra-individual differences in drug distribution or clearance. Integral components of TDM are (I) collection and processing of biological material, (II) development, validation and application of analytical methods, and (III) processing and interpretation of analysis results. Interpretation of TDM results requires adequate knowledge of the pharmacokinetics and pharmacodynamics of the monitored drugs and their association with the patient's clinical data. Thus, for the successful implementation of TDM in clinical practice, it is necessary to combine theoretical knowledge and practical aspects of methods of clinical analysis and clinical pharmacology. In a broader context, monitoring of biologically active substance levels is also carried out in the areas of disease diagnosis, toxicology, doping control, forensic analysis and other practical areas. In screening endogenous and exogenous substances in biological systems, emphasis is placed on basic methodological and practical aspects of metabolomics, lipidomics,

genomics/transcriptomics, and proteomics. The graduate of the course will gain knowledge related to the development and application of analytical methods and procedures usable in solving the tasks of the above areas of pharmaceutical practice.

Class syllabus:

Introduction to TDM
o Clarification of the concept of "therapeutic drug monitoring"
o The importance of TDM in clinical practice (current state of the art)
o Analytical aspects in TDM
o Pharmacological aspects in TDM
Groups of therapeutically monitored drugs
o Drugs with a narrow therapeutic range
o Drugs with a well-defined relationship between drug concentration and effect (therapeutic, or toxic)
o Drugs with large inter- or intra-individual differences in drug distribution or clearance
o Division of drug groups (according to effect)
* Antibiotics with nephrotoxic and ototoxic effects (aminoglycosides amikacin, gentamicin, netilmicin, tobramycin, polypeptide antibiotic vancomycin)
* Cardiovascular drugs (cardioglycosides: digoxin, antidysrhythmics: quinidine)
* Antiepileptic drugs (carbamazepine, ethosuximide, phenobarbital, phenytoin, primidone, valproic acid)
* Tricyclic antidepressants (amitriptyline, imipramine, clomipramine)
* Antiasthmatics (theophylline)
* Immunosuppressants (cyclosporine A, tacrolimus, azathioprine, 6-mercaptopurine, 6-thioguanine)
* Cytostatics (methotrexate)
# Monitoring of biologically active substances in the preclinical phase
o New molecules as potential drugs
o In vitro and in vivo tests
o ADME-TOX screening
o Animal models
o Statistical data analysis
Medical laboratories in the TDM process
o Laboratory accreditation and its importance
o Legislation in the field of accreditation
o Quality management, validation
o Good laboratory practice
Interpretation of TDM results
o Interpretation of serum drug concentrations in the context of all clinical data (related areas: pharmacokinetics and pharmacodynamics of drugs)
o Factors affecting drug concentrations
o Practical aspects of interpretation
o Use of therapeutic drug monitoring data
* Optimization of therapy (dosage adjustment, efficiency of therapy, limitation of toxicity risk) – pharmacokinetic software and calculators
* Patient compliance
* Reduction of treatment costs
# Analytical aspects of genomics and transcriptomics
o DNA/RNA analysis – sequence, variants, expression, isoforms, epigenetic marks
o Targeted and untargeted analysis – panels/WES/WGS

o Sample collection and preparation – blood/plasma (cfDNA/cfRNA), tissues (fresh/FFPE); stabilization, extraction, QC (RIN/DIN, A260/280)
o Analytical techniques – qPCR/dPCR, NGS (short/long reads), DNA bioarrays, RNA-seq, CE, blotting
o Method validation
o Practical analytical aspects – liquid biopsy/MRD, pharmacogenomics, pathogen detection, prenatal screening
Analytical aspects of proteomics
o Protein/peptide analysis – sequence, PTM, conformation, complexes
o Targeted and untargeted analysis
o Sample collection and preparation – plasma, serum, CSF, urine, saliva, tissues; denaturation, purification, fractionation (SCX, HILIC…)
o Analytical techniques – LC (SEC, IEC), LC MS, MALDI TOF, electrophoresis (SDS-PAGE, IEF), CE MS, immunoassays, , NMR, CD, X-ray crystallography; top down, bottom up, middle up approaches
o Method validation
o Practical analytical aspects – TDM (biologics), protein biomarkers
Analytical aspects of metabolomics
o Small molecule analysis – endogenous substances, drugs, metabolites
o Targeted and untargeted analysis – quantification of known substances vs. discovery of unknown substances
o Sample collection and preparation – plasma/serum, urine, CSF, saliva, DBS, tissues, stool; quenching, protein precipitation, LLE/SPE, derivatization (GC)
o Analytical techniques – LC MS (RP/HILIC), GC MS, CE MS, NMR, ion mobility
o Method validation
o Practical analytical aspects – TDM (small molecules), PK/PD studies, disease biomarkers, toxicology
Analytical aspects of lipidomics
o Lipid analysis – glycerophospholipids, sphingolipids, glycerolipids, sterols, fatty acids; lipid mediators (eicosanoids)
o Targeted and untargeted analysis – mediator panels vs. global lipid profiling
o Sample collection and preparation – plasma/serum, DBS, tissues; antioxidants, extraction; class-specific internal standards
o Analytical techniques – LC MS, direct MS (“shotgun”), GC MS, ion mobility – isomer resolution
o Method validation
o Practical analytical aspects – risk of cardiovascular events (ceramide score), inflammatory mediators, liver diseases, neurodegeneration
Antidoping, toxicology and forensic analysis
o Monitoring concentrations of biologically active substances for toxicological, doping and forensic analysis
o Toxic and prohibited substances (doping, narcotics and psychotropic substances, poisoning) and drugs applied without a doctor’s consent (self-medication)
* Commercial drugs (e.g. β2-agonists)
* Experimental drugs (e.g. SARMs)
# Application areas – solved examples and case studies
o TDM of monoclonal antibodies and thiopurines in optimizing the therapy of patients with non-specific inflammatory bowel diseases
o TDM of antiepileptics in optimizing the therapy of patients with epilepsy
o TDM of antibiotics in optimizing the efficacy and safety of antibiotic treatment

o Monitoring the concentrations of prohibited substances (clenbuterol, SARMs) in connection with doping control

Recommended literature:

• Mikuš, P., Piešťanský, J., Dokupilová, S.: Kvapalinová chromatografia, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2018. 365s.
• Mikuš, P., Piešťanský, J.: Kapilárna elektroforéza, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, 2014. 310 s.
• Mikuš, P., Maráková, K.: HYPHENATED ELECTROPHORETIC TECHNIQUES IN ADVANCED ANALYSIS, Bratislava, KARTPRINT, 2012. 217 s.
• Tekeľ, J., Mikuš , P.: Vybrané kapitoly z analytickej chémie. Analýza látok v biologických systémoch. Bratislava : UK, 2004, 192 s.
• Mikuš, P., Hanko, M., Piešťanský, J., Maráková, K., Dokupilová, S., Mikulová, M.: Analytical chemistry: Instrumental analysis. Bratislava : VEDA, is being prepared.
• Havránek, E. a kol.: Laboratórne cvičenia z analytickej chémie III. Fyzikálno-chemické metódy. Bratislava : UK, 2007. 91 s.
• Světlík, J.: Molekulová spektroskopia a optické metódy. Bratislava : UK, 2006. 81 s.
• Labuda, J. a kol, Analytická chémia, Bratislava, STU v Bratislave, 2019, 682 s.
• Magulová, L.: Metodický list racionálnej farmakoterapie 15./16., Terapeutické monitorovanie hladín liečiv, Ročník 5, Číslo 1-2, 2001. (and the literature cited therein)
• Scientific publications registered in the Web of Science database: keywords: Mikus (author), Comenius (Address), amino acids, biogenic amines, thiopurines (Topic)

Languages necessary to complete the course:
slovak language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Gabriel Dóka, PhD., PharmDr. Mária Göböová, PhD., PharmDr. Andrej Kováč, PhD., PharmDr. Kristián Slíž, PhD., Mgr. Michal Hanko, PhD., Ing. Peter Bystrický, PhD., PharmDr. Zuzana Kiliánová, PhD., Mgr. Jana Havlíková

Last change: 29.05.2026

Approved by: prof. RNDr. Peter Mikuš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/01-Mgr/24	Anatomy and Physiology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 3 **per level/semester:** 28 / 42
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
Mandatory 100% participation in laboratory exercises and lectures and sufficiently demonstrated readiness for practical exercises. Students' readiness for the exercises is continuously verified by tests (written, oral). Excused absence from exercises (max. 2x) is replaced by: a) substitution; b) by preparing a written work; c) written or oral examination. During the semester, students take 2 interim assessment tests (pre-tests), whose writing on at least 60% of each test conditions the possibility to participate in the final exam. The final exam test is completed by students in computer by written form (distant) of examination. To pass the final exam test by students in minimally 60% rate. Evaluation (mark and score): A 92-100%, B 84-91%, C 76-83%, D 68-75%, E 60-67%, FX < 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the course, the student will gain a comprehensive idea of the organization and activities of the human body. He will learn essential knowledge of the anatomy of the human body, its spatial organization, composition and structure of individual systems and organs, they will get acquainted with the structure of tissues and their components. The student will be able to characterize the basic anatomical and functional units, learn the functions of tissues, organs, individual systems. The focus of teaching is neurohumoral regulation and signaling at the level of the cell and subcellular structures, regulatory, coordination and integration relationships between individual functional systems and the function of the organism as a whole. A necessary condition of the study is the verification of theoretical knowledge gained in lectures at practical exercises. The course is essential for the study of pharmacy and biologically-medically oriented subjects.

Class syllabus:
Introduction to Anatomy and Physiology. Body systems. Structural characteristics of the organs and tissue. Epithelial, connective tissues. Bones, skelet. Muscular system. Types of muscle tissue. Excitation-Contraction Coupling (ECC). Mechanism of contraction. Nervous system - orgainization, structure, function. Physiology of Nerve. Central nervous system. Peripheral nervous system-/ somatic, autonomic. Somatic, visceral reflex arc.

Special Senses. Physiology of vision, hearing, equilibrium and orientation.Endocrine System. Organization and feedback system. Hormones. Glands and their hormones.Organization of cardiovascular system. Structure, function and factors affecting heart, vessels, circulation. ECG. Autonomic regulation of vascular lumen diameter. Blood pressure. Blood composition, plasma, elements and their role in the body. Blood clotting. Lymphatic system. Respiratory System. Respiratory Tract, Mechanics of Breathing, Gas Transport, Neurochemical Control of Breathing. Digestive System. Anatomy and Function of the Organs. Basic functional units. Enterohepatic circulation. Secretory function of stomach, liver, pancreas, intestine. Physiology of digestion. Nutrition. Regulation of Body Temperature. Urinary System. Anatomy and Functions of the Kidneys, Accesory Excretory Structures, Urine. Countercurrent multipier. Mechanism of micturition. Acid-Base Balance. Body Fluids. Anatomy and Physiology of Reproductive System. Male and Female Reproductive Organs, hormones, mestrual cycle, pregnancy
Exercise topics are focused on the anatomical structure of the body, musculoskeletal system, tissue histology and practical tasks determining selected physiological functions of individual systems: nerve cell physiology, reflexes, muscle physiology, blood examination, ECG recording, blood pressure measurement, urine examination, blood examination, determination blood glucose, cholesterol, functional lung examination, determination of body weight and composition, food composition, sensory examination.
Teaching includes self-study of educational videos, assigned problems and independent student work.

Recommended literature:

JAVORKA, Kamil, 2014. Lekárska fyziológia. 4., prepracované a doplnené vyd. Martin: Osveta. ISBN 978-80-8063-407-0.
TROJAN, Stanislav, 2003. Lékařská fyziologie. 4. přepracované a doplněné. Praha: Grada Publishing. ISBN 80-247-0512-5.
STANKOVICOVA, Tatiana, 2019. Anatómia a fyziológia: teoretické a praktické návody na cvičenia pre farmaceutov [online]. 2. Bratislava: Univerzita Komenského v Bratislave. ISBN 978-80-223-4696-2. Dostupné na: http://www.fpharm.uniba.sk/fileadmin/faf/Pracoviska-ubory/KFT/Anat_fyz/fyziologia_skripta_web.pdf
SILBERNAGL, S. a A. DESPOPOULOS, 2004. Atlas fyziologie člověka. 6. Praha: Grada Publishing. ISBN 80-247-0630-X.
KITTNAR, Otomar, 2011. Lékařská fyziologie. 1. Praha: Grada Publishing. ISBN 978-80-247-3068-4.
BÉDER, Igor, 2005. Fyziológia človeka: učebnica pre bakalárske a magisterské štúdium v medicíne. Bratislava: Univerzita Komenského v Bratislave. ISBN 80-223-2028-5.
MERKUNOVÁ, Alena a Miroslav OREL, 2008. Anatomie a fyziologie člověka. 1. vyd. Praha: Grada Publishing. ISBN 978-80-247-1521-6.
MELLOVÁ, Yvetta, Gabriela HEŠKOVÁ a Desanka VÝBOHOVÁ, 2011. Anatómia človeka pre nelekárske študijné programy. 1. vyd. Martin: Osveta. ISBN 978-80-8063-335-6.
ČALKOVSKÁ, Andrea, 2014. Fyziológia človeka pre nelekárské študijné odbory. 1. vyd. Martin: Osveta. ISBN 978-80-8063-344-8.
KOSÍROVÁ Stanislava a kol., 2023. Vybrané otázky ku skúške z Anatómie a fyziológie pre študentov farmácie. 1. vyd. Bratislava: Univerzita Komenského v Bratislave
Podklady prednášok a cvičení v systéme Moodle

Languages necessary to complete the course:

Slovak

Notes:

Past grade distribution
Total number of evaluated students: 223

A	ABS	B	C	D	E	FX
0,9	0,0	12,56	21,08	16,59	26,46	22,42

Lecturers: Mgr. Ondrej Sprušanský, PhD., doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., PharmDr. Katarína Hadová, PhD., PharmDr. Csaba Horváth, PhD., PharmDr. Attila Kulcsár, PhD., doc. PharmDr. Tomáš Rajtík, PhD., PharmDr. Nikola Chomaničová, PhD., Mgr. Kristína Ferenczyová, PhD., Mgr. Barbora Kaločayová, PhD., PharmDr. Dominika Dingová, PhD., Mgr. Linda Bartošová, PhD., Mgr. Izabela Jarabicová, PhD.

Last change: 12.09.2024

Approved by: doc. PharmDr. Stanislava Kosírová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/13-Mgr/25	Applied Biochemistry

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Termination of course: Written examination.
Preliminary conditions: The requirement for completing a practical course is to fulfil all prescribed experimental assignments and successfully pass the preliminary semestral pre-tests. Students have to obtain at least 60% from the sum of maximal points of pre-tests. After successful completion of practical exercises, the course is completed by a written exam.
Scale of assessment (preliminary/final): Pre-tests evaluation - achievement of at least 60 % from the sum of maximal points of pre-tests.Written exam. Evaluation A corresponds to obtaining min. 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.

Learning outcomes:
Students obtain information about the aetiology of diseases and mechanisms of biochemical processes associated with their pathology. The specific emphasis is put on the current possibilities of therapeutic approaches based on the application of biologics (biological treatment). In addition to knowledge related to changes in biochemical processes in various diseases, the subject is also focused on the use of clinical-biochemical knowledge in the diagnosis of diseases. It provides an overview of the processing and preparation of biological material, basic reference parameters, methodologies for their determination, while also focusing on the interpretation of laboratory results of selected case reports within the framework of the overall assessment of the patient's condition. The mentioned areas of Applied Biochemistry are implemented into practical courses realized within the subject.

Class syllabus:
Course Description:
- Fundamentals of clinical biochemistry. Procedures for preparation and adjustment of analyzed samples. Principles of selected clinical-biochemical methods.
- Clinical enzymology, laboratory diagnostics. Importance of enzyme preparations in the diagnosis and therapy of diseases.
- Disorders of glucose and glycogen metabolism, biochemical presentation of diabetes mellitus.
- Lipid metabolism disorders. Lipoproteins: lipid transport forms, regulation of cholesterol metabolism, dyslipoproteinemias, disorders of sphingolipid metabolism

- Disorders connected to specific metabolic processes of carbohydrates, lipids, and proteins in the liver. Formation of ketone bodies and their relationship to various pathological conditions.
- Proteins and amino acid absorption disorders, proteolytic enzymes, innate amino acid metabolism disorders.
- Disorders of synthesis and degradation of purine and pyrimidine nucleotides.
- Disorders of heme and bilirubin metabolism, porphyria and hemoglobinopathy.
- Disorders of hormonal regulation.
- Acidobasic balance, mineral metabolism.
- Biochemical fundamentals of tumour process, specific markers of cancer diseases.
- Biochemical principles of the inflammatory response of the organism, enzymes, and mediators of the inflammatory process.
- Use of clinical-biochemical knowledge in disease diagnostics, overview of basic reference parameters, their practical application.
- Case reports of diseases, interpretation of results.

Recommended literature:

Balažová A., Obložinský M.: Vybrané kapitoly z patobiochémie. Bratislava:UK, 2019. http://stella.uniba.sk/texty/AB_MO-kpt-patobiochemia.pdf
Bezáková L. a kol.: Praktické cvičenia z patobiochémie a molekulárnej biológie. Bratislava: UK, 2010.
Dobrota D. a kol.: Lekárska biochémia. Vydavateľstvo Osveta s.r.o. Martin, 2016, 2. vydanie.
Ďurovcová E. a kol.: Klinická biochémia (vybrané kapitoly), Vydavateľstvo Osveta s.r.o. Martin, 2020, 1. vydanie

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 128

A	ABS	B	C	D	E	FX
11,72	0,0	12,5	23,44	20,31	26,56	5,47

Lecturers: PharmDr. Andrea Balažová, PhD., doc. PharmDr. Marek Obložinský, PhD., RNDr. František Bilka, PhD., Mgr. Ivana Holková, PhD., PharmDr. Renáta Kubíková, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., PharmDr. Ema Balažová, PharmDr. Veronika Vyletelová, PhD., PharmDr. Barbora Hans, PhD.

Last change: 31.03.2025

Approved by: doc. PharmDr. Marek Obložinský, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/22-Mgr/26	Basics of Regulatory Pharmacy

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Phartmacology (1), Social Pharmacy and Pharmacoeconomics

Course requirements:
Mandatory 80% attendance at lectures and seminar work, in particular cases a written test.
Scale of assessment (preliminary/final): Ongoing 0 / final 100

Learning outcomes:
By passing this course, student is acquiring basic knowledge from field of regulation of medicinal products, mainly of evaluation of non-clinical and clinical documentation in the process of registration of medicinal products, regulation of safety of medicinal product, evaluation of efficacy of medicinal products and basic knowledge concerning regulatory aspects and procedures in medicines agencies (SIDC, EMA) and regulatory principles in non-clinical testing and clinical trials. During classes, one solves case studies with experts from practice.

Class syllabus:
- history of regulation of medicinal products in context of increased need for safety and efficacy demonstration - principles of regulation of medicinal products, basic characteristics of medicinal products – quality, efficacy, safety - need for good manufacturing practice, good clinical practice, good laboratory practice from regulatory point of view – effects on non-clinical and clinical testing -integration of regulatory pharmacy into pre- and post-marketing, planning and overview of product strategy, transfer of information to interested parties - regulatory and practical aspects of non-clinical and clinical testing - re-evaluation, referrals in the EU, issues concerning confidentiality and transparency in regulatory processes – consistence of decisions and application of state of the art knowledge - orphan medicinal products, paediatric data, advanced therapies, biosimilars, generics – non-clinical and clinical aspects - over-the-counter vs. prescription-only medicines, legal status of medicinal products, evaluation of legal status - regulation and evaluation of medical devices - regulatory aspects of medicinal product´s documentation - off-label use and misuse from the regulatory point of view - regulatory aspects of pharmacovigilance, evaluation of adverse events and safety of medicinal products - evaluation of risk-benefit ratio in medicinal product´s regulation

Recommended literature:

Klimas J a kol: Basics of Regulatory Pharmacy, Univerzita Komenského v Bratislave, 2014
Guidelines of European medicines agency, see http://www.ema.europa.eu/ema/

Languages necessary to complete the course:
Slovak, English

Notes:
maximum number of students: 20, in case of higher interest - selection will be made based on: grade average (years 1-3), average from subjects Pharmacology and Social pharmacy and pharmacoeconomics, motivation letter, certificate (exam) proving knowledge of english language

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Ján Klimas, PhD., MPH

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/03-Mgr/25	Biochemistry

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 3 / 4 **per level/semester:** 42 / 56
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
The conditions for the recognition of practical exercises is:
1) a 100% attendace at the laboratory practices,
2) written protocols from each exercise,
3) obtaining at least 60% of the mathematical sum of the points of all semestral tests.
If a student fails to reach the requirement (point 3), student is entitled to one reparative test (with a minimum yeald of at least 60%). If the student fails to fulfil the minimum 60% score requirement, the teacher will give the student a grade of Fx, which will not allow the student to participate in the exam. The examination will be conducted by attendance and will consist of a written and an oral part. The student must score at least 60% on each part of the exam. If the student does not obtain 60% on the written part of the exam, student cannot take the oral part. In the case of a grade of Fx, the student will retake both the written and oral parts of the examination. The final grade A corresponds to obtaining at least 92% of the maximum number of points, B - 84%, C - 76%, D - 68%, E - 60%, Fx less than 60%.
Scale of assessment (preliminary/final): Both parts of the exam participate to the same extent on the exam evaluation: Final grade A corresponds to obtaining min. 92% of the maximum number of points; B - 84%, C - 76%, D - 68%, E - 60%, FX less than 60%.

Learning outcomes:
After completing biochemistry courses, the students should manage the basic biochemical analysis including enzyme kinetic on cell and molecular level. Moreover, should have good knowledge about basic metabolic pathways, their enzyme equipment and subcellular location. The student should know the basics of the mechanism of metabolic regulation as well as about some important signalling molecules and enzymes that can be involved in the mechanism of drug effect.

Class syllabus:
1) The dynamic idea of the properties and functions of a biological system.
2) Protein structures and functions - translation, posttranscriptional and posttranslational modifications, higher structures of proteins and their biological properties.
3) Enzymology - kinetics, inhibition, regulation. Coenzymes.

4) Energy - biological membranes, respiratory chain, proton gradient and energy generation, biological oxidations, Krebs cycle.
5) Nutrient metabolism - catabolism and anabolism - carbohydrates (glycolysis, gluconeogenesis, phosphopentose cycle, glycogen metabolism), lipids (beta-oxidation, fatty acid synthesis, mobilization and formation of storage lipids), amino acids (formation, degradation, ureogenetic cycle), proteins.
6) Hormone biochemistry - relation to regulation of metabolic pathways.
7) Metabolism of nucleotides and nucleic acids.
8) Basic issues of xenobiochemistry and its´ attributes.
9) Integration of metabolism - regulatory modes in nutrient metabolism.
10) Plant biochemistry - photosynthesis, glyoxylate cycle, nitrogen metabolism, enzymology of secondary metabolites.
11) Use of biochemical knowledge in pharmaceutical practice.

Recommended literature:

Dobrota D. a kol.: Lekárska biochémia, Osveta, Martin, 2016, 2.vyd.
Lieberman M. A., Ricer R.: Biochemistry, Molecular Biology, and Genetics, Wolters Kluwer, 2020, 7th ed.
Voet D., Voet J.: Biochemistry, John Wiley & Sons, USA, 2004, 3rd ed.
Pelley J.: Biochemistry, Mosby Elsevier, 2007, 1st ed.
Kožurková Mária, Putala Martin: Biochemická terminológia, Univerzita Pavla Jozefa Šafárika v Košiciach, 2012. ISBN 978-80-7097-3-9
Ledvina M. a kol. Biochemie pro studující medicíny I. a II díl. Praha Karolinum 2020. 3. vydanie
Selected chapters will be provided in electronic form.

Languages necessary to complete the course:
Slovak language

Notes:
The biochemistry course in its practical part is focused on two thematic units:
1. Definition, function, properties and meaning of biochemical substrates mainly of saccharides, lipids and proteins.
2. Enzymes: enzyme structures and functions, the principle of catalysis, inhibition, enzyme kinetics
Because of difficulties with biological material it is not possible to replace practical exercises.

Past grade distribution
Total number of evaluated students: 33

A	ABS	B	C	D	E	FX
51,52	0,0	18,18	15,15	6,06	9,09	0,0

Lecturers: RNDr. František Bilka, PhD., doc. PharmDr. Marek Obložinský, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., PharmDr. Andrea Balažová, PhD., Mgr. Ivana Holková, PhD., PharmDr. Renáta Kubíková, PhD., PharmDr. Ema Balažová, PharmDr. Veronika Vyletelová, PhD., PharmDr. Barbora Hans, PhD.

Last change: 25.03.2026

Approved by: RNDr. František Bilka, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/01-Mgr/26	Bioorganic Chemistry

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Jindra Valentová, PhD., Mgr. Lucia Lintnerová, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/27-Mgr/26	Biopharmaceutical technology

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Type, volume, methods and workload of the student - additional information
Lectures: 2 hours / week
Seminars: 3 blocks (4 hours) / semester
On-site learning

Number of credits: 3

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance at lectures and seminars is mandatory. A student may be excused for a maximum of 1 seminar, the content of which will be examined. The student must complete all lectures and seminars, and must submit a properly prepared protocol for each seminar. During the semester, 1 test is written, in which a minimum of 60% must be achieved. Only students who meet the given conditions are admitted to the exam. The subject is concluded with a combined written and oral exam, and to be admitted to the oral exam, a minimum of 60% points must be achieved in the written part. The minimum passing score is 60%. Evaluation:
A = 100 – 95%
B = 94 – 89
C = 80 – 88
D = 71 – 79
E = 60 – 70
Fx < 60

Learning outcomes:
During the lectures, students will become familiar with the current principles of production, formulation and quality control of biopharmaceuticals. Seminars will allow students to gain a comprehensive view on incorporation of biopharmaceuticals into a suitable dosage form for i.v. administration. Students will also gain an insight into new possibilities for formulating biopharmaceuticals for atypical methods of their application. The subject ultimately follows current modern trends in the field of drug development, which has changed rapidly due to the rapid development of innovative technological approaches. The subject comprehensively covers the requirements of the current pharmaceutical industry, but also of current science and research. It focuses in detail on the "down-stream" processes in the technology of biopharmaceuticals, follows the processes of incorporation of biologics into a suitable dosage form, provides an insight into the

possibilities of delivering biologics into the body. Students will become familiar with the factors affecting the stability and immunogenicity of biologics, and the processes of ensuring their quality control.

Class syllabus:

Introduction to biopharmaceutical technology. Biologics – general definitions, position of biologics in the hierarchy of drugs. Dosage forms of biologics. Protein engineering. Modeling, design and simulation of biomolecules. Methods of protein characterization. Crystallography and NMR spectroscopy of proteins. Monoclonal antibodies – production, formulation and characterization of monoclonal antibodies. Comprehensive characterization of monoclonal antibodies – methods applied in the characterization process (identification and quantification methods), critical quality attributes. Glycan characterization – identification and determination of structure, distribution and localization of glycoprotein glycans. Post-translational modifications as critical quality control attributes. Biosimilars, biobetters, ADC conjugates – technology of formulation, application and administration. "Fill & finish" processes in the preparation of biologics. Blood products and drugs prepared from blood plasma. Transfusion drugs. Plasma processing. Quality control of transfusion drugs. Therapeutic aspects. Formulation processes and characterization of blood products and drugs prepared from blood plasma. Interleukins, interferons, antibody fragments, growth factors – formulation processes and characterization. Oligonucleotides – formulation processes and characterization. Vaccines – formulation processes and characterization. Vaccines based on immunogenic peptides. Legislative aspects of biologics – approval processes of biologics, development and production of biologics from the perspective of the pharmaceutical industry.

Recommended literature:

Fusek, M. a kol.: Biologická léčiva. Teoretické základy a klinická praxe. Praha: Grada Publishing. 2012. 224 s.
Tesař, V. a kol.: Biosimilars. Praha: Mladá fronta. 2017. 150 s.
Lill, J.R., Sandoval, W. (eds.): Analytical characterization of biotherapeutics. Hoboken: John Wiley & Sons. 2017. 343 p.
Chen G. (ed.): Characterization of protein therapeutics using mass spectrometry. New York: Springer. 2013. 404 p.
Elkordy A.A.: Formulation of monoclonal antibody therapies. From lab to market. London: Academic Press. 2023. 338 p.
Piešťanský, J., Kováč, A. Pripravované skriptum

Languages necessary to complete the course:

Slovak

Notes:

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Andrej Kováč, PhD., PharmDr. Veronika Šimunková, PhD., PharmDr. Miroslava Špaglová, PhD., doc. RNDr. Miroslava Šupolíková, PhD., PharmDr. Desana Matušová, PhD., doc. PharmDr. Juraj Piešťanský, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/02-Mgr/26	Biophysics

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.II.

Prerequisites: FaF.KFChL/22-Mgr/22 - Physical Chemistry and FaF.KFChL/21-Mgr/21 - Pharmaceutical Physics

Recommended prerequisites:
General biology, Organic chemistry, Mathematics

Course requirements:
Written essay on the selected theme from literature, seminar presentation of the theme and its defense (max. 40 points). Active discussion at seminars, oral examination from lecture topics (max. 20 points).
A total of at least 55 points must be obtained to obtain an A rating, at least 51 points to obtain a B rating, a minimum of 47 points for a C rating, a minimum of 42 points for a D rating and a minimum of 37 points for an E rating. Scale of assessment (preliminary/final): Seminar work and exam interview: a maximum of 60 points
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The aim of the subject is to provide pharmacists with knowledge of physical processes that take place on the level of tissues, cells and molecules at physiological and pathological conditions. The importance of pharmaceutical view is emphasized in each of the studied problems. Students will be able to understand basic topics of molecular biophysics, to study selected themes from literature, to elaborate a written work about it and to present a lecture.

Class syllabus:
Selected lectures from molecular biophysics will be delivered either by experts from the Faculty or invited from other institutes: Introduction to Biophysics. Membrane biophysics, lipid bilayers, lipid rafts. Polymorphic behavior of lipids. Lipids as drug delivery systems in various applications. Biological membrane and anesthesia, solitons. Membrane channels – general introduction, specification, methods of study. Methods of isolation and detection of voltage dependent ion channels. Biophysics and pharmacology of voltage dependent channels. Hereditary diseases caused by mutation of membrane's channels. Dendrimers in drug delivery. Computational drug design.
The lectured topics are discussed in seminars. The students discuss their own selected scientific problem and related literature for the essay and its presentation.

Recommended literature:

Uhríková, D. a kol.: Biofyzika – Vybrané kapitoly. Bratislava: UK, 2015. 239 s.
Holan, J. a kol.: Biofyzika pre lekárov. Martin: Osveta, 1982. 741 s.
Prosser, V. a kol.: Experimentální metody biofyziky. Praha: Academia, 1989. 716 s.
Staničová, J.: Biofyzika. Košice: Príroda, 1990. 231 s.
Hlinková, E.: Biofyzika. Bratislava: UK, 1991. 192 s.
Ottová-Leitmannová, A.: Základy biofyziky. Bratislava: Alfa, 1993. 384 s.
Chorvát D.: Biofyzika. Bratislava: UK, 1998. 200 s.
Dunca, J., Hanzelík, F., Hlaváčová, Z., Hlozák, K.: Biofyzika. Nitra: SPU, 1999. 222 s.
Kodíček, M., Karpenko, V.: Biofysikální chemie. Praha: Academia, 2000. 337 s.
Ďoubal, S., Horáčková, I.: Biofyzika pro farmaceuty. Praha: Karolinum, 2000
Hrazdira, I., Mornstein, V., Škorpíková, J.: Základy biofyziky. Brno: Neptun, 2006. 312 s.
Kukurová, E., Kráľová, E.: Lekárska fyzika a biofyzika. Bratislava: UK, 2006. 263 s.
Šajter, V., Turecký, L., Kadlečík, R. Boruta, P.: Biofyzika, biochémia a rádiológia. Martin: Osveta, 2006. 271 s.
Ďoubal, S.: Vybrané kapitoly z biofyziky. Hradec Králové: FaF UK, 2006.
Jancura, D., Fabriciová, G.: Molekulová biofyzika. Košice: PriF UPJŠ, 2009. 236 s.
Lacinová, Ľ., Uhríková, D.: Biofyzika napäťovo závislých iónových kanálov. Bratislava: UK, 2010. 62 s.
Rosina, J., Vránová, J., Kolářová, H., Stanek, J.: Biofyzika. Praha: Grada, 2013. 224 s.
Kol. autorov: Funkcie biologických membrán v bunkách živočíchov, Bratislava, 2006, skriptá k druhému bloku prednášok projektu ESF "Biomembrány"
Kol. autorov: Biofyzikálne experimentálne metódy, Bratislava, 2008, skriptá k druhému bloku prednášok projektu ESF "Biomembrány"

Languages necessary to complete the course:
Slovak

Notes:
The number of enrolled students for the subject is ranged between 5 – 30 (min – max).

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. RNDr. Daniela Uhríková, CSc., Mgr. Mária Klacsová, PhD., Mgr. Norbert Kučerka, DrSc.

Last change: 27.05.2026

Approved by: prof. RNDr. Daniela Uhríková, CSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/01-Mgr/26	Biostatistics for Pharmacists

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
The final evaluation consists of continuous evaluation at seminars (0-10 points), evaluation of the final written project (0-24 points) and evaluation of the presentation (0-16 points) as a sum of points: A 45-50 points, B 40-44 points, C 36-39 points, D 33-35 points, E 30-32 points.

Learning outcomes:
After completing the course, the student will be familiar with methods of applied statistics in drug development and research, drug control and analysis, manufacturing processes and outputs, methods applied in epidemiology and drug policy, and finally in applied statistical procedures of economic management of pharmacies and drug distribution.

Class syllabus:
1. Methodological basics of statistical survey: research question, research hypothesis, population, sample, selection methods, quantitative and qualitative research, types of studies, observation, experiment, meta-analysis, research file design, sample size, randomization procedures, factors, intervention, intervention effect , cross effect, effect size, background, suppressor, confounder, noise, main research result, supporting information, research protocol, phases of statistical survey (plan, data collection, quality assurance procedures, statistical analysis, interpretation)
2. Data preparation for statistical analysis: object and subject of the research, character, random variable, types and distribution of random variables, parameter, external and internal sources of variability, uncertainty and error, probability and its models, variable transformation, standardization of random variable, blinding methods , Latin square, data quality control and assurance (gross errors, incomplete, missing and remote data, transformation, encryption, coding), replicas, parallel measurements, sorting, filtering, stratification
3. Procedures for selection of processing methods: target population, research sample, sample design, prospective and retrospective studies, intervention, exposed and control sample, randomization, crossover plan, longitudinal study, blinding, instrumental and questionnaire research, reliability, validity, sensitivity and robustness of the questionnaire, Likert scale, scoring, signal, noise, distortion, standardized questionnaire, questionnaire validation methods, reliability measurement, data-information-knowledge transformation, character, character value, variable independence, descriptor, predictor, regressor

4. Descriptive statistics: cardinal, ordinal and nominal variables, scale, interval and categorical variables, size measures, arithmetic, geometric and hypergeometric mean, statistical weight, mode, median, variability rates, variation range, mean deviation, variance and standard deviation, coefficient of variation, shape measures, distribution symmetry, distribution concentration, frequency analysis, information content and its reduction
5. Univariate sample analysis: sampling types, point and interval estimation, parametric tests, null hypothesis, significance level, effect size, first and second type errors, false positivity and negativity, statistical significance, clinical and biological significance, mean value hypothesis tests and variance, agreement of the agreement of two means and variance, decomposition of variability into components, analysis of variance, balanced experiment, fixed, random and mixed effects and models, one-factor analysis of variance
6. Measures of association: countable random variable, transformation of measurable variables into countable, exposure and effect as quality, frequency analysis of qualitative traits, chance and risk, absolute and relative risk, risk ratio and chance ratio, frequency interval estimation, interval estimation OR and RR , contingency table, independence, tables 2x2, Fisher-Freeman exact test, Pearson goodness-of-fit test, survival curves, Kaplan-Meier survival curve
7. Relative numbers and indices - aggregation, temporal and spatial development, time series, cyclical phenomena, seasonality, trend, chaos, noise, influence of cyclical and random phenomena on processes, predictability
8. Multivariate analysis: correlation and covariance, trends, correlation dependence, simple linear regression, linear modeling, transformation to linear problem, statistical dependence tightness measures, sign tests, rank tests, Kruskallov Walis test, Friedman test for dependent samples, regression diagnostics (linearity, homoskedascite, autocorrelation, residue analysis), multifactor analysis of variance, general linear model, nonlinear regression models with two or more parameters
9. Process evaluation: types of measurement errors, simple and complex uncertainty, propagation and composition of uncertainties, Ishikawa diagram, accuracy, precision, robustness, limit of detection (LOD), limit of quantification (LOQ), outliers, validation, control standard, certified reference material, accredited tests, ROC curve, sensitivity and selectivity, AUC, inter-rater agreement, statistics in pharmacopoeial methods, validation of evaluation processes
10. Statistical software: data import and export, format compatibility, mass data processing, scripts, data mining, statistical software for users from the CU.

Recommended literature:

Fazekaš, T.: Moderná aplikovaná štatistika pre farmaceutov. 1st.edt. Bratislava : UK, 2000. 195 p.
Hanousek, J., Charazma, P.: Moderní metódy spracování dat : matematická statistika pro každého. Praha : Grada, 1992. 216 p.
Meloun, M., Militký, J.: Statistické zpracování experimentálních dat. Praha : Plus, 1994. 839 p.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Tomáš Fazekaš, PhD., RNDr. Alexander Búcsi, PhD.

Last change: 27.05.2026

Approved by: RNDr. Tomáš Fazekaš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/12-Mgr/25	Biotechnology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
During the semester there will be 2 written tests, from each of which it is necessary to obtain at least 60%. The student can have justified max. 1 practical class, the content of which will be tested. The student must submit correctly prepared and evaluated protocols from all completed practical classes. The course is completed by examination made up of two equal parts - written and oral. Grade A corresponds to obtaining min. 92% of the maximum number of points; B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.

Learning outcomes:
On completion of the lectures, the student will have acquired knowledge of the possibilities of producing drugs using biotechnological processes based on the manipulation of nucleic acids. He/she will be familiar with recombinant DNA technology and the molecular aspects of bioprocessing. The student will be familiar with different types of cloning and expression vectors and their use in the production of specific biopharmaceuticals (e.g., r-hormones, r-cytokines, r-vaccines, r-enzymes, and r-monoclonal antibodies). The student will be introduced to the latest therapeutic trends and the molecular nature of gene therapy, therapeutic cloning, and the use of stem cells. The student will master the basics of working in a molecular biology/biotechnology laboratory, e.g., bioinformatic analysis of nucleic and amino acid sequences, learn to assess the viability of cell lines in vitro and become familiar with the use of in vitro plant cultures in pharmaceutical biotechnology.

Class syllabus:
Biotechnology. Definition of terms. Classical vs. molecular biotechnology, principles, their importance, and use. Stages in the development of biotechnology. Pharmaceutical biotechnology and biotechnology in medicine (biologics, biosimilars and biobetters).
Recombinant DNA methods. OMICS technologies. Work with nucleic acids - isolation, restriction analysis, cloning, hybridization, molecular probes, sequencing, genomic and cDNA libraries, Next Generation Sequencing, work with gene and protein databases in silico, computer genome analysis, gene editing using CRISPR-Cas9 technology.
Use of recombinant DNA for the production of biologics. Cloning and expression vectors for various cell types (bacteria, yeast, animal, and plant cells), methods for transferring recombinant DNA into target cells. Molecular biology background of production cells (microorganisms,

mammalian cell lines, insect cells, transgenic plants, and animals). Selection of a suitable expression system for the production of a specific biological drug. Post-translational modifications. Immunogenicity of biologics. Fusion proteins. Ways of increasing the efficacy and stability of biologics - chemical and genetic modifications, ribosomal engineering, prolonging biological half-life, influencing therapeutic effect, chaperones (HSP). Protein labelling. Targeted structural modifications.
Molecular aspects of bioprocessing: GMP. Upstream processes in the manufacture of biologics. Cultivation equipment, media, and processes. Bioreactors and their modes of operation in the biologics manufacturing process. Use of molecular biological aspects in downstream processes in the manufacture of biologics.
Plants in pharmaceutical biotechnology: cell, callus, organ, organelle cultures in vitro. Transgenic plants. Edible vaccines, "plantibodies" and functional foods.
Biotechnological background of production of the most important recombinant biologicals: recombinant enzymes, hormones, growth factors, cytokines and interferons, recombinant vaccines (subunit, edible, vector, DNA and RNA vaccines). Monoclonal antibodies, structure and nomenclature, methods of preparation and modification, examples of use.
Molecular biological principles, mechanisms and approved techniques of gene therapy, types of vectors, gene therapy in vitro and in vivo. Biological drugs based on nucleic acids (CPG oligonucleotides, miRNA, siRNA, aptamers, CRISPR-Cas method, DNA microarray).
Reproductive and therapeutic cloning. Methods, ethical aspects and legislative requirements, practical applications. Stem cells - types, characterisation, isolation and use in therapy.

Recommended literature:

Feng X., Xie H.G., Malhotra A., Yang C.F.: Biologics and Biosimilars. Drug discovery and clinical applications, CRC Press 2022.
Pessoa Jr. A., Vitolo M., Long P.F.: Pharmaceutical Biotechnology. A Focus on Industrial Application. CRC Presss 2022.
Crommelin D. J. A., Sindelar R. D., Meibohm B.: Pharmaceutical Biotechnology, Cahm: Springer 2019.
Clark D.P. a Pazdernik N.J.: Biotechnology. Oxford: Academic Cell 2016.
Obložinský M. a kol.: Molekulárna biológia účinku liečiv a biotechnológia pre farmaceutov. 1. vyd. Bratislava: Univerzita Komenského, 2010.

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 31

A	ABS	B	C	D	E	FX
29,03	0,0	19,35	25,81	19,35	0,0	6,45

Lecturers: doc. Mgr. Andrea Bilková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., PharmDr. Hana Kiňová Sepová, PhD., Mgr. Jana Hricovíniová, PhD., Mgr. Eva Drobná, PhD., PharmDr. Gabriela Greifová, PhD.

Last change: 31.03.2025

Approved by: doc. Mgr. Andrea Bilková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/11-Mgr/26	Calculations in chemical analysis

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Course requirements:
Elective course. The exam will be performed in writing - by a test. To successfully pass the exam, it is necessary to obtain at least 60% of possible points.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Calculations from various chemical equations are an integral part of chemical analysis (Analytical Chemistry 1). Elective course "Calculations in chemical analysis" which takes place in parallel with the course “Analytical Chemistry 1”, helps students to overcome problematic areas of chemical analysis and at the same it extends this scope to other relevant calculations.

Class syllabus:
• Determination of stoichiometry of chemical equations, calculations of equilibrium constants (stability constant, dissociation constant, solubility product, redox potential) and pH
• Fundamentals of calculations in quantitative analytical chemistry - explanation of the term chemical equivalent
• Calculation of concentration for the prepared solution (calculation of mass and molar concentration, dilution of solutions, mass and volume percentage), standardization of titrant solutions, buffers
• Calculation of the content of the test substance in gravimetric determinations
• Calculation of the content of the test substance in acid - base titrations
• Calculation of the content of the analyte in oxidation-reduction determinations
• Calculation of the content of the analyte in complexometric titrations
• Calculation of the content of the test substance in precipitation titration determinations
• Evaluation of measured data of direct, backward and indirect titrations

Recommended literature:
• Majer, J. a kol.: Analytická chémia pre farmaceutov. Martin : Osveta, 1989. 363 s. (učebnica)
• Pikulíková, A., Dvořáková, E., Riečanská E.: Laboratórne cvičenia z analytickej chémie I. Chemická analýza. Bratislava : UK, 2007. 273 s. (skriptá)
• Křenek, P.: Analýza organických látok. Bratislava : UK, 2007. 80 s. (skriptá)

• Mikuš, P., Mikušová, V.: Analytical Chemistry: Chemical Analysis, VEDA, 2022.
• Garaj, J., Bustin, D., Hladký, Z.: Analytická chémia. Bratislava, Alfa 1989. 740 s. (učebnica)

Languages necessary to complete the course:
slovak language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Anna Boriková, PhD., PharmDr. Samuel Varényi, PhD.

Last change: 25.05.2026

Approved by: RNDr. Anna Boriková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/11-Mgr/22	Clinical Pharmacology and Pharmacotherapy

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Anatomy and Physiology, Pathology, Pharmacology (1,) Pharmacology (2)

Course requirements:
Continuous assessment: 1 seminar work
Student assessment takes the form of a written examination, the minimum threshold of success: 60 %.
Scale of assessment: A: 100 % - 92 %; B: 91,9 % - 84 %; C: 83,9 % - 76 %; D: 75,9 % – 68 %; E: 67,8 % - 60 %; Fx: 59,9 % and less

Learning outcomes:
By completing the course, the student acquires basic information not only about the effectiveness of medicinal products, but also about their safe administration to patients, in particular at risk groups. Students become familiar with the methods of preclinical and clinical trials of medicinal products, explanation of mechanism of interactions, adverse effects of drugs and their monitoring. As part of the case-solving process, he acquires communication skills and experience as a means of social interaction, and acquires the basic skills of managing the patient as well as the professional team. Pharmacy students will be able to contribute to the rational use of medicines in clinical practice.

Class syllabus:
- Clinical Pharmacology and Clinical Pharmacy.
- The importance of basic pharmacological knowledge for the clinical use of drugs.
- The importance of rational pharmacotherapy for the effectiveness and safety of treatment.
- Preclinical and clinical evaluation of drugs.
- Adverse drug reaction. Drug interactions. Pharmacovigilance.
- Summary of Product Characteristic and Patient Information Leaflet.
- Importance of pharmacogenetics for the rational pharmacotherapy.
- Chronopharmacology and its importance for therapy.
- Pharmacotherapy of special patient groups: Peculiarities of pharmacotherapy of pregnant women, in children and in elderly patients.
- Humans rights and medicine.

- The importance of pharmacokinetic parameters for clinical practice.
- Basic symptomatology of the disease. The importance of the pharmacist's assessment of the patient's current state of health and symptoms.
- Pathophysiological conditions influencing drug response and safety of treatment.
- Liver diseases and their influence on the effect of drugs.
- The role of pharmacists in the prevention of cardiovascular and metabolic diseases, nutritional supplements
- Abdominal pain˜ basic evaluation and first aid.
- Chest pain and back pain˜ differential diagnosis and first aid.
- Dizziness and vomiting˜ first aid and therapy.
- Shock conditions and unconsciousness˜ characteristics and causes.
- Prescription from the aspect of irrational pharmacotherapy and drug interaction.
- Over-the-counter medicines: a) most common gastrointestinal disorders, first aid, therapy.
- b) certain symptoms of CNS diseases, first aid, therapy,
- c) most common skin damage, first aid, therapy,
- d) selected diseases of the ocular mucosa, first aid, therapy.

Recommended literature:

Kuželová M., Dóka G., Foltánová T., Jankyová S., Kiliánová Z., Kráľová E., Ondriašová E., Vavrincová D., Vavrinec P.: Vybrané kapitoly zo špeciálnej klinickej farmakológie a farmakoterapie pre farmaceutov, Univerzita Komenského v Bratislave, 2020
Kuželová M., Foltánová T., Kiliánová Z., Kosírová S., Kráľová E., Ondriašová E.: Vybrané kapitoly zo všeobecnej a špeciálnej klinickej farmakológie a farmakoterapie pre farmaceutov, Univerzita Komenského v Bratislave, 2021
Kuželová, M., Švec, A., Švec, P.: Kapitoly zo všeobecnej klinickej farmakológie pre farmaceutov. Bratislava : Farmaceutická fakulta UK, 2011
Kuželová, M., Švec, A., Švec, P.: Vybrané kapitoly z klinickej farmakológie pre farmaceutov. Bratislava : Farmaceutická fakulta UK, 2010
Kuželová M., Kovácsová B., Švec P.: Farmakológia antiinfekčných liečiv. Osveta, 2010
Kuželová M., Ondriašová E.: Farmakológia kardiovaskulárneho systému pre farmaceutov. Univerzita Komenského, Bratislava, 2014

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 3315

A	ABS	B	C	D	E	FX
16,38	0,0	18,04	25,82	24,13	15,05	0,57

Lecturers: prof. PharmDr. Ján Klimas, PhD., MPH, PharmDr. Gabriel Dóka, PhD., PharmDr. Zuzana Kiliánová, PhD., doc. PharmDr. Stanislava Kosírová, PhD., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Boris Dudík, PhD., PharmDr. Eva Kráľová, PhD., PharmDr. Natália Stollárová, PhD.

Last change: 12.09.2024

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/12-Mgr/25	Clinical Pharmacy and Pharmacotherapy

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 4 / 2 **per level/semester:** 56 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Pharmacology (1), Pharmacology (2), Clinical pharmacology and pharmacotherapy

Course requirements:
Preliminary assessment: 1 seminar work in a form of solved case report.
Final assessment of students takes place in two parts: written examination (50% of the final mark) and an oral exam (50% of the final mark). Minimum pass for each part the exam: 60%
Overall evaluation of the exam: A: 100 % - 92 %; B: 91,9 % - 84 %; C: 83,9 % - 76 %; D: 75,9 % – 68 %; E: 67,8 % - 60 %; Fx: 59,9 % and less

Learning outcomes:
Completing the course the student acquires basic information about treatment options and first aid for pain, insomnia, dizziness and vomiting, fever, cough and shortness of breath, diarrhea, bleeding disorders, infections, gastrointestinal diseases and ear, nose, throat diseases. The student will become familiar with the ATC groups and with the most current problems of therapeutic use and potential manifestations of adverse effects in selected pharmacotherapeutic groups. This course will contribute to the participation of pharmacists for solving pharmacotherapeutic problems in clinical practice in cooperation with physicians.

Class syllabus:
Course Description:
- Pharmacotherapeutic problems as part of clinical pharmacy, classification of pharmacotherapeutic problems.
- Pharmacotherapeutic problems of the most commonly used medicines in therapy (cardiovascular, central nervous system, anti-infective drugs) and their analysis.
- Potentially inappropriate medicines in therapy. Criteria for evaluation in pharmacotherapy.
- Medication errors in clinical practice.
- The issue of over-the-counter medicines.
- Interactions of over-the-counter medicines.
- Therapeutic drug monitoring part of rational pharmacotherapy.
- Problems of medicines using in dermatology.

- Allergic reactions and their skin manifestations.
- Oral and parenteral nutrition.
- Life style drugs.
- Problems of pharmacotherapy of women of childbearing and postmenopausal age.
- Compliance, adherence to therapy and concordance.
- ATC groups, indication subgroups of drugs and their classification.
- ATC Group A-V: the most current issues of therapeutic drug use and standard therapeutic procedures.
- Main symptoms of the disease, non-pharmacological and pharmacological treatment.
- Identification and solution of pharmacotherapeutic problems, pharmaceutical care part of clinical pharmacy. Rational use of drugs in pharmacotherapy.
- Case reports: fever, insomnia and fear, headache, cough and shortness of breath, diarrhea and constipation, treatment of some GIT symptoms and diseases, treatment of ear, nose and throat diseases. bleeding disorders, treatment of fungal and viral infections.

Recommended literature:

Kuželová M., Dóka G., Foltánová T., Jankyová S., Kiliánová Z., Kráľová E., Ondriašová E., Vavrincová D., Vavrinec P.: Vybrané kapitoly zo špeciálnej klinickej farmakológie a farmakoterapie pre farmaceutov, Univerzita Komenského v Bratislave, 2020
Kuželová M., Foltánová T., Kiliánová Z., Kosírová S., Kráľová E., Ondriašová E.: Vybrané kapitoly zo všeobecnej a špeciálnej klinickej farmakológie a farmakoterapie pre farmaceutov, Univerzita Komenského v Bratislave, 2021
Kuželová, M., Švec, A., Švec, P.: Kapitoly zo všeobecnej klinickej farmakológie pre farmaceutov. Bratislava : Farmaceutická fakulta UK, 2011
Kuželová, M., Švec, A., Švec, P.: Vybrané kapitoly z klinickej farmakológie pre farmaceutov. Bratislava : Farmaceutická fakulta UK, 2010
Kuželová M., Kovácsová B., Švec P.: Farmakológia antiinfekčných liečiv. Osveta, 2010
Kuželová M., Ondriašová E.: Farmakológia kardiovaskulárneho systému pre farmaceutov. Univerzita Komenského, Bratislava, 2014
Online databases:
- Lexidrug. UpToDate Lexidrug Standard. Wolters Kluwer. 2025. Link: https://online.lexi.com/
- European Medicines Agency (EMA). Link: https://www.ema.europa.eu/
- Štátny ústav pre kontrolu liečiv. (ŠÚKL). Link: https://www.sukl.sk/
- Cochrane library. Cochrane. Link: https://www.cochranelibrary.com/

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 56

A	ABS	B	C	D	E	FX
3,57	0,0	28,57	41,07	14,29	3,57	8,93

Lecturers: prof. PharmDr. Ján Klimas, PhD., MPH, PharmDr. Gabriel Dóka, PhD., PharmDr. Zuzana Kiliánová, PhD., doc. PharmDr. Stanislava Kosírová, PhD., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Eva Kráľová, PhD., doc. PharmDr. Anna Paul Hrabovská, PhD., PharmDr. Natália Stollárová, PhD., PharmDr. Boris Dudík, PhD., PharmDr. Miroslava Snopková, PhD.

Last change: 31.03.2025

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/14-Mgr/26	Computer Data Processing

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
There are two tests during the semester. At least 60% must be obtained for their successful completion. The exam is a written test.
100 – 95 %: A
94 – 85 %: B
84 – 75 %: C
74 – 65 %: D
64 – 60 %: E
< 59 %: Fx
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing the course, the student is able to work independently and creatively in the field of data collection, processing and evaluation in electronic form. He / she is independently oriented in this area and can use procedures and techniques of working with data, understands data organization and is able to use current versions of standard application software in their professional activities.

Class syllabus:
The content of the course is an update of the student's abilities and skills to communicate with the means of computer technology at the level of the so-called standard application equipment as a result of intensive development in the technical and program area, which is an organic part of professional pharmaceutical activities in all branches of pharmaceutical sciences and practice.
Course syllabus:
· Qualified communication of the user with the computer, knowledge of working with devices, peripherals and media of computer technology,
· Data organization and its means, work with archive files (zip, rar, etc.) and their current tools,
· Word processing, creation and operations with text files, creation of tables and calculations in them, conversion to rtf, pdf formats,
· Spreadsheet and its user functions, including mathematical and statistical, graphing,
· Creation of presentations as specific document formats.

Recommended literature:
The literature is constantly updated at the exercises in the form of protocols. Due to the need for constant updating, students are provided with study texts on individual issues.

Languages necessary to complete the course:
Slovak language, English language.

Notes:
The course is taught only in the winter semester, the capacity of the course is limited to 20 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/19-Mgr/26	Cosmetics in Pharmacy

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of the lectures and practical exercises is obligatory. Absence tolerance for lectures is a maximum of three lectures. Absences are not tolerated at exercises. In case of violation of this rule, the student will lose the opportunity to pass the exam. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final written exam. Assessment: A: 93.00–100.00%, B: 85.00–92.99%, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: less than 60.00%.

Learning outcomes:
By completing the course, the student acquires basic knowledge about the functioning of the skin, how to care for it, and an overview of the basic skin diseases and defects that students will meet in their pharmaceutical practice. As erudite experts, they will be able to evaluate the patient's condition and then recommend a suitable product or a visit to the doctor. Attention is also paid to hair, skin aging, cosmetics with a special focus, and phototherapy. The course includes compulsory practical exercises in the laboratory, students get acquainted with the basic principles of cosmetics preparation, and learn to select appropriate excipients and specific excipients that meet the requirements of individualized therapy and provide a sufficient therapeutic or cosmetic effect.

Class syllabus:
Human skin, skin types, and specifics of their treatment. The most used biologically active substances and their use. Types of cosmetics for skin and body skin care. Healthy skin care. The most common skin diseases and their treatment. Skin aging, mechanisms of aging, prevention and anti-aging preparations, and alternative substances. Solar radiation, benefits and risks, types of UV filters, phototypes, and types of cosmetics for protection against sunlight. Biologically active substances and auxiliary substances in cosmetics. Cosmetics testing, the most common allergens, prohibited substances, interpretation of information on cosmetics packaging, and legislation on the production of cosmetics. Hair physiology. Hair cosmetics, therapy of the most common hair diseases. Phototherapy in the management of skin and autoimmune diseases. Cosmetics with a special focus. Care for specific parts of the body: nails, eyes, lips, and feet. Intimate hygiene cosmetics.

Recommended literature:

J. Hojerová, K. Škultétyová: Materiály pre 2. A 3. Ročník študijného odboru kozmetik. Slovenské pedagogické nakladateľstvo, 2012
Frank Burczyk, Dr. Aggy Gianni: Lexikon kosmetiky od A do Z. Praha: PRAGMA 1999
C. B. Quirini: Prírodná kozmetika. Citadella, 2017
V. Rozsívalová et al..: Kosmetika I. Informatorium, spol.s.r.o.
D. Janeš, N. Kočevar Glavač: Modern cosmetics. Širimo dobro besedo, d. o. o.Velenje, 2018
A. Shai, H. I. Maibach, R. Baran: Handbook of Cosmetic Skin Care. CRC Press, 2009
Feřtek, O. et al.: Kosmetická problematika v dermatologické praxi. Praha : Avicenum, 1987. 276 s.
Feřteková et al.: Kosmetika v teórii a praxi. Praha : Maxdorf, 1994.

Languages necessary to complete the course:

Slovak language

Notes:

The course is only available in the summer term, if enrolled at least 5 students are registered, capacity is limited to 40 students.

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Jana Selčanová, PharmDr. Veronika Šimunková, PhD., PharmDr. Miroslava Špaglová, PhD., PharmDr. Jarmila Prieložná, PharmDr. Veronika Mikušová, PhD., PharmDr. ThLic. Mária Raučinová, PhD., PharmDr. Miroslava Potúčková, PhD., PharmDr. Daniel Krchňák, DiS

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/13-Mgr/22	Current Trends in Preparations of Natural Origin

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
A 100% attendance in practical training in person or online is required*. The final exams will have the form of a test**. Grading rules: 100-92/A, 91-84/B, 83-76/C, 75-68/D, 67-60/E, 59-0/FX.
* According to the attendance list (will be downloaded from MS Teams after each online lecture)
**In the case of the distance form of the study, the exam will be in the form of an online test in MS Forms
Scale of assessment (preliminary/final): 1/1

Learning outcomes:
Upon successfully completing the educational process, the student should have extensive knowledge from Pharmacognosy about medicinal plants and natural products in the current pharmaceutical market, food, beverages, or cosmetics. Furthermore, get information about the pitfalls of natural remedies in self-medication to learn exciting facts about recent research of natural products and their path to the herbal drug. The acquired knowledge should give the pharmacist courage and confidence to dispatch herbal drugs, medical devices, cosmetic products and food supplements of natural origin.

Class syllabus:
Lectures are devoted to current topics on natural substances and medicinal plants, which are available as OTC products (over-the-counter) in pharmacies or used in everyday life, and which are not fully covered in Pharmacognosy 1 and 2. The student will meet with important information about current research of natural products, about psychoactive plants and their constituents, about the Influence of the intestinal microbiome on the activity of natural substances, about plant antioxidants in the prevention of various diseases (e.g. Alzheimer's, Parkinson's), about vegetables, fruits, and spices with therapeutic potential, about known beverages, and natural substances from non-vascular land plants or sea plants. Attention will also be paid to important natural substances with antimicrobial effects, natural dyes, and plant metabolites currently used in pharmacotherapy.

Recommended literature:
Nagy-Grančai-Mučaji: Farmakognózia – Biogenéza prírodných látok, 1. vyd.

Mučaji – Bittner Fialová – Czigle – Grančai – Nagy: Farmakognózia. Biologicky aktívne rastlinné metabolity a ich zdroje, 3. vydanie
European Medicines Agency (https://www.ema.europa.eu/en/medicines)
Databázy: ScienceDirect, Scopus, PubMed, SciFinder, GoogleScholar

Languages necessary to complete the course:
English

Notes:
only in the summer semester, min. 5 students, max. 20 students

Past grade distribution
Total number of evaluated students: 134

A	ABS	B	C	D	E	FX
48,51	0,0	29,85	13,43	6,72	0,75	0,75

Lecturers: doc. PharmDr. Silvia Bittner Fialová, PhD., prof. PharmDr. Pavel Mučaji, PhD., PharmDr. Mgr. Elena Kurin, PhD.

Last change: 25.03.2026

Approved by: prof. PharmDr. Pavel Mučaji, PhD.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/300-Mgr/25	**Course title:** Defense of Diploma Thesis
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the subjects: Diploma Thesis Preparation I, Diploma Thesis Preparation II Diploma Thesis Preparation III, and has also prepared and submitted the final version of the diploma thesis.	
Learning outcomes: The student can work with scientific and professional literary sources and summarize basic scientific knowledge into a logically organized unit that meets the formal aspect of a diploma thesis. He can clearly define the goal and methodology of scientific work, he can process the results together with their practical interpretation (according to the focus of the work), he can cite literature in accordance with applicable regulations. He can present and defend the results of his diploma thesis.	
Class syllabus: The state exam consists of presenting the thesis, the results of the diploma thesis and defending them before the state exam committee.	
State exam syllabus:	
Last change: 04.04.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF.KORF/29-Mgr/26	**Course title:** Diet and Nutrition Basics
Educational activities: **Type of activities:** lecture / seminar **Number of hours:** **per week:** 2 / 1 **per level/semester:** 28 / 14 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 7.	
Educational level: I.II.	
Prerequisites:	
Course requirements: 1. Obligatory participation in seminars. Absence on the seminar must be proved by the reason for absence and the seminar must be replaced in agreement with the teacher. 2. Continuous test without a set minimum pass. 3. Completion of the course is done by a written exam with a minimum success rate of 60%. Rating: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-65%, E = 64-60%, FX = 59% and less.	
Learning outcomes: By completing the course, the student will gain basic knowledge and skills in the medical field of dietetics and the origin and development of nutrition-related diseases. The student will gain theoretical knowledge and practical foundations of dietary, nutritional, and supplementary counselling provided preventively and medically.	
Class syllabus: Lectures: Dietetics in the treatment and prevention of diseases. The relationship of nutrition to health and disease. Physiology of nutrition. Nutritional components - nutrients (carbohydrates, fats, proteins), macroelements and microelements, micronutrients, vitamins. Water. Alcohol. Nutritional status of the individual. Population nutritional monitoring. Energy balance - energy intake and expenditure. Energy substrates. Energy density of food. Influence of energy expenditure. Therapeutic and preventive dietary recommendations for selected diseases - obesity, type 1 and type 2 diabetes mellitus, dyslipoproteinemia, hypertension and atherosclerosis, cancer. Diet therapy for specific population groups (children, pregnant and lactating women, the elderly). Eating disorders (malnutrition, malnutrition, anorexia, bulimia). Food allergies and intolerances. Food and nutritional literacy. Food safety. Basics of nutrition hygiene. Nutrition recommendations. Nutritional habits and their monitoring (analysis of dietary records, databases of energy and nutritional composition of food). Nutrigenetics and nutrigenomics. Artificial nutrition - enteral and parenteral nutrition. The current nutritional situation in our country and in the world. Nutrition as part of the National Health Promotion Program. Principles of rational healthy nutrition. Alternative forms of nutrition. Organic food, genetically modified food, functional food. Foods for specific nutritional purposes - dietetic foods and nutritional supplements. Legislation, marketing,	

reimbursement, rational use, and advice. Nutrition and supplementation advice in a pharmacy. Nutrition software, mobile applications for nutritional and supplementation counselling.
Seminars: Anthropometric examinations in adults and children. Measurement of skin algae. Bioimpedance analysis of body composition. Biochemical markers of nutrition in the evaluation of nutritional status. Rational physiological nutrition - work with graphic aids (food pyramid, properly divided plate). Caloric tables, practice of calculating caloric values. Working with nutritional databases and software. Training in dietetic and nutritional procedures for selected diseases and specific population group

Recommended literature:

1. Golian J., Minárik P., Mináriková D. Potravinová a nutričná gramotnosť. Josef Raabe Slovensko, 2021, s. 378, ISBN 978-80-8140-621-8.
2. Svačina Š a kol. Klinická dietológie, Grada Publishing Praha, 2008, s. 381, ISBN 802-47-2256-6.
3. Zlatohlávek L. Klinická dietológie a výživa, Current Media Praha, 2016, s. 424, ISBN 978-80-881-2903-5.
4. Minárik P., Mináriková D., Golian J., Penesová A., Babjaková J. Odporúčania pre stravovanie a výživu u dospelých. Josef Raabe Slovensko, 2023, s. 216, ISBN 978-80-8140-8000-7.
5. Minárik P., Mináriková D.: Rakovina a výživa – mýty a fakty II, Kontakt Bratislava, 2014, s. 224, ISBN 978-80-971-0592-1.
6. Minárik, Paulová, Mináriková: Diéta pri ochoreniach pažeráka, žalúdka a dvanástnika, Kontakt Bratislava, 2016, s. 208, ISBN 978-80-971-0594-5.
7. Minárik P, Blaho E. Diéta pri ochoreniach žlčníka a pankreasu, Josef Raabe Slovensko Bratislava, 2017, s. 278, ISBN 978-80-814-0275-3.
8. Minárik P., Zoboková B., Blaho E. Diéta pre diabetikov, Josef Raabe Slovensko Bratislava, 2017, s. 327, ISBN 978-80-814-0295-1.
9. Minárik, Fábryová, Blaho: Diéta pri zvýšenom cholesterole a iných poruchách metabolizmu tukov, Josef Raabe Slovensko Bratislava, 2018, s. 267, ISBN 978-80-814-0349-1.
10. Minárik, Rác, Blaho: Diéta pri ochoreniach pečene. Josef Raabe Slovensko Bratislava, 2019, s. 340, ISBN 978-80-814-0402-3.
11. Minárik, Kabátová, Kabátová ml., Blaho: Bezlepková diéta, Josef Raabe Slovensko Bratislava, 2020, s.300, ISBN 978-80-814-0434-4.
12. Minárik P., Fábryová Ľ., Penesová A., Ukropcová B., Blaho E. Redukčná diéta. Skúsme to inak. Josef Raabe Slovensko, 2021, s. 352, ISBN 978-80-814-0504-4.
13. Potravinový kódex SR
Skriptá:
1. Minárik P., Mináriková D.: Strava a výživa v prevencii a liečbe rakoviny, VSZSP sv. Alžbety, 2017
2. Minárik P., Chlebo P.: Výživa, potrava a ľudské zdravie, VSZSP sv. Alžbety, 2017

Languages necessary to complete the course:
Slovak, czech

Notes:
Maximum capacity 25 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Daniela Mináriková, PhD., PharmDr. Ľubica Lehocká, PhD.
Last change: 27.05.2026
Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/01-Mgr/22	Diploma Thesis Preparation I

Educational activities:
Type of activities: practicals
Number of hours:
per week: 4 **per level/semester:** 56
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 560

A	ABS	B	C	D	E	FX
96,43	0,0	1,79	0,89	0,18	0,18	0,54

Lecturers: prof. RNDr. Daniela Uhríková, CSc., RNDr. Alexander Búcsi, PhD., RNDr. Tomáš Fazekaš, PhD., prof. Ing. Vladimír Frecer, DrSc., doc. RNDr. Jana Gallová, CSc., Mgr. Lukáš Hubčík, PhD., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Ing. Jarmila Oremusová, CSc., doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., doc. PharmDr. Miroslava Sýkorová, PhD., Mgr. Róbert Šandrik, PhD., Ing. Stanislava Šoralová, PhD., Ing. Jaroslav Galba, PhD., PharmDr. Vladimír Garaj, PhD., PharmDr. Iva Kapustíková, PhD., PharmDr. Matej Maruniak, PhD., PharmDr. Eva Salanci, PhD., PharmDr. Lenka Stopková, PhD., doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Peter Herich, PhD., doc. Ing. Martin Pisárčik, CSc., doc. PharmDr. Jindra Valentová, PhD., Mgr. Lucia Lintnerová, PhD., doc. PharmDr. Miloš Lukáč, PhD., RNDr. Roman Mikláš, PhD., PharmDr. Andrea Balažová, PhD., PharmDr. Renáta Kubíková, PhD., RNDr. František Bilka, PhD., doc. Mgr. Andrea Bilková, PhD., Mgr. Eva Drobná, PhD., doc. PharmDr. Marek Obložinský, PhD., PharmDr. Gabriela Greifová, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., Mgr. Ivana Holková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., Mgr. Jana Hricovíniová, PhD., PharmDr. Hana Kiňová Sepová, PhD., Ing. Michael Kenneth Lawson, PhD., Mgr. Lenka Bies Piváčková, PhD., doc. PharmDr. Anna Paul Hrabovská, PhD., PharmDr. Gabriel Dóka, PhD., prof. PharmDr. Adriana Duriš Adameová, DrSc., doc. PharmDr. Tomáš Rajtík,

PhD., doc. PharmDr. Tatiana Foltánová, PhD., PharmDr. Katarína Hadová, PhD., Mgr. Ondrej Sprušanský, PhD., PharmDr. Csaba Horváth, PhD., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., doc. PharmDr. Peter Křenek, PhD., PharmDr. Eva Malíková, PhD., doc. PharmDr. Marek Máťuš, PhD., PharmDr. Mária Bodnár Mikulová, PhD., RNDr. Anna Boriková, PhD., prof. RNDr. Peter Mikuš, PhD., RNDr. Jozef Motyčka, PhD., RNDr. Svetlana Dokupilová, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, doc. Ing. Dáša Kružlicová, PhD., doc. PharmDr. Katarína Maráková, PhD., doc. PharmDr. Juraj Piešťanský, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD., doc. PharmDr. Daniela Mináriková, PhD., PharmDr. Miroslava Snopková, PhD., doc. PharmDr. Silvia Bittner Fialová, PhD., RNDr. Veronika Brindza Lachová, PhD., doc. PharmDr. Szilvia Czigle, PhD., Mgr. Ondrej Ďuriška, PhD., PharmDr. Vladimír Forman, PhD., RNDr. Peter Gál, PhD., MBA, prof. Ing. Miroslav Habán, PhD., PharmDr. Mgr. Elena Kurin, PhD., PharmDr. Michaela Mergová, PhD., RNDr. Ingrid Mistríková, CSc., Mgr. Petra Mitrengová, PhD., prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., PharmDr. Zuzana Scheerová Kontšeková, PhD., PharmDr. Ivana Šušaníková, PhD., RNDr. Daniela Tekeľová, CSc., Mgr. Jaroslav Tóth, PhD., Ing. Patrícia Oláh Paračková, PhD., Ing. Flóra Jozefíková, PhD., RNDr. Romana Bajcura, PhD., PharmDr. Veronika Vyletelová, PhD., Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD., PharmDr. Kristína Szmicseková, PhD.

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/02-Mgr/22	Diploma Thesis Preparation II

Educational activities:
Type of activities: practicals
Number of hours:
per week: 10 **per level/semester:** 140
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 603

A	ABS	B	C	D	E	FX
90,38	0,0	6,97	1,82	0,33	0,33	0,17

Lecturers: prof. RNDr. Daniela Uhríková, CSc., RNDr. Alexander Búcsi, PhD., RNDr. Tomáš Fazekaš, PhD., prof. Ing. Vladimír Frecer, DrSc., doc. RNDr. Jana Gallová, CSc., Mgr. Lukáš Hubčík, PhD., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Ing. Jarmila Oremusová, CSc., RNDr. Svetlana Dokupilová, PhD., doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., doc. PharmDr. Miroslava Sýkorová, PhD., Mgr. Róbert Šandrik, PhD., Ing. Stanislava Šoralová, PhD., Ing. Jaroslav Galba, PhD., PharmDr. Vladimír Garaj, PhD., PharmDr. Iva Kapustíková, PhD., PharmDr. Matej Maruniak, PhD., PharmDr. Eva Salanci, PhD., PharmDr. Lenka Stopková, PhD., doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Peter Herich, PhD., doc. Ing. Martin Pisárčik, CSc., doc. PharmDr. Jindra Valentová, PhD., Mgr. Lucia Lintnerová, PhD., doc. PharmDr. Miloš Lukáč, PhD., RNDr. Roman Mikláš, PhD., PharmDr. Andrea Balažová, PhD., PharmDr. Renáta Kubíková, PhD., RNDr. František Bilka, PhD., doc. Mgr. Andrea Bilková, PhD., Mgr. Eva Drobná, PhD., doc. PharmDr. Marek Obložinský, PhD., PharmDr. Gabriela Greifová, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., Mgr. Ivana Holková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., Mgr. Jana Hricovíniová, PhD., PharmDr. Hana Kiňová Sepová, PhD., Ing. Michael Kenneth Lawson, PhD., doc. PharmDr. Peter Křenek, PhD., PharmDr. Eva Malíková, PhD., Mgr. Lenka Bies Piváčková, PhD., doc. PharmDr. Marek Máťuš, PhD., doc. PharmDr. Anna

Paul Hrabovská, PhD., PharmDr. Gabriel Dóka, PhD., prof. PharmDr. Adriana Duriš Adameová, DrSc., doc. PharmDr. Tomáš Rajtík, PhD., doc. PharmDr. Tatiana Foltánová, PhD., PharmDr. Katarína Hadová, PhD., Mgr. Ondrej Sprušanský, PhD., PharmDr. Csaba Horváth, PhD., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., PharmDr. Mária Bodnár Mikulová, PhD., RNDr. Anna Boriková, PhD., prof. RNDr. Peter Mikuš, PhD., RNDr. Jozef Motyčka, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, doc. Ing. Dáša Kružlicová, PhD., doc. PharmDr. Katarína Maráková, PhD., doc. PharmDr. Juraj Piešťanský, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD., doc. PharmDr. Daniela Mináriková, PhD., PharmDr. Miroslava Snopková, PhD., doc. PharmDr. Silvia Bittner Fialová, PhD., RNDr. Veronika Brindza Lachová, PhD., doc. PharmDr. Szilvia Czigle, PhD., Mgr. Ondrej Ďuriška, PhD., PharmDr. Vladimír Forman, PhD., RNDr. Peter Gál, PhD., MBA, prof. Ing. Miroslav Habán, PhD., PharmDr. Mgr. Elena Kurin, PhD., PharmDr. Michaela Mergová, PhD., RNDr. Ingrid Mistríková, CSc., Mgr. Petra Mitrengová, PhD., prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., PharmDr. Zuzana Scheerová Kontšeková, PhD., PharmDr. Ivana Šušaníková, PhD., RNDr. Daniela Tekeľová, CSc., Mgr. Jaroslav Tóth, PhD., Ing. Patrícia Oláh Paračková, PhD., Ing. Flóra Jozefíková, PhD., RNDr. Romana Bajcura, PhD., Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/03-Mgr/22	Diploma Thesis Preparation III

Educational activities:
Type of activities: seminar
Number of hours:
per week: 22 **per level/semester:** 308
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 9., 10..

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 579

A	ABS	B	C	D	E	FX
90,33	0,0	6,74	1,55	0,86	0,35	0,17

Lecturers: prof. RNDr. Daniela Uhríková, CSc., RNDr. Alexander Búcsi, PhD., RNDr. Tomáš Fazekaš, PhD., prof. Ing. Vladimír Frecer, DrSc., doc. RNDr. Jana Gallová, CSc., Mgr. Lukáš Hubčík, PhD., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Ing. Jarmila Oremusová, CSc., doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., doc. PharmDr. Miroslava Sýkorová, PhD., Mgr. Róbert Šandrik, PhD., Ing. Stanislava Šoralová, PhD., Ing. Jaroslav Galba, PhD., PharmDr. Vladimír Garaj, PhD., PharmDr. Iva Kapustíková, PhD., PharmDr. Matej Maruniak, PhD., PharmDr. Eva Salanci, PhD., PharmDr. Lenka Stopková, PhD., doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Peter Herich, PhD., doc. Ing. Martin Pisárčik, CSc., doc. PharmDr. Jindra Valentová, PhD., Mgr. Lucia Lintnerová, PhD., doc. PharmDr. Miloš Lukáč, PhD., RNDr. Roman Mikláš, PhD., PharmDr. Andrea Balažová, PhD., PharmDr. Renáta Kubíková, PhD., RNDr. František Bilka, PhD., doc. Mgr. Andrea Bilková, PhD., Mgr. Eva Drobná, PhD., PharmDr. Gabriela Greifová, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., Mgr. Ivana Holková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., PharmDr. Hana Kiňová Sepová, PhD., Ing. Michael Kenneth Lawson, PhD., PharmDr. Eva Malíková, PhD., Mgr. Lenka Bies Piváčková, PhD., doc. PharmDr. Marek Máťuš, PhD., PharmDr. Elena Ondriašová, CSc., PharmDr. Dominika Dingová, PhD., doc. PharmDr. Anna Paul Hrabovská, PhD., PharmDr. Gabriel Dóka, PhD., prof.

PharmDr. Adriana Duriš Adameová, DrSc., doc. PharmDr. Tomáš Rajtík, PhD., doc. PharmDr. Tatiana Foltánová, PhD., PharmDr. Katarína Hadová, PhD., Mgr. Ondrej Sprušanský, PhD., doc. MUDr. Tatiana Stankovičová, CSc., PharmDr. Csaba Horváth, PhD., doc. RNDr. Ingrid Tumová, CSc., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., doc. PharmDr. Peter Křenek, PhD., PharmDr. Attila Kulcsár, PhD., PharmDr. Mária Bodnár Mikulová, PhD., RNDr. Anna Boriková, PhD., prof. RNDr. Peter Mikuš, PhD., RNDr. Jozef Motyčka, PhD., RNDr. Svetlana Dokupilová, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, doc. Ing. Dáša Kružlicová, PhD., doc. PharmDr. Katarína Maráková, PhD., doc. PharmDr. Juraj Piešťanský, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD., doc. PharmDr. Daniela Mináriková, PhD., PharmDr. Miroslava Snopková, PhD., doc. PharmDr. Silvia Bittner Fialová, PhD., RNDr. Veronika Brindza Lachová, PhD., doc. PharmDr. Szilvia Czigle, PhD., Mgr. Ondrej Ďuriška, PhD., PharmDr. Vladimír Forman, PhD., RNDr. Peter Gál, PhD., MBA, prof. Ing. Miroslav Habán, PhD., PharmDr. Mgr. Elena Kurin, PhD., PharmDr. Michaela Mergová, PhD., RNDr. Ingrid Mistríková, CSc., Mgr. Petra Mitrengová, PhD., prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., PharmDr. Zuzana Scheerová Kontšeková, PhD., PharmDr. Ivana Šušaníková, PhD., RNDr. Daniela Tekeľová, CSc., Mgr. Jaroslav Tóth, PhD., Ing. Patrícia Oláh Paračková, PhD., Ing. Flóra Jozefíková, PhD., RNDr. Romana Bajcura, PhD., Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFCh/01-Mgr/24	Drug Analysis

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 4 / 3 **per level/semester:** 56 / 42
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
FaF.KFCh/05-Mgr/00 Pharmaceutical chemistry (1), FaF.KFCh/05-Mgr/20 Pharmaceutical chemistry (2), KFANF/01-Mgr/19 Analytical chemistry (1), KFANF/02-Mgr/20 Analytical chemistry (2).

Course requirements:
Compulsory participation in all forms of teaching in full extent. Passing two preliminary tests, which consist of questions from laboratory practicals and lectures, with a minimum success rate of 60 %. Elaboration of protocols "Drug quality control" according to the principles of good laboratory practice in accordance with applicable regulations. Final written examination. The final written exam consists of questions of quality control of drugs, excipients and drugs (identification tests, purity tests, content determination), according to valid legal regulations of the European Union, Slovak Republic and validation of these methods.
Evaluation grades: 100-92.00% evaluation A, 91.99-84.00% evaluation B, 83.99-76.00% evaluation C, 75.99-68.00% evaluation D, 67.99-60 % evaluation E, less than 60.00% evaluation FX.
Scale of assessment (preliminary/final): 20/80.

Learning outcomes:
Drug analysis is a profile pharmaceutical discipline, which in theoretical and laboratory teaching focuses on quality control of drugs, excipients and medicines in the entire process of production, distribution and use in order to ensure the quality, safety and efficacy of drugs and medicines. The teaching and content of the course is based on the requirements of the currently valid European Pharmacopoeia and the Slovak Pharmaceutical Codex as legal standards containing a set of technical requirements for drug quality assessment, which must be met by anyone who handles drugs, uses them in health care or performs state supervision in the field of pharmacy. The theoretical foundations of the discipline are applied in laboratory practicals, where the student works with a pharmacopoeia in order to learn to quickly orient in a large amount of factual data and experimentally perform drug and medicine quality control in accordance with the principles of good laboratory, good pharmacy and good manufacturing practice. The knowledge and laboratory skills acquired after completing the course Drug Analysis are used in practice in pharmacies, hospitals,

State Instute for Drug Control, accredited control laboratories, in pharmaceutical production, research and in further postgraduate education of pharmacists - in a specialized study.

Class syllabus:

The chemical structure of the drug is the starting point for determining the appropriate procedure for the analytical use of its physical, physicochemical and chemical properties in identification testing, evaluation of the purity and stability of the drug and in the quantitative analysis of the drug. The thematic areas of lectures and practical exercises are designed to cover all important areas of the field.

1. Analysis of drugs - content, mission and importance of the discipline. Quality control and evaluation of drugs and medicines in the Slovak Republic. State Instute for Drug Control. European Pharmacopoeia. Slovak Pharmaceutical.
2. European Pharmacopoeia (Ph. Eur.) - identification reactions of ions and organic groups (2.3.1). Group reactions.
3. Drug identification tests (Ph. Eur.) - selective chemical reactions: precipitation, complex-forming reactions.
4. Drug identification tests (Ph. Eur.) - selective chemical reactions: redox, specific reactions.
5. Drug identification tests (Ph. Eur.) based on physical, physicochemical and chemical principles using instrumental analytical methods - Part 1. Flame tests, solubility, melting point, freezing point, distillation range, density, viscosity, reaction of solution, optical rotation, refractive index (2.2).
6. Drug identification tests (Ph. Eur.) based on physical, physicochemical principle using instrumental analytical methods - Part 2: analytical methods, spectral, separation, electrochemical methods.
7. Tests for purity of drugs (Ph. Eur.) - Part 1: Origin of impurities in the drug and the medicine. Influence of impurities on drug quality and organism. Classification of impurities by origin. Impurities of defined composition. Impurities of undefined composition. General articles on impurities in the pharmacopoeia - limit tests (2.4).
8. Tests for purity of drugs - part 2. Proof of impurities in the drug using their physical and physico-chemical manifestations. Instrumental analytical methods for drug purity tests - optical methods, separation methods, electrochemical (2.2).
9. Determination of drug content - Part 1. Gravimetric and volumetric methods for determining the content of drugs and their division. Pharmacopoeial volumetric methods - categorization of methods and principle of individual methods, primary standards for volumetric solutions, standardization of volumetric solution (factor of volumetric), milligram equivalent of volumetric solution, indication of equivalence point. Determination of water content in drugs (semi-micro method). Determination of nitrogen in primary aromatic amines. Acid value, ester value, hydroxyl value, iodine value, peroxide value, saponification value.
10. Determination of drug content - Part 2. Instrumental methods for drug content determination - optical methods, separation methods, electrochemical.
11. Multi-component drug systems and medicines. Drug identification tests in multicomponent systems, tests for purity and determination of drug content in medicines according to the Slovak Pharmaceutical Codex and company standards. Quality assessment of drugs with special properties and requirements for them - radiopharmaceuticals, vaccines.
12. Stability of drugs and medicines and its evaluation. Degradation processes and factors affecting the stability of drugs and medicines. Chemical principles of decomposition reactions. Accelerated and long-term drug stability tests. Kinetic characteristics of decomposition processes. Evaluation of packaging material quality.
13. Statistical evaluation of analysis results. Validation of analytical methods. Good manufacturing practice. Good laboratory practice. Drug registration. Good pharmacy practice - reagent apparatus

in a pharmacy. Legislation: work with hazardous chemical agents, warning symbols, risk phrases (R-phrases), safety phrases (S-phrases), Safety Data Sheet.

Recommended literature:

European Pharmacopoeia, Current Edition and Supplements, Strasbourg, Council of Europe, Cedex
Slovenský farmaceutický kódex, Aktuálne vydanie.
Slovenský farmaceutický kódex 2015. 2. vyd. Bratislava: Obzor, 2015
Slovenský liekopis 1, zv. I – VII, Bratislava: Herba, 1997 – 2003
Slovenský farmaceutický kódex. 1. vyd. Doplnok. Bratislava: Obzor, 2007
Slovenský farmaceutický kódex. 1. vyd. Bratislava: Herba, 1996
Bezáková Ž. a kol.: Základy farmaceutickej analýzy. Kvalitatívne hodnotenie chemických liečiv. 1. vyd. Nitra: VA Print, 2002, 722 s., ISBN 80-96-82-56-7-4
Bezáková Ž.: Kvalita liečiv. Zabezpečenie a kontrola. Martin: Neografia, 2007, 400 s., ISBN 978-80-88892-79-3
Bezáková Ž.: Analýza chemických liečiv. Stanovenie obsahu liečiv podľa Slovenského liekopisu 1. 1. vyd. VA Print, Nitra 2002, 208 s., ISBN 80-968-256-0-7
Eger, K., Troschütz, R., Roth, H.-J.: Arzneistoffanalyse. Reaktivität-Stabilität-Analytik. 4. Aufl., Stuttgart: Deutscher Apotheker Verlag, 1999, 730 s., ISBN 3-7692-2595-3
Rücker, G., Neugebauer, M., Willems, G.G.: Instrumentelle pharmaceutische Analytik. 3. Aufl., Stuttgart: Wissenschaftliche Verlagsgeselschaft, 2001, 705 s., ISBN 3-8047-1739-X

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 264

A	ABS	B	C	D	E	FX
25,76	0,0	27,65	22,73	16,29	6,82	0,76

Lecturers: doc. PharmDr. Miroslava Sýkorová, PhD., PharmDr. Iva Kapustíková, PhD., Ing. Jaroslav Galba, PhD., doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., PharmDr. Vladimír Garaj, PhD., PharmDr. Lenka Stopková, PhD., Mgr. Róbert Šandrik, PhD., Mgr. Henrich Szabados, PhD., Ing. Ondrej Cehlár, PhD.

Last change: 09.05.2024

Approved by: doc. PharmDr. Miroslava Sýkorová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/VP/20	Extracurricular study activities

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 2.., 3., 4.., 5., 6.., 7., 8.., 9., 10..

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Jindra Valentová, PhD.

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/15-Mgr/26	First Aid

Educational activities:
Type of activities: lecture
Number of hours:
per week: 1 **per level/semester:** 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
100% completion of prescribed lectures and practical exercises. Passing the interim written test with a minimum of 60% correct answers (the interim test is not included in the final grade). Passing the final exam, which will consist of a written test with a minimum threshold of 60% correct answers.

Learning outcomes:
First aid should be a natural part of general care of persons affected by a sudden damage to their health. A graduate of pharmacy as a health worker should master the basics of first aid and, if necessary, provide initial treatment to the injured before the arrival of RZP/ZZS.

Class syllabus:
Characteristics of the subject, basic concepts, aims of the subject, legislation. Motivational background of first aid provision (personal and legal). Basic life functions. Respiratory system, heart and blood circulation, relation to first aid. Transport of oxygen. Diagnostics of the basic life functions. Basic life-saving procedures. General principles of first aid provision. Basic support of life functions. Cardiopulmonary resuscitation. Automatic external defibrillation. Acute coronary syndrome - prevention and first aid. Sudden stroke - prevention and first aid. Disturbances of respiration, suffocation, first aid. Convulsive states. Unconsciousness, intoxications. Severe injuries. Injuries, bleeding. Shock - causes, symptoms, first aid. Burns and scalding. Effects of extreme temperatures (hypothermia, overheating, heatstroke). Injury due to electrical current. Accidents with a mass injury of persons. Practice of resuscitation.
Practical exercises: Composition and contents of the first aid kit, Treatment of fractures, Treatment of burns, Choking on a foreign body (Heimlich maneuver) in children/adults, Cardiopulmonary resuscitation in children/adults, Use of an automatic external defibrillator (AED)

Recommended literature:
Kalig K.: Prvá pomoc pre tých, čo ju poskytujú, a pre tých, čo ju potrebujú. Rescue Man, 2008
Van de Velde S et al.: European first aid guidelines, Resuscitation, 2006
Miriana Pištejová, Dušan Kraus: Prvá pomoc v praxi, Rokus 2017
Robin Šin, Petr Štourač a Jana Vidunová: Lékařska první pomoc, Galén 2019
Viliam Dobiaš: Volali ste záchranku? Dixit 2020

Viliam Dobiaš: 5P. Prvá pomoc pre pokročilých poskytovateľov. II. rozšírené vydanie. Dixit 2022
Masár O a kol.: PRVÁ POMOC PRE MEDIKOV. Univerzita Komenského v Bratislave, 2012. ISBN 978-80-223-3257-6. Online

Languages necessary to complete the course:
Slovak Language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Tomáš Rajtík, PhD., PharmDr. Dominika Dingová, PhD., PharmDr. Csaba Horváth, PhD., MUDr. Karol Kálig, CSc.

Last change: 27.05.2026

Approved by: doc. PharmDr. Tomáš Rajtík, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/19-Mgr/25	General Biology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
Student assessment consists of three written parts.
Control test - exercises - the result is 20% of the total evaluation of the subject.
Exam - written test - the result is 50% of the total evaluation of the course.
Exam - solving selected problems from the areas covered in lectures - the result is 30% of the total evaluation of the course.
In each written part, the student must achieve at least 60% success rate
Grade Rating (%)
A 100.00 - 92.00
B 91.99 - 84.00
C 83.99 - 76.00
D 75.99 - 68.00
E 67.99 - 60.00
FX <60.00

Learning outcomes:
By completing the course the student acquires basic information about the position of molecular and cell biology in the pharmaceutical study and the scientific field of Pharmacy. The acquired knowledge is the basis for related medical disciplines: physiology, pathology, biochemistry, immunology, microbiology, molecular and general pharmacology, clinical disciplines and forms the basis for understanding the effects of biologically active molecules - drugs.

Class syllabus:
- Chemical composition of living matter, biologically active macromolecules - carbohydrates, lipids, proteins, nucleic acids
- Basic cell structure, cell theory, phylogeny, origin of cells and multicellular organisms. prokaryotic and eukaryotic cell. Non-membrane cell structures - cytology in terms of cell morphology and structure,
- Cell membrane, membrane organelles, their structure and function
- Membrane transport, cell connections.
- Biocommunication, cellular receptors

- DNA replication and DNA repair mechanisms
- Gene expression - basic principles and regulation of transcription and translation.
- Cell division and cell cycle, cell death
- Germ cells, sexosomes, insemination. Ontogenesis. Stem cells
- Chromatin, chromosomes, HUGO project. Introduction to genetics, Mendel's laws, investigative methods in genetics, human genetics, mutations, genetic engineering
- Cellular and molecular biology of cancer, oncogenes, tumor suppressor genes, metastases
Teaching includes self-study of educational videos, assigned problems and independent student work.

Recommended literature:

Alberts, B. a kol.: Základy bunečné biologie. Ústí nad Labem : Espero Publishing, 2003. 630 s. (učebnica) Kyselovič, J., Musil, P.: Všeobecná biológia - Teoretické a praktické návody na cvičenia : Stimul Bratislava, 2008, 124s. (skriptá)
Lodish, H. a kol.: Molecular Cell Biology, eight edition, W.H.Freeman and Company, 2016
Alberts, B. a kol.: Molecular Biology of the Cell, sixth edition, Garland Science, 2015.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 198

A	ABS	B	C	D	E	FX
16,67	0,0	25,76	23,23	15,66	8,59	10,1

Lecturers: Mgr. Ondrej Sprušanský, PhD., PharmDr. Katarína Hadová, PhD., PharmDr. Csaba Horváth, PhD., PharmDr. Nikola Chomaničová, PhD.

Last change: 31.03.2025

Approved by: Mgr. Ondrej Sprušanský, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/06-Mgr/26	General and Inorganic Chemistry

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
The student is obliged to complete all seminars during the semester. During the semester, the student is obliged to write 3 written tests and 1 written test on laboratory techniques. To meet the conditions for the exam, the student must obtain more than 60% of the sum of the maximum number of points of all 4 tests from the above 4 tests. The student is obliged to complete all laboratory exercises during the semester. Bonus for written tests: Points obtained from 3 written tests + 1 test on laboratory techniques are multiplied by a coefficient of 0.3 and their value constitutes 30% of the grade for the subject in case of successful completion of the exam. The obtained coefficient is valid only in the given academic year.
Exams: Subject exams are held in written form in the case of face-to-face examination or in a combined written and oral form in the case of distance examination. Participation in the exam is conditional on completing the entire program of seminars, laboratory practicals and obtaining more than 60% of the sum of the maximum number of points of all 4 tests. In the case of face-to-face examination, successful completion of the examination requires achieving more than 60% of the maximum number of points in the General Chemistry section and at the same time more than 60% of the maximum number of points in the Inorganic Chemistry section. In the case of distance examination, successful completion of the examination requires achieving more than 60% of the maximum number of points in the written part of the examination and at the same time more than 60% of the maximum number of points in the oral examination in the General Chemistry section and at the same time more than 60% of the maximum number of points in the oral examination in the Inorganic Chemistry section. The average percentage of success achieved in all parts of the examination is multiplied by a coefficient of 0.7. The test scores from seminars and laboratory techniques contribute 30% to the grade for the subject and the written exam 70%. Classification scale for the grade for the subject: A: 90.01% – 100.00%; B: 82.01% – 90.00%; C: 74.01% - 82.00%; D: 66.01% - 74.00%; E: 60.01% - 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
The aim of the course is to acquire basic knowledge in the field of general and inorganic chemistry. As part of the course, students will acquire basic laboratory skills and carry out the synthesis

of selected types of inorganic compounds. The skills acquired in the course are necessary for completing other chemistry courses such as Organic Chemistry 1, 2 and are also necessary for pharmaceutical-oriented courses, e.g. Pharmaceutical Chemistry.

Class syllabus:
The subject General and Inorganic Chemistry is the first basic subject in the comprehensive chemical preparation of pharmacy students. The first part – general chemistry – includes thematic areas necessary as a theoretical basis for subsequent subjects of chemical, pharmaceutical, biological or medical focus. Great attention is paid to the issue of chemical bonding and the structure of substances, especially to their importance in explaining the material properties of drugs, including their pharmacotherapeutic effects. The second part of the subject – systematic inorganic chemistry – presents the chemistry of elements and their compounds with a rational division according to groups of the periodic table of elements. In parallel with the explanation of the essence of the chemical reactivity of elements and their compounds, emphasis is placed on their use in pharmacy and medicine based on their function, place and importance in biological systems. Necessary attention is also paid to environmental education. The subject is comprehensively designed with a focus on the accredited master's degree in Pharmacy. Supplementation of other pharmaceutically significant knowledge from systematic inorganic chemistry is carried out in the subject Selected Chapters from Inorganic Chemistry.
The teaching includes self-study of educational videos, assigned problems and independent work by the student.

Recommended literature:
1. Krätsmár-Šmogrovič, J. a kol.: Všeobecná a anorganická chémia. Martin, Osveta 2007. 400s. (učebnica).
2. Sokolík, J. a kol.: Názvoslovie, výpočty a príprava vybraných anorganických látok. Bratislava, UK 2010. 141 s.
3. R. Chang, K.A. Goldsby: General Chemistry, The Essential Concepts, 7th edition, McGraw-Hill, 2014.
4. C.E. Housecroft, A.G. Sharpe: Inorganic Chemistry, 5th edition, Pearson, 2018.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the winter semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Ing. Martin Pisárčik, CSc., doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Lucia Lintnerová, PhD., Mgr. Peter Herich, PhD., RNDr. Roman Mikláš, PhD., Ing. Flóra Jozefíková, PhD., RNDr. Romana Bajcura, PhD., Ing. Patrícia Oláh Paračková, PhD., Mgr. Klára Oláhová, Ing. Iryna Bondar, Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/31-Mgr/25	Genetics and pharmacogenomics

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
Preliminary assessment: students will submit a pharmacogenetic testing protocol with an interpretation of the result at the last exercise, which will be assessed as "pass" / "fail". The assessment "pass" is a mandatory requirement for participation in the final exam.
The final assessment has 2 parts: a written exam assesses the acquired knowledge (makes up 50% of the total assessment) and an oral exam assesses the acquired skills in interpreting pharmacogenetic testing on patient case reports (makes up 50% of the total assessment). The minimum passing score for each part of the exam individually is at least 60%. The overall assessment is the average of both parts of the exam with the final grade according to the scale: A: 100% - 92%; B: 91.9% - 84%; C: 83.9% - 76%; D: 75.9% - 68%; E: 67.8% - 60%; Fx: 59.9% and less.

Learning outcomes:
The main objective of the course is to provide students with comprehensive knowledge of genetic factors influencing pharmacotherapy and their use in personalized medicine. The course covers the basic principles of molecular and population genetics, heredity and genetic variability, as well as their impact on pharmacokinetics, pharmacodynamics and adverse effects of drugs. Students will become familiar with pharmacogenetic testing methods, interpretation of results and their implementation in clinical practice. Emphasis is placed on the role of pharmacists in optimizing pharmacotherapy, ethical and legal aspects of pharmacogenetics and communication of genetic information with patients and healthcare professionals. The course also addresses advanced gene and nucleotide therapies, including CRISPR, siRNA and antisense oligonucleotide drugs (ASO) and mRNA drugs/vaccines, and future perspectives of pharmacogenetics.

Class syllabus:
By completing the course, students will gain knowledge in the following areas:
- Fundamentals of genetics and population genetics – Gene, genome, alleles, mutations, polymorphisms. Heredity and genetic variability in populations.
- Principles of pharmacogenetics (PGx) – Genotype-phenotype relationship, pharmacogenetic polymorphisms, impact on drug efficacy and safety.
- Pharmacogenetic testing/Genotyping – Types of genetic tests – targeted genotyping and gene sequencing, DNA isolation, sample quality, bioinformatic analysis.

- Phenotyping – Genotype versus phenotype, metabolic phenotypes, phenotyping methods, factors influencing phenotype.
- Pharmacogenetics of biotransformation/metabolic enzymes (CYP450, TPMT, NUDT15, DPYD, UGT1A1, NAT2), transporters (SLCO1B1, ABCB1, ABCG2) and other pharmacogenes (VKORC1)
- Pharmacogenetics and adverse drug reactions – Risk genes (HLA), prediction and prevention of adverse reactions.
- „Actionable“ drugs with pharmacogenetic recommendations – PGx in cardiology, psychiatry, neurology, oncology, immunology and other fields
- Implementation of pharmacogenetics – Clinical guidelines (PharmGKB, CPIC, DPWG, FDA, EMA), personalized pharmacotherapy.
- Ethics and communication – GDPR, informed consent, how to interpret and communicate sensitive PGx results.
- Pharmacogenetics in personalized medicine – The role of pharmacists, pre-emptive vs. reactive testing, PGx panels, genetic scores.
- Advanced therapies & the future of PGx – Gene therapy, CRISPR, siRNA/ASO drugs, PGX in e-health, use of artificial intelligence and multi-omics.
Students will acquire the following skills during practical exercises:
- Sample collection and DNA isolation
- DNA quantification by microspectrophotometry and quality assessment by electrophoresis
- Targeted genotyping by qPCR
- Interpretation of PGx testing results on patient case reports, including training in communicating sensitive information

Recommended literature:
Books:
- Pharmacogenomics in Precision Medicine : From a Perspective of Ethnic Differences, edited by Weimin Cai, et al., Springer, 2020. ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/uniba-ebooks/detail.action?docID=6227123.
- Pharmacogenomics: A Primer for Clinicians, edited by Jerika T. Lam, et al., The McGraw-Hill, 2021. https://accesspharmacy.mhmedical.com/content.aspx?bookid=3020&sectionid=254122611.
- Pharmacogenomics: An Introduction and Clinical Perspective, edited by Joseph S. Bertino, Jr, et al., The McGraw-Hill, 2013. https://accesspharmacy.mhmedical.com/content.aspx?bookid=511&sectionid=40849364.
Websites and databases:
- Pharmacogenomics Knowledge Base (PharmGKB), Stanford USA, 2025, https://www.pharmgkb.org/
- Pharmacogene Variation Consortium (PharmVar), Kansas City, USA, 2025, https://www.pharmvar.org/
- Clinical Pharmacogenetics Implementation Consortium (CPIC), Stanford, USA, 2025, https://cpicpgx.org/
- Dutch Pharmacogenetics Working Group (DPWG), The Royal Dutch Pharmacists Association (Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie (KNMP)), Hague, Netherlands, 2023, https://www.knmp.nl/dossiers/farmacogenetica/pharmacogenetics

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 1

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	100,0	0,0	0,0	0,0

Lecturers: Mgr. Ondrej Sprušanský, PhD., Mgr. Lenka Bies Piváčková, PhD., PharmDr. Natália Stollárová, PhD., PharmDr. Gabriel Dóka, PhD., PharmDr. Zuzana Kiliánová, PhD., Mgr. Natália Krajčírová

Last change: 31.03.2025

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/17-Mgr/26	Good Manufacturing Drugs Practice

Educational activities:
Type of activities: practicals
Number of hours:
per week: 1 **per level/semester:** 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of lectures and practical exercises is obligatory. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final written exam. Assessment: A: 93.00 –100.00%, B: 85.00–92.99%, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: less than 60.00 %

Learning outcomes:
After passing the course, the student will have a basic overview of production processes in the pharmaceutical industry and their optimization, and quality management – from the formulation of dosage forms to the final pharmaceutical product intended for therapeutic practice. The course is enriched by an excursion in a pharmaceutical plant, possibly also a thematically focused seminar work of the student. The acquired knowledge on this topic will enable the students to understand the importance of good practices in the field of pharmacy for the preparation and production of effective, safe, and quality drugs.

Class syllabus:
• Drug manufacturing, its development, future, and place in the medical care system.
• Research and development of drugs and medicines, transfer to production, and key aspects of pharmaceutical technology. Principles of Quality by Design, pre-formulation, formulation, optimization of the production process, and quality assurance during the product´s life cycle.
• Pharmaceutical legislation, registration processes, and structure of registration documentation.
• Pharmaceutical quality assurance, principles of ensuring Good Manufacturing Practice (GMP) and other practices, redundancy systems, the role of QA and QC, and the status of qualified persons.
• Pharmaceutical production - principles, organization, primary and secondary pharmaceutical production, regulation of production processes, documentation, production equipment and technical backup, sanitation and disinfection, and validation.
• Pharmaceutical quality control, PAT, and RTRT systems. Risk management. Importance of inspection.

Recommended literature:

Komárek, P., Rabišková, M. et al.: Technologie léků, 3. vyd. Praha: Galén, 2006, 399 s. (textbook)
Vlček a kol.: Vybraná farmaceutická odvětví, Praha: Profesional Publishing, 2004, 176 s.
Aulton, M. E.: Aulton´s Pharmaceutics: the design and manufacture of medicines. Edinburgh: Churchill Livingstone, 2007
European Pharmacopoeia current edition, Strasbourg: EDQM.
Eudralex – Volume 4, European Commission. Available online: https://ec.europa.eu/health/documents/eudralex/vol-4_en
European Medicines Agency. Good manufacturing practice (GMP). Available online: https://www.ema.europa.eu/en/human-regulatory/research-development/compliance/good-manufacturing-practice.
Matušová, D., Bauerová, K., Tomasch, J.: Postupy a správna prax pri výskume, vývoji a výrobe liekov. Available online: http://stella.uniba.sk/texty/FAF_DMKBJT_vyvoj_vyroba_liekov.pdf

Languages necessary to complete the course:
Slovak

Notes:
The course is only available: in summer term, if enrolled at least 5 students are registered. Due to the participation of students on the excursion in a manufacturing company, the capacity of the course is limited to 40 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Miroslava Potúčková, PhD., Ing. Silvia Molnárová, PharmDr. Daniel Krchňák, DiS, PharmDr. Andrea Halenárová

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/22-Mgr/26	Health Psychology

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Completion of lectures and seminars. The exam performed by the written test with a minimum success rate of 60%.
The assessment: A = 100-93%, B = 92-85%, C = 84-77%, D = 76 -69%, E = 68-60%, FX = less than 60%.
Scale of assessment (preliminary/final): 0 / 100

Learning outcomes:
After finishing the course student will gain basic overview in the following topics: social psychology, psychology of patients, psychology of diseases and psychology of healthcare professional, information on basic types of personalities, assertive behaviour,abilities to handle conflict situations, stress, how to communicate correctly and use the verbal and nonverbal communication, how to get ready for public presentation, how to communicate with patients, colleagues, other healthcare professionals, representatives of pharmaceutical industry, insurance companies and/or media. Students through various tests can find out information on themselves (what kind of personalities they are, what should they focus on while solving of stress and conflict situations, and how they can improve their communication abilities).

Class syllabus:
- Introduction to Health Psychology.
- Psychology in disease. Relationship patient – healthcare professional in psychology.
- Personality, forming of personality and its position in social group.
- Social interaction and communication.
- Verbal communication in the work of pharmacists.
- Non-verbal communication in the work of pharmacists.
- Optimal communication in the work of pharmacists.
- Conflict in community pharmacy and its resolution in team of co-workers.
- Stress situations in community pharmacy.
- Cooperation within a team of co-workers in healthcare, leadership.
- Public presentation, job interview and presentation of self.

Recommended literature:

1. Zacharová, E., a kol.: Zdravotnická psychologie, Praha, Grada 2007, 232 s.
2. Říčan, P.: Psychologie osobnosti. Praha Grada, 2007, 200 s.
3. Kollárik, T.: Sociálna psychológia. Bratislava, UK, 2004, 548 s.
4. Bruno, t., Adamczyk, G.: Řeč těla, Praha, Grada, 2005, 112 s.
5. Medzihorský, Š., a kol.: Komunikácia a lekárenská starostlivosť, Bratislava, 2011, Linwe/KRAFT, 94 s.
6. Foltán, V., a kol.: Vybrané aspekty lekárenskej starostlivosti, Bratislava 2012, Linwe/KRAFT, 208 s.
7. Morovicsová, E., a kol.: Komunikácia v medicíne, UK Bratislava, 2011, 212 s.

Languages necessary to complete the course:
Slovak language, Czech language.

Notes:
Maximum capacity 20 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Ľubica Lehocká, PhD., doc. PharmDr. Daniela Mináriková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF.KORF/28-Mgr/26	**Course title:** Health Technology Assessment
Educational activities: **Type of activities:** lecture / seminar **Number of hours:** **per week:** 1 / 1 **per level/semester:** 14 / 14 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 8.	
Educational level: I.II.	
Prerequisites:	

Course requirements:
Student #s assessment includes a written test. The minimum success limit is 60 %. The final assessment of the exam is:
A = 100 – 85 %, B = 84 – 79 %, C = 78 – 73 %, D = 72 – 66 %, E = 65 – 60 %, FX = less than 59 %.	

Learning outcomes: By completing the study course, the student acquires basic knowledge in the field of the health technology assessment with an emphasis on the evaluation of drugs for the categorization process within the public health insurance system. Health technology assessment is an interdisciplinary process, that summarizes information on health, social, economic and ethical issues related to the use of health technology. For the purposes of Directive 2011/24 /EU, the term „Health technology“ means a medicinal product, medical device or medical and surgical procedures, as well as disease prevention, diagnosis or treatment measures used in healthcare. As part of the course, students will participate in solving case studies from real practice.	
Class syllabus: - History of health technology assessment. - The importance of health technology assessment. - Health technology assessment as a strategic tool for decision-making in the health care system. - Directive 2011/24/EU and health technology assessment. - EUnetHTA Project - Procedure of health technology assessment. The HTA Core Model is a methodological framework for production and sharing of HTA information. (The first part characterizes the health problem and the currently used technology, so it contains epidemiological and basic information about the currently available medical intervention to address this medical problem. The second area concerns the description and technical characteristics of the evaluated medical intervention. The third part deals with its clinical effectiveness. The fourth part focuses on the safety of the evaluated medical intervention. The fifth part focuses on financial costs and economic evaluation. Part six contains the ethical aspects of the evaluated medical intervention. Organizational aspects depending on the individual health care systems are part of part seven. Part eight analyzes the social aspects related to putting new	

technology into practice. The last part deals with legal analysis related to new technology in the context of the requirements of applicable legislation).
- Knowledge transfer in the context of HTA.
- Current use of health technology assessment in European countries.
- European cooperation in health technology assessment

Recommended literature:
Tesař, T., Babeľa, R.: Hodnotenie zdravotníckych technológii, Úvod do problematiky. SAP – Slovak Academic Press s.r.o., Bratislava, 2014, 96 s.
Zákon č. 363/ 2011 Z.z. o rozsahu a o podmienkach úhrady liekov, zdravotníckych pomôcok a dietetických potravín na základe verejného zdravotného poistenia a o zmene a doplnení niektorých zákonov v znení neskorších predpisov.

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/24-Mgr/26	History of Pharmacy

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
The evaluation of students takes place in the form of a written exam (70% of the final evaluation) and mandatory is elaboration of a seminar paper in the form of an essay as well (30% of the final evaluation). Minimum success rate: 60%.
Rating: A: 100-92%, B: 91-85%, C: 84-78%, D: 77-70%, E: 69-60%, FX: 59% and less.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the study course, the student aquires basic information about the historical development of pharmacy in the context of social development, focusing on the territory of Europe and Slovakia. They will get acquainted with changes in the social status of pharmacy, drugs and medicines, in the perception of health and disease in different times and cultures. Completion of this course also contributes to the formation of professional ethical opinions and professional pride of students.

Class syllabus:
1. History of pharmacy as a scientific field, basic terminology.
2. Periodization of the history of pharmacy.
3. Prehistoric medicine.
4. Medicine in ancient cultures.
5. Separation of pharmaceutical function from medicine.
6. Pharmacy as a relatively separate field. Pre-classical and classical pharmacy.
7. Differentiation of pharmacy – development of pharmaceutical sciences.
8. Differentiation of pharmacy – development of pharmaceutical branches (industry, wholesale distribution, pharmacy, education, research, control).
9. Pharmaceutical associations and organizations - development with a focus on the territory of Slovakia.
10. History of drugs and medicines.

Recommended literature:
Rusek, V. – Kučerová, M.: Úvod do studia farmacie a dějiny farmacie. Praha: Avicenum, 1983.

Bartunek, A.: Dejiny slovenského lekárnictva I. (do roku 1918). Prešov: AB Art Gallery, 2012.
Bartunek, A.: Osobnosti slovenského lekárnictva. Martin: Osveta, 2001.
Broncová, D. (ed.): Historie farmacie v českých zemích. Praha: Milpo Media, 2003.
Rusek, V. a kol.: Kapitoly z dějin československé farmacie. Bratislava: SPN, 1970.
Smečka, V. – Rusek, V. – Kolář, J. : Lékarenství I. Vývojové kroky československých lékáren se zřetelem k činnosti výdejní. Brno: VFU, 2008

Languages necessary to complete the course:
Slovak language

Notes:
The course is taught only in the winter semester

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Ing. Mgr. Ingrid Slezáková, MHA, MPH, prof. PharmDr. Tomáš Tesař, PhD., MBA

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/32-Mgr/26	Hospital Pharmacy

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
Students are evaluated in writing during the semester, the minimum success rate is 60%. Rating: A: 93-100%,B: 85-92%. C: 77-84%, D: 69-76%, E: 60-68%, Fx: less than 60%. The final evaluation of students takes place in the form of an oral exam. The oral exam is evaluated according to the knowledge demonstrated by the student in the range according to the scale of continuous assessment.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the study course, the student aquires a general overview of the field of hospital pharmacy, which in a theoretical and practical position deals with the issue of providing pharmaceutical care to patients in medical facilities.

Class syllabus:
- The position of the pharmacist in the health care system.
- Teaching is provided in hospital pharmacies (in the form of exercises).
- Demonstration and acquisition of practical skills in the preparation and dispensation of drugs to inpatients.
- Emphasis on the practical assumption of responsibility for the prepared and dispensed drug to outpatients and inpatients.
- Demonstration of drug effects and drug side effects.
- Preparation and dispensing of drugs in cooperation with a specialist.
- Progressive forms of drug distribution in the clinical environment.
- Practical use of the hospital drug formuraly.
- Work with a patients medication cards in hospital wards.
- Participation in patient management – medication practice.

Recommended literature:
Vyhláška MZ SR č. 129/ 2012 o požiadavkách na správnu lekárenskú prax
- Zákon NR SR č. 362/2011 Z.z. o liekoch a zdravotníckych pomôckach v znení neskorších predpisov

- Sýkora, J., Szücsová, S.: Nemocničné lekárenstvo v 90. rokoch 20. storočia v Slovenskej republike. Farm.Obz. 2000, 5, s. 16-17.
- Koncepcia odboru lekárenstvo, Vestník MZ SR 2006, čiastka 13.
- Fulmeková a kol: Lekárenstvo, UK Bratislava 2010,s.185
- Aktuálne vestníky MZ SR r.2010-2017 Lekárenský software

Languages necessary to complete the course:
Slovak language.

Notes:
The course is obligatory elective and it is taught only in the 8th semester of study.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Ľubica Lehocká, PhD., PharmDr. Slávka Porubcová, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/07-Mgr/26	Hygiene of Pharmaceutical Facilities

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
During the semester there will be one written test with the number of points 20, to obtain the final rating A it is necessary to obtain at least 18.5 points, to obtain the rating B at least 17 points, to obtain rating C at least 15 points, to obtain rating D at least 13.5 points and evaluation E at least 12 points. Credits will not be awarded to students who obtain less than 12 points from any written examination. To obtain credit, it is necessary to provide a final exam in writing with a minimum success rate of 60%.

Learning outcomes:
The subject focuses mainly on the explanation of the facts that are most important for the pharmacist. The rules used for compliance with hygiene air, water and waste in environment will be the first information to topic. The aim of environmental health is to inform students about how to improve the health status of the population, how to create conditions in environment that will ensure, respectively contributed to the protection of human health, its healthy development, physical and mental well-being.
Food hygiene and tools general use is a field which studies the process of nutrition and addresses how their ensure for the physiological needs of man. Nutrition can increase the overall fitness of the organism, however, if it is irrational, causes the emergence of the widespread outbreak of civilization diseases (obesity, diabetes, cardiovascular disease, tumours). Health risks associated with food are caused by foreign substances contained in food. Therefore, following to the basic rules of nutrition learn students the adverse effects of contaminants in food and their prevention against them. In terms of experts, pharmacist obtains in the last part of the subject the necessary knowledge and information about observing the rules of hygiene, of the pharmaceutical equipment, of the work in these facilities and the hygiene in the preparation of pharmaceuticals, which requires discipline, knowledge of the dangerous factors and basic knowledge of effective measures necessary to achieve the health security in terms of microbiological contamination of pharmaceutical equipment.

Class syllabus:
In the first part, the Hygiene of pharmaceutical equipment determines the basic elements of the components of the environment and their effects on human health - specifically, the position of hygiene and its role in health and the environment, air hygiene, water, waste. In the second part,

students get acquainted with the basic rules of nutrition - specifically the hygiene of nutrition and food. The third part emphasizes the hygiene of work, pharmaceutical facilities, and hygiene rules in the preparation of drugs. The basic content of the hygiene of pharmaceutical equipment is based on the current state of individual departments concerning the hygiene of a particular environment and rules or methods used in practice - hygiene requirements in pharmacy, drug handling and drug control and evaluation of microbiological purity of pharmaceutical products from sterility requirements and non-sterility according to Ph. Eur.

Syllabus of lectures:

1. A basic glossary of terms. The position of hygiene in the health system. Tasks of hygienic service. Man and his environment.
2. Environmental epidemiology.
3. Hygiene of air-physical, chemical, and biological factor effect on humans. Air quality in the preparation of drugs.
4. Hygiene of water-physical, chemical, and biological factor effect on humans. Properties of water depending on its origin and use. Drinking water supply. Water in pharmaceutical facilities.
5. Soil, solid wastes, hazardous wastes. Waste - health risks for humans. Providing solid, liquid and special waste. Wastes from pharmaceutical manufacture.
6. Occupational hygiene and health in context with environmental health. Factors of the work environment that affect human performance. Work performance, ergonomics and relaxation.
7. Nutrition and health. Energy and nutrients. Nutritional needs and recommendations at different times of life.
8. Contamination of food. Poisoning and infections associated with nutrition. Hygiene of food preparation.
9. Hygiene of pharmaceutical equipment, requirements for construction and operation. Sanitary hygiene. Environmental contamination of the pharmacy and hygienic regime. Personal hygiene of workers in the pharmaceutical facility.
10. Microbiological quality of pharmaceutical preparations. Hygiene of drug preparation. Hygiene measures from the point of view of the good manufacturing practice.
11. Products are required to be sterile. Requirements of the European Pharmacopoeia.
12. Products does not require to comply with the test for sterility. Requirements of the European Pharmacopoeia.
13. The impact of the environment on the human immune system.

Laboratory practices:

1) The air in the galenical laboratory. Air quality in the preparation of drugs.
2) Water Aqua purificata (Purified water). Water quality requirements for drug preparation.
3) Validation of the hygienic regime. Validation of disinfectants.
4) Microbiological quality of drugs. Requirements for the microbiological purity of pharmaceutical products.
5) Products are required to be sterile preparations according to Ph.Eu.
6) Products are not required with the test for sterility according to Ph.Eu.

Recommended literature:

Dubničková M, Bilková A.: Hygiena pre farmaceutov. Bratislava: UK, 2011, 116 s.
Drobná E., Hrčka Dubničková M., Greifová G: Praktické cvičenia z mikrobiológie pre farmaceutov. Bratislava: UK, 2021, 174 s.
Mlynarčík, D., Májeková, H., Dubničková, M.: Farmaceutická mikrobiológia, Univerzita Komenského, Bratislava 2017, 422 s., ISBN 978-80-223-4102-8
Šulcová M., Čižmár I., Fabiánová E.: Verejné zdravotníctvo. Bratislava: VEDA, 2012, 654 s.
Ševčíková a kol.: Hygiena. Bratislava: UK, 2006. 328 s.
Európsky liekopis - aktuálna verzia, vybrané kapitoly

Tuček M. a kol.: Hygiena a Epidemilologie. Praha: Karolinum 2018, 358 s.
Podstatová H.: Základy epidemiológie a hygieny. Praha: GALÉN 2009. 158 s.

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Martina Hrčka Dubničková, PhD., doc. Mgr. Andrea Bilková, PhD., Mgr. Eva Drobná, PhD., PharmDr. Hana Kiňová Sepová, PhD., PharmDr. Gabriela Greifová, PhD., Mgr. Jana Hricovíniová, PhD.

Last change: 25.05.2026

Approved by: doc. Mgr. Martina Hrčka Dubničková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/08-Mgr/26	Immunodiagnostics

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
The student may have excused max. 2 practical classes, that will we individually examined. The student must submit correctly prepared and evaluated protocols and assigned tasks from all completed practical classes. There will be one written test during the semester; to pass, at least 60 % points must be obtained. The final exam is in written form and for successful completion it is necessary to obtain at least a rating of 60 % points.

Learning outcomes:
Students will become familiar with methods and principles of human immune profile diagnosis, factors of cellular and humoral immunity, as well as serological, immunochemical, and molecular biology techniques used to evaluate the parameters of the immune system and their use in the diagnosis of diseases. At the same time, the student will gain knowledge about the isolation and processing of samples from the patient (e.g., serum, plasma, or various types of blood cells), as well as how to use them for immunodiagnostic purposes.

Class syllabus:
The subject of Immunodiagnostics builds on the knowledge of basic and clinical immunology. It deals with the human immune profile, the state of cellular and humoral immunity and the immunochemical and molecular biology techniques used to evaluate it. It deals in detail with the latest types of vaccines (DNA, mRNA, vectors, VLPs, etc.), preparation of monoclonal antibodies and immunodiagnostic preparations, including rapid tests available in pharmacies. A separate part is devoted to up to date immunoanalytical techniques used for detection of antigens and antibodies, without which current diagnosis of diseases is not possible.

Recommended literature:
Kiňová Sepová H., Bilková A., Hrčka Dubničková M., Dudík B.: Imunologické metódy: princípy a návody na cvičenia. Bratislava: UK, 2021. 147 s.
Sapák M. a kol.: Vyšetrovacie metódy v imunológii. Bratislava: UK, 2014. 190 s
Buc M.: Základná a klinická imunológia. Bratislava: UK, 2012. 831 s.

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Andrea Bilková, PhD., PharmDr. Hana Kiňová Sepová, PhD., Mgr. Eva Drobná, PhD., PharmDr. Gabriela Greifová, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., Mgr. Jana Hricovíniová, PhD.

Last change: 25.05.2026

Approved by: PharmDr. Hana Kiňová Sepová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/23-Mgr/26	Immunology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
There will be 2 written tests during the semester; to pass, at least 60 % points must be obtained from each of them. Student has to write a report on each laboratory practice with the correct evaluation of obtained results. Maximum 2 laboratory practices may be apologised, and the student will be examined of the missed lesson. The final exam will be in written form and for its successful passing it is necessary to obtain at least 60 % of points.

Learning outcomes:
Student will gain knowledge about the mechanisms and functions of the immune system and its main significance for human life. He/She will understand that drugs applied to the body act through cellular and humoral immune mechanisms, and these are essential in the prevention and treatment of all diseases.

Class syllabus:
The subject Immunology deals with the knowledge of basic and clinical immunology. The student is familiarized with the composition and function of the human immune system, mechanisms of cell and humoral immunity, as well as the preventive, therapeutic and practical use of immunology in medicine and in pharmaceutical practice. In basic immunology, the subject deals with inflammation, fever, structure, and function of complement, cytokines, antigens, and antibodies. Emphasis is placed on the preparation and use of monoclonal antibodies in pharmacy and medicine, without which modern diagnosis and therapy of diseases would not be possible. The clinical part of immunology lectures is focused on anti-infective, anti-tumour and transplant immunity and deals also with immunopathological diseases as well as the role of immunomodulators in the prevention and therapy of some diseases. Finally, it focuses also on the production, application, and the use of vaccines and preparations for passive immunization.

Recommended literature:
Buc, M: Základná a klinická imunológia. Bratislava: UK, 2012. 831 s.
Buc, M: Základná a klinická imunológia pre študentov zubného lekárstva. Bratislava: UK, 2010. 336 s.
Sapák, M. a kol.: Vyšetrovacie metódy v imunológii. Bratislava: UK, 2014. 190 s.

Kiňová Sepová H., Bilková A., Hrčka Dubničková M., Dudík B.: Imunologické metódy: princípy a návody na cvičenia.
Bratislava: UK, 2021. 147 s.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Hana Kiňová Sepová, PhD., doc. Mgr. Andrea Bilková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., Mgr. Jana Hricovíniová, PhD.

Last change: 25.05.2026

Approved by: doc. Mgr. Andrea Bilková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/16-Mgr/26	Innovative Dosage Forms and Biological Medicines

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of the lectures and practical exercises is obligatory. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final written exam. Assessment: A: 93.00–100.00%, B: 85.00–92.99 %, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: less than 60.00%.

Learning outcomes:
Knowledge acquired by passing this course interlocks with previously acquired basic knowledge about conventional dosage forms and provides further detailed information about new trends in formulation and new applications of dosage forms. The aim is to enhance the student´s knowledge in the field of innovative dosage forms and biological medicines.

Class syllabus:
Lectures: Drug delivery systems and dosage forms for targeting. New excipients for new-generation drug formulations. Drug carriers: polymeric carriers, drug-carrier complexes, nanoparticles, nanofibres, and microspheres. Lipid carriers: NLC, SLN, and liposomes: formulation, drug incorporation, liposomal dosage forms and their perspectives. Micro- and nanoemulsions, self-emulsifying systems, multiple and dry emulsions, micro- and nanosuspensions, formulation, and applications. New trends in dermal and transdermal applications of drugs. Innovative solid and semi-solid dosage forms.
Biological medicines (BM), biosimilars, dosage forms, Fill/Finish operations, and excipients in the production of BM. Formulation, stability, and methods of evaluation of BM. BM in hormonal therapy – insulin dosage forms, possibilities in controlled liberation. Application devices. Growth hormones – use, side-effects. Enzyme therapy - lactase, pancreatase, serapeptase etc. Transfusion preparations and their quality. Plasma processing. Blood products. Medicines prepared or isolated from plasma. Thrombin inhibitors. Erythropoietins, granulocytes, colony-stimulating factors. Combination Products – wearable pumps, autoinjectors pre-filled syringes. BM in oncology - interleukins, interferons, monoclonal antibodies, antibody fragments, hematopoietic growth factors. Vaccines and BM for immune system response modulation. Allergen immunotherapy.

DNA formulations for gene therapy. Other applications of BM – dermatology, rheumatology, gastroenterology, sclerosis multiplex, macular degeneration, etc.
Practical exercises: Formulation of new dosage forms: nanodispersion drug carriers, microemulsions, nanoemulsions, and their comparison with conventional dosage forms (emulsions). Study of the influence of different excipients on the drug formulation and the physico-chemical properties. In vitro drug release assay from the prepared formulations.

Recommended literature:
Žabka, M. a kol: Moderné lieky vo farmaceutickej technológii. Bratislava: SAP, 2001.486 s.
European Pharmacopoeia current edition, Strasbourg: EDQM.
https://www.fpharm.uniba.sk/pracoviska/ustredna-kniznica/externe-informacne-zdroje/
Current available literature is listed in lectures or practical exercises with relevant theme.

Languages necessary to complete the course:
Slovak

Notes:
The course is only available: in the summer term, if at least 5 students are registered, capacity is limited to 40 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Miroslava Špaglová, PhD., PharmDr. Veronika Mikušová, PhD., PharmDr. ThLic. Mária Raučinová, PhD., PharmDr. Veronika Šimunková, PhD., doc. PharmDr. Juraj Piešťanský, PhD., doc. RNDr. Miroslava Šupolíková, PhD., PharmDr. Daniel Krchňák, DiS, PharmDr. Mária Čuchorová, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/23-Mgr/26	Innovative Medicines in Pharmacotherapy

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Phartmacology (1), Social Pharmacy and Pharmacoeconomics

Course requirements:
Mandatory 80% attendance at lectures and seminar work, in particular cases a written test.
Scale of assessment (preliminary/final): Ongoing 0 / final 100

Learning outcomes:
By completing the course, the student will gain knowledge about the advances in pharmacotherapy achieved in recent decades, the milestones in the treatment of major diseases and the importance of investment in science and research. At the same time, by completing the course, the student gets familiar with examples of innovative medical procedures in selected medical disciplines in the world and in Slovakia, as well as with obstacles or solutions that appear in practice when using new procedures.

Class syllabus:
- Characteristics of the concept and meaning of innovations in medicine (focus on pharmacotherapy)
- Research and development of new medicines with a focus on practical demonstrations of what innovation brings to patients, physicians and society
- The importance of the availability of innovation (Market Access and current trends seeking a compromise between availability and the rising costs of securing innovation entry)
- Information on the growing role of the patient in decision-making processes, which also influences the direction of future investments in innovation
- Practical examples of innovations in selected medical disciplines (1. Oncology 2. Hematooncology 3. Rheumatology and Dermatology 4. Cardiology 5. Vaccines 6. Hepatology 7. Neurology)

Recommended literature:
www.efpia.eu/topics/innovation, Laws 362/2011 and 363/2011 as amended, www.ema.europa.eu, www.nice.org.uk, www.sukl.sk

Languages necessary to complete the course:

slovak, english

Notes:
maximum number of students: 40, in case of higher interest - selection will be made based on: grade average (years 1-3), average from subjects Pharmacology and Social pharmacy and pharmacoeconomics, motivation letter, certificate (exam) proving knowledge of english language

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Tatiana Foltánová, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/17-Mgr/26	Latin Medicinal Terminology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
Active participation, taking the final test with an overall success rate of at least 60%.
Grading scale:
100 – 91% = A
90 – 81% = B
80 – 73% = C
72 – 66% = D
65 – 60% = E
59 – 0% = Fx
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
At the end of the course, students can understand the terminology correctly and use it in acquiring knowledge and practice within their field. Professional medical terminology includes mainly terms of the Latin and Greek origin used in medicine. Anatomical, pathological terms. Acquired information about specialized terms and their development helps students orient themselves to their field and understand their specialisation in the broader social and historical context, especially with increasing overall knowledge.

Class syllabus:
1. Grammatical introduction, phonetic rules of Latin, length of syllable, accent
2. Morphological introduction, introduction to the structure of medical terms
3. Latin nouns of the 1st declension, verb esse and its compounds
4. Latin nouns of the 2nd declension, verbs of the 1st conjugation
5. Adjectives of the 1st and 2nd declensions, verbs of the 2nd conjugation, adverbs
6. Latin nouns of the 3rd declension – consonant stems
7. Review of grammar
8. Latin nouns of the 3rd declension – vowel stems
9. Verbs of the 3rd conjugation
10. Greek nouns of the 1st and 2nd declensions
11. Verbs of the 4th conjugations

12. Greek nouns of the 3rd declension - consonant and vowel stems
13. Overview of grammar

Recommended literature:

• VALLOVÁ, Eleonóra. Cursus linguae Latinae ad usum pharmaciae studentium. Bratislava: Univerzita Komenského, 2016. . 978-80-223-4176-9.
• OZÁBALOVÁ, Ľudmila. Latinčina pre farmaceutov. Bratislava: Univerzita Komenského, 2017. ISBN 80-223-4323-7.
• OZÁBALOVÁ, Ľudmila, VALLOVÁ, Eleonóra and Tomáš HAMAR. Trojjazyčný latinsko-anglicko-slovenský slovník pre študentov farmácie a medicíny. Bratislava: Univerzita Komenského, 2017. ISBN 978-80-223-4347-3.
• KÁBRT, Jan and Jan KÁBRT ml. Lexicon medicum. Praha: Galén, 2015. ISBN 978-80-7492-200-8.
• European Pharmacopoeia Online 9.0
• Farmaceutický kódex 2015 – Codex pharmaceuticus Slovacus MMXV.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Nicola Sipekiová, PhD.

Last change: 27.05.2026

Approved by: Mgr. Nicola Sipekiová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/18-Mgr/26	Latin Pharmaceutical Terminology

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
Active participation, taking the final test with an overall success rate of at least 60%.
Grading scale:
100 – 91% = A
90 – 81% = B
80 – 73% = C
72 – 66% = D
65 – 60% = E
59 – 0% = Fx
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After successfully completing the course, the student is able to understand pharmaceutical terminology, and to use it correctly. Pharmaceutical terminology mainly includes terms from botany, pharmacognosy, chemistry, galenics and prescription. Acquired information on pharmaceutical terms helps students to better orient themselves in their chosen field, and to see the problematics of their specialization in a broader social and historical context, especially with the increase in the total amount of knowledge.

Class syllabus:
1. Overview of grammar of units 1-7
2. Latin adjectives of the 3rd declension
3. Greek adjectives of the 3rd declension
4. Comparison of adjectives and adverbs
5. Nouns of the 4th declension, nouns of the 5th declension
6. Verbum infinitum
7. Numerals
8. Review of grammar
9. Prepositions, prefixes
10. Compound words
11. Relative pronouns, present subjunctive

12. Grammatical structure of medical prescription
13. Final overview of grammar

Recommended literature:

• VALLOVÁ, Eleonóra. Cursus linguae Latinae ad usum pharmaciae studentium. Bratislava: Univerzita Komenského, 2016. . 978-80-223-4176-9.
• OZÁBALOVÁ, Ľudmila. Latinčina pre farmaceutov. Bratislava: Univerzita Komenského, 2017. ISBN 80-223-4323-7.
• OZÁBALOVÁ, Ľudmila, VALLOVÁ, Eleonóra and Tomáš HAMAR. Trojjazyčný latinsko-anglicko-slovenský slovník pre študentov farmácie a medicíny. Bratislava: Univerzita Komenského, 2017. ISBN 978-80-223-4347-3.
• KÁBRT, Jan and Jan KÁBRT ml. Lexicon medicum. Praha: Galén, 2015. ISBN 978-80-7492-200-8.
• European Pharmacopoeia Online 9.0
• Farmaceutický kódex 2015 – Codex pharmaceuticus Slovacus MMXV.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Nicola Sipekiová, PhD.

Last change: 27.05.2026

Approved by: Mgr. Nicola Sipekiová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/27-Mgr/26	Legal Rudiments for Pharmacists

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
During the semester, two practical cases will be solved using uncommented legislation of 25 points each. Credits will not be awarded to a student who obtains less than 12 points from any written test. The minimum success limit for both written tests is 60 %. Evaluation scale: A: 92-100%, B: 83-91%, C: 76-82%, D: 68-75%, E: 60-67%, Fx: 59% and less.

Learning outcomes:
Student receive an overview and practical skills in those areas of law with which he will come into contact after graduation as an economically active person, especially in the field of liability law, civil, labor and administrative law.

Class syllabus:
- Introduction to legal disciplines - legal norms, principles, general concepts.
- Basics of civil law - Act No. 40/1964 Coll. Civil code.
- Civil, criminal, disciplinary and contractual liability for damage/injury.
- Introduction to employment law.
- Employment relationship - pre-contractual relations, commencement and termination of employment.
- Rights and obligations of the contracting parties.
- Job description and work discipline
- Responsibility in labor law.
- Decisions, applications
- Administrative proceedings - administrative bodies, procedural parties, representation

Recommended literature:
platné právne normy – najmä zákon č. 40/1964 Zb. občiansky zákonník, zákon č. 71/1967 Zb. správny poriadok a zákon č. 311/2001 Z. z. zákonník práce.

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/18-Mgr/26	Management Basics in Pharmacy

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
1. Obligatory participation in seminars. Absence on the seminar must be proved by the reason for absence and the seminar must be replaced in agreement with the teacher.
2. Continuous test without a set minimum pass.
3. Completion of the course is done by a written exam with a minimum success rate of 60%. Rating: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-65%, E = 64-60%, FX = 59% and less.

Learning outcomes:
By completing the course, the student acquires knowledge of the theory of management and marketing with a focus on the specifics of healthcare. The student knows the basic knowledge of general management, managerial functions (decision-making, planning, control, leadership) and management as a process in the field of healthcare. He gets an overview of strategic, personnel, financial and crisis management and quality management of health care, team leadership and motivation. The student also gains basic knowledge of marketing (market, segmentation, market position, customers, marketing mix - product, price, distribution, marketing communication) in the field of healthcare and pharmacy. The student can use theoretical knowledge in the form of practical discussion, solution of case studies and management games in seminars.

Class syllabus:
The course presents a selection of thematic specific areas from the extensive issues of management and marketing theory with a focus on the specifics of management and marketing in healthcare and pharmacy:
- General theory of management, manager's thinking and directions.
- Management as a process.
- Managerial functions - management, decision-making, planning, control, leadership.
- Strategic management.
- Financial management.
- Organization, organizational structure - personnel management.
- Management and quality control.
- Team leadership and motivation.
- Specifics of healthcare management and managers.

- Crisis management in healthcare.
- Specifics of management procedures in pharmacy - patient and medical facility management.
- Basics of marketing in pharmacy - market, segmentation, market position, customer, marketing mix (product, price, distribution, marketing communication). Advertising in pharmacy.
- Marketing of medicines and assortment in the pharmacy.
- Marketing of medical equipment - pharmacy.
- Marketing and management in a pharmaceutical company.

Recommended literature:

1. Foltán V. a kol.: Manažment, marketing a lieky, Herba 2010. s. 154, ISBN 978-80-891-7168-2
2. Ozorovský V. a kol.: Zdravotnícky manažment a financovanie, Bratislava, Wolters Kluwer 2016, s. 344, ISBN 978-80-816-8522-4
3. Kotler P.: Marketing a management, Grada, 2001, s. 720, ISBN 802-47-0016-6
4. Jakušová V.: Základy zdravotníckeho manažmentu, Osveta Martin, 2010. s. 142, ISBN 978-80-806 3347-9
5. Sedlák M.: Základy manažmentu, IURA Edition 2012., s. 330, ISBN 978-80-807-8455-3
6. Karlíček M.: Základy marketingu, Grada 2018, s. 288, ISBN 978-80-247-5869-5
7. Metyš K., Balog P.: Marketing ve farmácii, Grada 2006, s. 208, ISBN 802-47-0830-2
8. Zákon č. 147/2001 Z.z. o reklame a o zmene a doplnení niektorých zákonov

Languages necessary to complete the course:
Slovak language, czech language

Notes:
Maximum capacity 60 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Daniela Mináriková, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/23-Mgr/26	Mathematic for Pharmacists

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
During the semester, students write 10 to 12 written tests of 2.5 to 5 points each, and a written test of 100 points is written at the exam. The points from the midterm tests at the seminars and the actual test at the exam are added together.
To obtain an A rating, it is necessary to obtain a total of 93 points or more, to obtain a B rating at least 85 points, to obtain a C rating at least 78 points, to obtain a D rating at least 70 points, and to obtain an E rating at least 61 points.
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
After completing the course, students will master the basics of higher mathematics, practical applications of discrete mathematics methods, an introduction to mathematical analysis, differential and integral calculus. They will use this knowledge in the study of physics, physical chemistry, biophysics, analytical chemistry, pharmaceutical technology, pharmacokinetics, as well as other related professional subjects of the pharmacy study program.

Class syllabus:
Discrete mathematics – propositional logic, sets. Arithmetic. Nuts. System of linear equations. Relations and Functions - Definition and graph of a function of one variable. Elementary functions and their properties. Differential calculus - limit and derivative, geometrical and physical meaning, investigation of the course of a function, Taylor development. Integral calculus - primitive function, indefinite and definite integral and its applications. First order ordinary differential equations and their applications in natural sciences and pharmacy. Functions of several variables – partial derivative, geometric meaning, extrema of functions of two variables.
Lectures on the subject Mathematics for Pharmacists are supplemented by a seminar where students verify their theoretical knowledge and acquire skills in solving mathematical examples.

Recommended literature:
V. Frecer: Matematika pre farmaceutov, UK, Bratislava, 2014.
M. Jasem, Ľ. Horanská: Matematika I. Zbierka úloh, Bratislava, STU, 2010.
J. Eliáš, J. Horváth, J. Kajan: Zbierka úloh z vyššej matematiky, I – IV., Bratislava, Alfa, 1989.

Languages necessary to complete the course:
Slovak language

Notes:
The course is provided only in the winter semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. Ing. Vladimír Frecer, DrSc., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Mgr. Katarína Sujová, RNDr. Michal Cagalinec, PhD., Ing. PharmDr. Lukáš Kerti

Last change: 27.05.2026

Approved by: prof. Ing. Vladimír Frecer, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KZT/01-Mgr/26	Medical Devices

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of the lectures is obligatory. Methods and options for compensating absences will be defined in the course syllabus.
The semester ends with a comprehensive semester-written exam (test). Assessment grades: A: 93,00–100,00%, B: 85,00–92,99%, C: 77,00–84,99%, D: 69,00–76,99%, E: 60,00–68,99%, FX: 59,99% and less.

Learning outcomes:
The student acquires basic knowledge about medical devices and handling them. Emphasis is placed on medical devices (MD) that are available in pharmacy and medical supplies dispensaries. The students´ knowledge also includes the process of the MDs´market access. The course focuses on important attributes of MDs, these are quality and safety. The student acquires knowledge on those MDs which are the most frequently indicated in medical and preventive health care. The student learns the MD properties, and material used, and can specify a proper handling, including storage, renovation options, and disposal.

Class syllabus:
Definition of medical devices (MDs) and an interface with drugs,
MDs classification,
Regulatory aspects of placing MD on the market, declaration of conformity, registration, distribution of MDs,
MDs for wound healing (dry wound healing, wet wound healing, burns),
MDs in outpatient health care,
MDs for self-monitoring,
Medical devices in mother and child care,
MDs for compression therapy,
MDs for diabetics,
MDs for incontinent patients and for patients with stoma,
MDs for patients with hearing and vision disorders,
MDs made of metal,
MDs in vitro diagnostic purposes,

Rehabilitation and compensation of the MDs.

Recommended literature:

Legislation
Zbierky zákonov NR SR, Vestníky MZ SR.
Zákon č. 362/2011 Z.z. o liekoch a zdravotníckych pomôckach.
European Pharmacopoeia, current edition. Strasbourg: EDQM.
https://uniba.sk/en/about/faculties-and-units/comenius-university-academic-library/externalelectronic-information-resources/
Drlíková, K., Zachová,V., Karlovská, M. a kol. 2016. Praktický průvodce stomika , Praha: Grada 2016, 192 s. ISBN 978-80-247-5712-4
Ecker, W. 2019. Medical Devices and IVDs. Market Access under the new EU-Regulations. National Library of Germany. Edition by Dr. Wolfgang Ecker, 2nd. edition, Feb 2019. 239 p. ISBN 978-3-7481-3746-7
Hliníková, E., Nemcová, J., Miertová, M. a kol. 2015. Nehojace sa rany. Martin: Osveta, 2015. 284 s. ISBN 978-80-8063-433-9
Kolář, J., Maly, J. 2005. Zdravotnické prostředky 1. Třídení zdravotníckych prostredků podle charakteru materiálů. Veterinárna a Farmaceutická Univerzita Brno, Farmaceutická Fakulta, 2005. 142 s. ISBN 80- 7305-545-7
Koutná, M., Ulrych, O. et.al. 2015. Manuál hojení ran v intenzivní péči. Praha: Galén, 2015, 1. vyd., 200 s. ISBN 978-80-7492-190-2.
Mináriková, D., et al. 2015. Zdravotnícke pomôcky. Legislatíva a regulácia. Vysokoškolská učebnica. Martin: Osveta, 2015. 1. vyd., 222 s. ISBN 978-80-8063-418-6
Procházková, R., Pokorná, A. 2017. Péče o okolí rány. Dermatol. praxi 2017. 11(4), s. 204–208
Ryšánková M. 2018. Inkontinence – novinky a možnosti řešení v ordinaci praktického lékaře. Med. praxi 2018; 15(5), s. 276–280
Staněk R. 2012. Inkontinence moči v ordinaci praktického lékaře. Med. praxi 2012. 9(8, 9), s. 347–353
Štechová, K. 2017. Selfmonitoring a jeho význam v moderní léčbě diabetu. Prakt. Lékáren. 2017. 13(3): 106 – 110.
Šveštková, S. 2013. Kompresivní terapie v praxi. Prakt. lékáren. 2013. 9(3), s. 117–119.

Languages necessary to complete the course:
Slovak

Notes:
The course is only available: in the winter term, if enrolled at least by 5 students are registered, the capacity is limited to 100 students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Janka Kubíková, PhD., MPH, PharmDr. Milica Molitorisová, PhD., PharmDr. Zuzana Baťová, PhD., M.Sc. Ľudmila Oreská, PhD., PharmDr. Eva Rybárová, PharmDr. Attila Kulcsár, PhD., PharmDr. Kristína Szmicseková, PhD., Mgr. Emil Babiak

Last change: 27.05.2026

Approved by: doc. Mgr. Martina Hrčka Dubničková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/28-Mgr/26	Medical Propaedeutics

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Personal attendance at all lectures and practical classes, justified absence (max 2x) is replaced according to the instructions of the teacher; to pass 1 scheduled pretests, minimally 60% rate. The final exam test is completed by students in computer by written form (distant) of examination. To pass the final exam test by students in minimally 60% rate. Evaluation (mark and score): A 91-100%, B 81-90%, C71-80%, D 66-70%, E 60-65%, FX # 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The subject Medical Propedeutics for Pharmacists is designed for pharmacy students focused on selected knowledge from medical disciplines and reflected the current state of pharmacy practice necessary to increase the quality of basic knowledge of compulsory study and professional qualifications of pharmacists. Subject content familiarises a student with a process of determining diagnosis based on physical examination, using a wide range of currently used laboratory and instrumentation procedures, screening tests and markers of some diseases, facilitates the determination of medication therapy management. An important skill is ability to communicate clearly and effectively with patients. The subject will provide general principles to prevent the emergence and spread of infectious diseases and a brief overview of vaccination and new possibilities for pharmacy-based immunization. The subject also provides space for medical education using pharmacist campaigns.

Class syllabus:
Medical history, physical examination of the patient and diagnosis, documentation of acquired health knowledge. Specifics of health status of children and seniors. Laboratory and instrumental examination methods. Laboratory and instrumentation analytical methods. Laboratory Medicine based on evidence. Implementation of laboratory diagnostics at the place of provision of Health Care Pact (Point of Care Testing PoCT). Overview of instruments analytical methods. Screening tests. Provision of physical and biochemical examinations in pharmacist - legislation, advice, dangerous waste management. Molecular markers of selected diseases. Overview of the paths and methods of drugs administration. Vaccination. The importance and role of disease prevention in society. Donation. Basics of epidemiology - Epidemiological Surveillance (tracking) of Infectious

Diseases in SR. Epidemiological methods in practice, indicators of occurrence, the result of the disease and health of the population. Pandemics. The importance and role of prevention of disease in society, educational pharmacists campaigns.
In the practical part, students will focus on investigative techniques, will gain an overview of a comprehensive analysis of blood and biochemical tests, PoCT in practice, learn about the use of various tests available in pharmacies intended for preventive diagnosis and monitoring the safety and efficacy of pharmacotherapy. Students will try basic performance and application techniques on the experimental models of skin or anatomical regions as well as how to obtain material for examination, e.g. capillary blood. Virtually try the model situations of communication with clients in a pharmacy and how a pharmaceutical campaign is prepared.

Recommended literature:

Presentations from lectures and seminars (in Moodle)
Dobiáš, V.: Klinická propedeutika v urgentnej medicíne. Praha: Grada, 2013.
Hloch, O. – Online: Propedeutika - http://new.propedeutika.cz/
Burkhardtová D. Laboratórne hodnoty ako pochopiť výsledky vyšetrení a zlepšovať ich hodnoty.
Univerzita Komenského v Bratislave
Farmaceutická fakulta
Ulica odbojárov 10
832 32 Bratislava
Rada študijného programu
pre viac študijných programov
prof. PharmDr. Ján Klimas, PhD., MPH
+421 2 9016 9101
klimas@uniba.sk
www.uniba.sk
Bratislava: Noxi, 2007.
Kovács, L. Očkovanie. Bratislava: Solen, 2012
Rusnák M. a kol. Propedeutika epidemiológie Trnava: Typi Universitatis Tyrnaviensis, 2018.
Snopková M. Lekárenská prax. Bratislava: FaF UK, 2017.
Kopecká, K., Korcová, M. a kol. Zdravotnícka etika. Martin: Osveta, 2008.
Morovicsová E. Komunikácia v medicíne. UK v Bratislave. 2014 ISBN 978-80-223-3620-8
Matejka P., Švec P. Metodická príručka pre poskytovanie biochemických vyšetrení v lekárni. Bratislava: FaF UK 2014.
Matejka P., Jeník P., Snopková M., Sukeľ O. Farský Š, Jauschová A: Štandardný postup pre výkon prevencie kardiovaskulárnych ochorení v podmienkach verejných lekární. Vestník Ministerstva zdravotníctva Slovenskej Republiky, Osobitné vydanie, 15.1.2023, ročník 71, strana 394.
Balla J. Laboratórna diagnostika: Čomu je potrebné venovať pozornosť pri zavádzaní laboratórnej diagnostiky na mieste poskytovania zdravotnej starostlivosti. Slovenská spoločnosť klinickej biochémie pre SLS. ISSN 1335-2644
Titze KJ. Clinical skills for Pharmacist. Elsevier. 2020 ISBN 9780323077385

Languages necessary to complete the course:

slovak

Notes:

The capacity of subject is limited to 20 students

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Tomáš Rajtík, PhD., PharmDr. Peter Jeník, PharmDr. Peter Matejka, PhD., PharmDr. Miroslava Snopková, PhD., PharmDr. Boris Dudík, PhD.

Last change: 27.05.2026

Approved by: doc. PharmDr. Tomáš Rajtík, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KJ/20-Mgr/26	Medical Writing

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
English B2 (upper-intermediate level)

Course requirements:
- active participation in seminars
-final test
To complete the course, the student must achieve at least 60%.
A - 100% - 91%
B - 90% - 81%
C - 80% - 73%
D - 72% - 66%
E - 68% - 60%

Learning outcomes:
After completing the seminars of Medical writing students get the understanding of the medical concepts and terminology, knowledge of relevant guidelines as regards the structure and contents of specific documents, and good writing skills. They become familiar with searching medical literature, understanding and presenting research data, the document review process, and editing and publishing requirements.

Class syllabus:
Medical writing involves writing different types of documents for different purposes, and for different audiences.
1. Medical Education (physician, patient)
2. Medical marketing of healthcare products
3. Publication/Presentation
4. Research Documents
5. Regulatory Documents

Recommended literature:
Taylor, R.B.: Medical Writing. Springer International Publishing AG, 2018

Languages necessary to complete the course:

English language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PaedDr. Viera Žufková, PhD., Mgr. Natália Kližanová

Last change: 27.05.2026

Approved by: PaedDr. Viera Žufková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/06-Mgr/26	Medicinal Plants

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Active attendance at the lectures and excursions is required, including work with herbarium specimans (25 pts.). Students have to prepare and defend their seminary work (30 + 45 pts.).
Final grade:
A: 100 - 94 pts., B: 93 - 85 pts., C: 84 - 78 pts., D: 77 - 71 pts., E: 70 - 60 pts., FX – 59 and less
Scale of assessment (preliminary/final): 25/75

Learning outcomes:
Students will learn to identify most important medicinal plants, students will learn fundamentals about dispersal, conservation, production, harvesting, processing and manufacturing of medicinal plants.

Class syllabus:
The lessons concentrate on the following topics: dispersal, conservation, production, harvesting, processing, and manufacturing of medicinal plants, Identification of pharmaceutically important medicinal plants.

Recommended literature:
Habán M. et al., 2013: Liečivé rastliny. Nitra : SPU, 2013
Habán M., Žitniak Čurná V., Korczyk-Szabó J., 2025: Rozšírenie liečivých rastlín v prírodných a kultúrnych agroekologických podmienkach Slovenska. Nitra : SPU, 200 s. ISBN 978-80-552-2817-4.
Habán M., Ďuriška O, 2025: Vybrané kapitoly zo seminárnych cvičení v elektronickej forme cez MS Teams.
Habán, M., Habánová, M., 2020: Liečivé a koreninové rastliny vo výžive ľudí/kapitola 13.7 In: Chlebo P., Keresteš P. et al., Zdravie a výživa ľudí 2. Vysokoškolská učebnica. Bratislava: CAD PRESS, s. 1392--1407. ISBN 978-80-88969-89-1 (viaz.).

Languages necessary to complete the course:
English

Notes:

The course is open to a minimum of 4 students and a maximum of 25 students.
Teaching schedule: 4 hrs per every second week.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. Ing. Miroslav Habán, PhD., Mgr. Ondrej Ďuriška, PhD.

Last change: 27.05.2026

Approved by: prof. Ing. Miroslav Habán, PhD., prof. PharmDr. Pavel Mučaji, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/13-Mgr/26	Metallodrugs and Nanoparticles as Modern Pharmaceuticals

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
Final assessment: exam in the form of a comprehensive test.
A: 90.01% – 100.00%; B: 82.01% – 90.00%; C: 74.01% – 82.00%; D: 66.01% – 74.00%; E: 60.01% – 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Apply basic knowledge of bioinorganic and biocoordination chemistry, as well as nanotechnology, in the field of pharmacy.

Class syllabus:
The teaching of the subject is focused on modern directions of development of new drugs using bioinorganic chemistry. In addition to complex metal compounds, it also deals with the current research area of application of nanoparticles in diagnostics and therapy (nanomedicine).
Complex metal compounds, as well as nanoparticles, provide new possibilities for the preparation of biologically active substances with a mechanism of action different from purely organic compounds. This allows obtaining drugs with an extended spectrum of effectiveness. After a brief introduction to the historical development of the use of metals in pharmacy, the basic directions of the current use of these substances are presented, for example in antimicrobial or antineoplastic therapy. Subsequently, new directions and perspectives of the development of drugs based on coordination metal compounds are outlined. The second part of the subject deals with the modern field of nanomedicine. In addition to the basic physicochemical properties of nanoparticles, the basic methods of their preparation and experimental characterization are also described. Finally, the lecture focuses on the bioactivity of nanoparticles and promising areas of their use in pharmacy.

Recommended literature:
Krätsmár-Šmogrovič, J. a kol.: Všeobecná a anorganická chémia. Martin : Osveta, 2007. 400 s. (učebnica).
Kaim W., Schwederski B., Klein A. Bioinorganic chemistry: inorganic elements in the chemistry of life. Chichester: John Wiley & Sons Ltd 2013.
Dabrowiak J.C. Metals in Medicine (2nd ed.) Chichester: John Wiley & Sons Ltd 2017.

Lawrance G.A. Introduction to Coordination Chemistry. Chichester: John Wiley & Sons Ltd 2010.
Burgess R. Understanding Nanomedicine – An Introductory Textbook. Boca Raton: CRC Press 2012.
P. Prasher, M. Sharma: Silver Nanoparticles: Synthesis, Functionalisation and Appications, Bentham, 2022.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the summer semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Ing. Ladislav Habala, Dr.rer.nat., doc. Ing. Martin Pisárčik, CSc.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/11-Mgr/26	Microbiology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
The condition is the completion of all practical exercises, submission of reports and in the continuous evaluation 60% success in tests (2 written tests per semester, obtain 60% of each). The subject exam has two parts: written and oral. The results from all forms of the test contribute equally to the evaluation result. A: 100-92%, B: 91-84%, C: 83-76%, D: 75-67% E: 66-60%.

Learning outcomes:
By passing through the subject, the result should be knowledge of the basics of general microbiology and the characteristics of the most important microorganisms from a pharmaceutical point of view (infectious disease agents, producers of antimicrobial drugs and other pharmaceutically used substances, eg vaccines). In practical activities, these are the basics of working with microorganisms and their evidence in pharmaceuticals.

Class syllabus:
Characteristics of microorganisms and their properties, characteristics of bacteria, fungi, protozoa, viruses and prions, basics of biochemistry and genetics of microorganisms, interaction of microorganisms with the environment and host, pathogenicity and virulence, fight against unwanted microorganisms, pharmaceuticals in prophylaxis and therapy of infectious diseases, effect of antimicrobial drugs, mechanisms of resistance of microorganisms to antimicrobial substances, importance of microorganisms for pharmacy and their use in pharmacy, ecology of microorganisms inhabiting pharmaceutical plants and medicinal products, microbiological control, quality of drugs..
Lectures:
1. Subject of the microbiology. Pharmaceutical microbiology. Characterization and classification of microorganisms.
2. Bacterial growth. Bacterial culture and cultivation. Reproduction of bacterial cells. Biofilm. Communication between bacteria. Genetics of bacteria. Modifications and mutations.
3. Relationships between microorganisms and their hosts. Factors and principles of pathogenicity, virulence and infection.
4. Properties of selected bacterial species. Spirochetes, Chlamydia, Proteobacteria.
5. Morphology, habitat, pathogenicity, therapy, prophylaxis of infections caused by gram-positive bacteria.

6. Antibiotics and synthetic antimicrobial chemotherapeutics
7. Bacterial resistance to antibiotics and non-antibiotic antimicrobial agents.
8. Properties, structure and replication of viruses.
9. Classification of viruses. Properties of selected viral species.
10. Structure, habitat, reproduction and pathogenicity of fungi and protozoa. Medically important species. Antifungal and antiprotozoal antibiotics and chemotherapeutics.
11. Sterilization, disinfection and preservation. Principles and practice. Sterilization control and sterility testing.
12. Ecology of microorganisms as it affects pharmaceutical industry. Microbial spoilage of pharmaceutical products.
PRACTIVAL EXERCISES:
Exercise 1: Laboratory safety. Manipulation of microorganisms. Pipette handling. Aseptic technique. Gram stain. Examination of bacteria – Bright field microscopy.
Exercise 2: Growth of microbial population. Measuring microbial growth.
Exercise 3: Bacteria from the genera Staphylococcus. Properties and identification of the bacteria from the genera Streptococcus. TEST1
Exercise 4: Bacterial resistance to antibiotics and non-antibiotic antimicrobial agents. Principles and methods of assaying antibiotics. Methods of evaluation of bacterial sensitivity
Exercise 5: Yeast and microscopic fibrous fungi - morphology, cultivation in laboratory conditions. TEST 2
Exercise 6: Identification and properties of the bacteria of the family Enterobacteriaceae. Differential plating. Biochemical Tests.

Recommended literature:

Mlynarčík, D., Májeková, H., Dubničková, M.: Farmaceutická mikrobiológia, Univerzita Komenského, Bratislava 2017, 422 s., ISBN 978-80-223-4102-8
Liptákova A. a kol. Lekárska mikrobiológia. Herba., Bratislava 2019, 952 s., ISBN 978-80-89631-91-9
Ondriska F.: Lexikón lekárskej parazitológie. HPL Servis s. r. o., Bratislava 2012, 82 s., ISBN 978-80-970873-3-3
Štefkovičová M. a kol.: Dezinfekcia a sterilizácia - teória a prax - II, vyd. VRANA, Žilina 2007,164 s., ISBN 978-80-968248-3-0
Beran J., Havlík J., Vonka V.: Očkování. Galén 2005, 348 s., ISBN 80-7262-361-3
Votava, M. a kol.: Lékařská mikrobiologie obecná. Brno: Neptun, 2005, 351 s., ISBN80-86850-00-5 Votava, M. a kol.: Lékařská mikrobiologie speciální. Brno: Neptun, 2003, 495 s., ISBN80-902896-6-5
Talaro, K. P., Chess, B. Foundations in Microbiology. 8th ed. New York : McGraw – Hill, 2012. ISBN 978-0-07-131673-6
Beneš J. Antibiotika. Grada Publishing, a.s. 2018 ISBN978-80-271-0636-3
Denyer, S. P., Hodges, N. A., Gorman, S. P. (ed.) Hugo and Russell´s Pharmaceutical Microbiology. 8th ed. London : Blackwell, 2011, ISBN 978-1-4443-3063-2

Languages necessary to complete the course:
Slovak language.

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Eva Drobná, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., doc. Mgr. Andrea Bilková, PhD., PharmDr. Hana Kiňová Sepová, PhD., PharmDr. Gabriela Greifová, PhD., Mgr. Jana Hricovíniová, PhD.

Last change: 25.05.2026

Approved by: doc. Mgr. Martina Hrčka Dubničková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFCh/08-Mgr/22	Molecular Basis of Drug Development

Educational activities:
Type of activities: practicals / lecture / seminar
Number of hours:
per week: 1 / 1 / 1 **per level/semester:** 14 / 14 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
Final Assessment: written final examination.
The evaluation of exam: 100 – 92 % (evaluation level A), 91 – 84 % (B), 83 – 76 % (C), 75 – 68 % (D), 67 – 60 % (E), less than 60 % (FX, not passed).
Scale of assessment (preliminary/final): 0 / 100

Learning outcomes:
Basic knowledge of modern methods and principles used in the design, research and development of drugs in the rational drug design.

Class syllabus:
The main objective of the subject is to provide new knowledge to students in the field of molecular basics of drug development, focusing mainly on methods of drug design (classical procedures, rational methods, chemical and biological information systems in the field of drug design, structure-activity relationships, methods of molecular modeling and molecular graphics), drug targets (proteins, enzymes, receptors, nucleic acids, lipids), drug-receptor interaction (thermodynamic, kinetic and structural analysis of drug-receptor interaction) and drug development(development of drugs from natural sources, synthetic analogs, receptor theories, 3D structure aided drug development, computer-aided drug development (CADD).
This subject is a part of pharmaceutical chemistry - its general part, whose methods and principles are generally applicable in drug development in any therapeutic group.

Recommended literature:
Remko, M.; Čižmárik J.: Vybrané kapitoly z farmaceutickej chémie: Molekulové základy vývoja liečiv, UK, 1997
Remko, M.: Metódy výskumu a vývoja liečiv. Bratislava: SAP, 1999.
Remko, M.: Molekulové modelovanie. Princípy a aplikácie. Bratislava: SAP, 2000.
Remko, M.: Medicínska chémia. SAP, 2002.
Remko, M.: Základy medicínskej a farmaceutickej chémie. Bratislava: Remedika, 2019.

Languages necessary to complete the course:
Slovak.

Notes:
The capacity of the course is limited to 40 students.

Past grade distribution
Total number of evaluated students: 81

A	ABS	B	C	D	E	FX
69,14	0,0	8,64	7,41	7,41	4,94	2,47

Lecturers: PharmDr. Vladimír Garaj, PhD., Ing. Stanislava Šoralová, PhD., Ing. Ondrej Cehlár, PhD.

Last change: 28.03.2022

Approved by: PharmDr. Vladimír Garaj, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/22-Mgr/22	Molecular Biology of Drug Effects

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
100% participation in all forms of education. The final exam has a writing form and for successful completion, it is necessary to obtain a minimal 60%.
Scale of assessment (preliminary/final): Grade A corresponds to obtaining min. 92% of the maximum number of points; B - 84%, C - 76%, D - 68%, E - 60%, Fx less than 60%.

Learning outcomes:
After completing of lectures the student is able to understand deeper knowledge about the flow of genetic information and its possible influencing by drugs, about cell signaling systems due to the mechanisms of drug effects, and about the molecular-biological basis of some diseases and their therapy (f.e. influenza, AIDS, Alzheimer's disease). By completing of laboratories the student will acquire a basic practical routine in the molecular biology laboratory practice (isolation of nucleic acids from biological material, electrophoretic procedures, PCR).

Class syllabus:
The flow of genetic information – the influencing possibilities of drugs: replication, transcription, translation and posttranslational modifications. Mutations and DNA repair mechanisms. Intracellular compartments and protein transport. Molecular-biological basis of some diseases. Principles of cell communication (cell signalling system). Networking of protein kinases and integration of signal processing. Transport processes in the cell. Principles of the DNA recombinant technology. Principles of gene manipulations. DNA and RNA vaccines.

Recommended literature:
Obložinský M. a kol.: Molekulárna biológia účinku liečiv a biotechnológia pre farmaceutov. 1.vyd. Bratislava: Univerzita Komenského, 2010.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 248

A	ABS	B	C	D	E	FX
22,18	0,0	23,39	20,16	20,16	10,89	3,23

Lecturers: RNDr. František Bilka, PhD., doc. PharmDr. Marek Obložinský, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., PharmDr. Andrea Balažová, PhD., Mgr. Ivana Holková, PhD.

Last change: 28.04.2025

Approved by: RNDr. František Bilka, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/06-Mgr/24	Movement and Health

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
- active participation in lectures - 100% participation
- successful completion of a written examination
A 92-100%, B 84-91%, C 76-83%, D 68-75%, E 60-67%, Fx< 60%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the course, students will gain information about the latest systems and methods of exercise, which can effectively solve acute and chronic problems of the organ and locomotor system. They will get acquainted with the possibilities and choice of physical activity in case of movement deficit. They will learn to prevent and solve problems after injuries using specific exercises and methods of regeneration. Physical activity also in your free time, and thus gain habits to create an optimal lifestyle in the long run.

Class syllabus:
- What precedes sports activity with a recommendation of when, where and how to start.
- Physical activity focused on the physical development of healthy people (fitness training) and improving the health of specific groups of the population.
- Exercise (preventive and curative) methods, methods and systems of exercises that help with diseases, injuries and stressful periods of life.
- Specific exercise programs, focused on a selected health problem.
- Specifics of physical activity in healthy people and people with diseases of the organ or musculoskeletal system.
- An overview of the most common injuries and injuries in selected sports activities, how to prevent them.
- Focus on individual physical activities, with specifics for age, health and interest groups.
Methodical videos - basic principles, procedures and principles of movement therapy:
1. Physical activity in everyday life
2. Addressing the negative consequences of physical activity
3. Regeneration after physical and mental stress
4. Developmental kinesiology

5. Back pain
6. Joint pain
7. Overweight and obesity - obese patient
8. Diabetes mellitus II. type
9. Bronchial asthma
10. Osteoporosis
11. Arterial hypertension
12. Hormonal imbalance

Recommended literature:

BINOVSKÝ, A. 2001. Systematická a funkčná športová anatómia. Bratislava 2001. ISBN: 80-88901-42-1
ČALKOVSKÁ, A. a kol. 2010. Fyziológia človeka pre nelekárske študijné programy. Martin: Osveta 2010. ISBN 978-80-8063-344-8
KENNEY, W. – WILMORE, J. – COSTILL, D. 2015. Physiology of sport and exercise. 6. Vyd. Champaign: Human Kinetics, 627 s. ISBN: 978-1-4504-7767-3
MÁČEK,M. akol.2010. Základy zátěžové fyziologie. www.tvl.lf2.cuni.cz. 2010
McARDLE VD, Katch V L,. Exercise Physiology. Lippincott Williams & Wilkins, baltimore, 2007, 1068 s.
NOVOTNÝ, Jan. 2014. Sportovní medicína. 1. vyd. Brno: Masarykova univerzita, 123 s. ISBN 978-80-210-7408-8
POWERS SK & Howley ET., Exercise Physiology, theory and Application of Fitness and performance, 6.vyd, McGraw-hill Int. Edition, 2007.
UKROPEC, J. – UKROPCOVÁ, M. 2012. Adipose tissue and skeletal muscle plasticity in obesity and metabolic disease. Dyslipidemia - from prevention to treatment. - Rijeka : InTech, s. 141-172. - ISBN 978-953-307-904-2.
UKROPCOVÁ, M. – UKROPEC, J.: 2013. Fyzická aktivita, obezita a zdravie. Klinická obezitológia. Brno: Facta Medica, 2013. s. 102-122, ISBN 978-80-904731-7-1.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 244

A	ABS	B	C	D	E	FX
98,77	0,0	0,41	0,0	0,0	0,0	0,82

Lecturers: Mgr. Dalibor Ludvig, PhD., Mgr. Lenka Nagyová, PhD., PaedDr. Martina Tibenská, PhD., Mgr. Michal Tokár, PhD.

Last change: 30.07.2024

Approved by: PaedDr. Martina Tibenská, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/08-Mgr/26	New Trends in Analytical Chemistry

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Obligatory elective course. Practices take place in working groups focused on the selected analytical method, into which students enroll at the beginning of the semester. Student participation in all forms of teaching is mandatory to the extent specified in the curriculum. During the semester, students prepare a semester work on a given topic. The submitted and defended semester work is a requirement for successful completion of the course exam. To pass the exam, one must obtain at least 60% of the possible points. The exam is conducted in the form of a written test. An A rating corresponds to obtaining at least 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
The course expands the knowledge gained in the module Analytical Chemistry II with the latest trends in the procedures of pretreatment and analysis of pharmaceutically relevant samples. Inthis context, it deals with the automation and miniaturization of the analytical procedure, using new materials (sensors, stationary phases, additives), methodologies (LIF, MS / MS, UHPLC, SFC, CDEKC, etc.), combined techniques (especially LC-MS, CE -MS) and multidimensional (2DLC, 2D-CE) techniques, on-line (e.g. SPE-LC) and miniaturized (microdialysis, microextraction,etc.) sample preparation prior to analysis. The student will learn the importance and the strategyof optimization, and practical application potential of such methods increasingly promoted in the effectiveness of analytical procedures in research and routine pharmaceutical laboratories.When developing a reliable analytical method, students will also become familiar with thebasics of validation of methods in the pharmaceutical analysis according to existing guidelines. Laboratory exercises are focused on the use of modern instrumental techniques, which are selected separation methods (liquid chromatography, gas chromatography, capillary zone electrophoresis,isotachophoresis), methods of polycomponent elemental analysis (radionuclide X-ray fluorescence
analysis), the latest approaches in electrochemical and spectral analytical methods as well as

computer simulation methods and molecular modeling methods. The knowledge and experience that students will gain after completing the course will be a good basis for successful completion of the diploma thesis, as well as in doctoral studies (PhD.).

Class syllabus:

• Advanced sample preparation methods prior to instrumental analysis
o microdialysis
o Microextraction (mSPE, mLLE)
o Ultrafiltration
o Ultracentrifugation
• Development, optimization, and validation of an analytical method for pharmaceutical use.
o Optimization and validation parameters of the method for pharmaceutical analysis
o Validation protocol in pharmaceutical analysis
o National and transnational pharmacopoeias in the process of validation of analytical methods
• New electrochemical methods and their specifics
o Traditional vs. new electrode materials (carbon, metal, nanomaterials)
o Electrode modifications (nanoparticles, enzymes, polymers, mediators, ionic liquids, nucleic acids)
o Electrode formats: traditional, miniaturized, screen-printed
o Advanced electrochemical techniques - electrochemical impedance spectroscopy (EIS), electrochemiluminescence (ECL), two-pulse chronoamperometry (DPCA), reverse pulse voltammetry (RPV), differential multipulse voltammetric techniques (DMPV, DN
o Affinity and biocatalytic biosensors for biomedical research and practice
• New trends in spectral methods
o Advanced Optical Methods (LIF)
o Advanced NMR techniques (2D NMR)
o Trends in mass spectrometry (tandem mass spectrometry, MSn), and ionization techniques (ESI, APPI, APCI, MALDI, ICP, ...)
• New trends in chromatographic separation methods
o New types of stationary phases (monoliths, solid-core particles, functional group modifications)
o Advances in instrumental design (UHPLC, UHTLC, SFC)
o Miniaturization of HPLC systems (micro, nano)
o Peak capacity, orthogonality, and chromatographic modes in the two-dimensional arrangement, LC-LC (heart cut analytical approach), LCxLC (comprehensive analytical approach)
o Combined multidimensional chromatographic techniques LC-GC
• New trends in electrophoretic separation methods
o Principles, advantages, limitations, and possibilities of using online sample pretreatment techniques
o Miniaturization of systems (chips)
o Combined multidimensional techniques (ITP-ITP, ITP-CZE, CZE-CZE)
o Hybrid separation techniques (capillary electrochromatography (CEC), micellar electrokinetic chromatography (MEKC)
• Specifics of analyzes of multicomponent samples by nuclear analytical methods
• Computer molecular modeling in relation to structural analysis and development of an analytical method.
o Study of metal complexes
o Prediction of analyte behaviour (parameters influencing the result during the analysis)

Recommended literature:

• Mikuš, P., Piešťanský J.: Kapilárna elektroforéza, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2014. 312p.
• Mikuš, P., Piešťanský, J., Dokupilová, S.: Kvapalinová chromatografia, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2018. 365p.
• Mikuš, P., Maráková, K,: Hyphenated Electrophoretic Techniques in Advanced Analysis, KARTPRINT, Bratislava, 2012. 217p.
• Mikuš, P.: Chiral Capillary Electrophoresis in Current Pharmaceutical and Biomedical Analysis, Intech, Rijeka, 2012. 182p.
• Labuda, J. a kol, Analytická chémia, Bratislava, STU v Bratislave, 2019, 682 s.
• Světlík J.: Molekulová spektroskopia a optické metódy, UK Bratislava, 2006. 81p.

Languages necessary to complete the course:
slovak and english language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Svetlana Dokupilová, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, doc. Ing. Dáša Kružlicová, PhD., doc. PharmDr. Katarína Maráková, PhD.

Last change: 29.05.2026

Approved by: RNDr. Svetlana Dokupilová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/04-Mgr/26	Organic Chemistry (1)

Educational activities:
Type of activities: lecture / laboratory practicals / seminar
Number of hours:
per week: 2 / 3 / 1 **per level/semester:** 28 / 42 / 14
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Recommendation: General and inorganic chemistry

Course requirements:
Seminars: The student is obliged to complete all seminars and all seminar tests during the semester. To meet the conditions for the exam, the student must obtain more than 60% of the total point value of all tests from seminar teaching. The points obtained from seminar teaching are multiplied by a coefficient of 0.3 and their value constitutes 30% of the exam value in the event of successful completion of the exam. The coefficient obtained from seminar teaching is valid only in the academic year in which it was obtained.
Laboratory pracicals: The student is obliged to complete all laboratory practicals during the semester. During the semester, the student must write one test on laboratory techniques (0-40 points) and independently complete four synthetic works (0-10 points). To meet the conditions for the exam, the student must obtain more than 60% of the total point value from laboratory exercises. The points obtained from laboratory practicals are multiplied by a coefficient of 0.1 and their value constitutes 10% of the exam value in the event of successful completion of the exam.
Exam: Exams in the subject are held mainly in written form during the exam period. Participation in the exam is conditional on completing the full program of seminar teaching, laboratory practicals and obtaining more than 60% of the total point value from seminar teaching and more than 60% of the total point value from laboratory practicals. Successful completion of the exam is conditional on obtaining more than 60% of each part of the written test. Upon successful completion, the average point value obtained from both parts of the test is multiplied by a coefficient of 0.6. The total exam grade is made up of the value obtained from seminar teaching (30%), laboratory exercises (10%) and the exam test (60%). Classification scale of the total exam result (after taking into account the result of the continuous control): A: 90.01% - 100.00%; B: 82.01% - 90.00%; C: 74.01% - 82.00%; D: 66.01% - 74.00%; E: 60.01% - 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 30+10/60

Learning outcomes:
The course provides comprehensive preparation in theoretical organic chemistry, as well as practical preparation in the field of organic synthesis focused on selected pharmaceutically important

compounds. The skills acquired in the course are necessary for completing other chemical courses such as Organic Chemistry 2 and are also necessary for pharmaceutical-oriented courses, e.g. Pharmaceutical Chemistry. The course is comprehensively designed with a focus on the accredited master's degree program in Pharmacy.

Class syllabus:
Theoretical teaching includes the basic principles of the origin of chemical bonds and the spatial structure of organic compounds, reflected in their physicochemical properties. The main attention is paid to individual types of stereoisomerism, electron effects, acid-base characteristics and salt formation, the formation and significance of conjugated and aromatic systems, especially in terms of reactivity and behavior in biological systems. Emphasis is placed on their significance in the chemistry of medicinal products and other related chemical subjects of pharmaceutical studies. The acquisition of knowledge from theoretical teaching and its application is the subject of seminar teaching. A modern element of the teaching of the subject is the use of computer technology for molecular modeling of typical organic molecules and molecules of some drugs, as well as the possibility of continuing in the optional subjects Fundamentals of Molecular Modeling and Selected Chapters in Organic Chemistry. The aim of the practical exercises is to master laboratory techniques and organic synthesis, including product identification by determining basic constants and evaluating the results of physical method measurements according to SL-1. The subject Organic Chemistry 1 is one of the basic subjects in the comprehensive chemical preparation of pharmacy students. When teaching the subject, emphasis is placed on the use of acquired knowledge from organic chemistry in pharmacy and medicine. The subject is comprehensively designed with a focus on the accredited master's degree program Pharmacy.
The teaching includes self-study of educational videos, assigned problems and independent work by the student.

Recommended literature:
1. Devínsky, F., Ďurinda, J., Lacko, I., Valentová J.: Organická chémia pre farmaceutov. Martin : Osveta, 2013. 805 s. (učebnica); 2. Devínsky, F., Heger, J.: Názvoslovie organických zlúčenín. Bratislava : UK, 2010. 259 s. (učebnica); 3. Čižmáriková, R. a kol.: Laboratórne cvičenia z organickej chémie. Bratislava, : UK, 2007, 2009. 116 s.; 4. Lukáč M., Devínsky F.: Organická syntéza. Laboratórny manuál.. Bratislava, : UK, 2015. 144 s.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the summer semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Jindra Valentová, PhD., doc. PharmDr. Miloš Lukáč, PhD., RNDr. Roman Mikláš, PhD., doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Lucia Lintnerová, PhD., Mgr. Peter Herich, PhD., doc. Ing. Martin Pisárčik, CSc., Ing. Flóra Jozefíková, PhD., Ing. Patrícia Oláh Paračková, PhD., Mgr. Klára Oláhová, RNDr. Romana Bajcura, PhD., Ing. Iryna Bondar, Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/05-Mgr/26	Organic Chemistry (2)

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Recommendation: Organic Chemistry 1

Course requirements:
Seminars: The student is obliged to complete all seminars during the semester. During seminar classes, each student must complete all seminar tests (0-40 points). To meet the conditions for the exam, the student must obtain more than 60% of the total point value of all tests from seminar classes. The points obtained from seminar classes are multiplied by a coefficient of 0.4 and their value constitutes 40% of the exam value in the event of successful completion of the exam. The coefficient obtained from seminar classes is valid only in the academic year in which it was obtained.
Exam: Exams in the subject are mainly in written form during the exam period. Participation in the exam is conditional on completing the full seminar program and obtaining more than 60% of the total point value from seminar classes. It is recommended to have successfully passed the exams in the subject General and Inorganic Chemistry and the subject Organic Chemistry 1. Successful passing of the exam is conditional on obtaining more than 60% of each part of the written test. Upon successful completion, the average point value obtained in both parts of the test is multiplied by a coefficient of 0.6. The total exam grade is made up of the value obtained from the seminar teaching (40%) and the exam test (60%). Classification scale of the total exam result (after taking into account the result of the continuous control): A: 90.01% - 100.00%; B: 82.01% - 90.00%; C: 74.01% - 82.00%; D: 66.01% - 74.00%; E: 60.01% - 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The subject provides comprehensive preparation in theoretical organic chemistry, as well as practical preparation in the field of organic synthesis focused on the area of selected pharmaceutically important compounds. The skills acquired in the subject are necessary for completing other chemistry subjects and are also necessary for pharmaceutical-oriented subjects, e.g. Pharmaceutical Chemistry. The subject is comprehensively designed with a focus on the accredited master's degree program in Pharmacy.

Class syllabus:
In theoretical teaching, the main attention is paid to systematic organic chemistry. According to individual groups of compounds, their physicochemical characteristics, properties, reactivity, types and mechanisms of reactions are discussed with an emphasis on the importance in the chemistry of drugs and other related chemical subjects of pharmaceutical studies. Basic knowledge is presented about natural substances. The acquisition of knowledge of theoretical teaching and its application is the subject of seminars. The subject Organic Chemistry 2 is one of the basic subjects in the comprehensive chemical preparation of pharmacy students. When teaching the subject, emphasis is placed on the use of acquired knowledge from organic chemistry in pharmacy and medicine. The subject is comprehensively designed with a focus on the accredited master's degree program Pharmacy.
The teaching includes self-study of educational videos, assigned problems and independent work by the student.

Recommended literature:
1. Devínsky, F., Ďurinda, J., Lacko, I., Valentová J.: Organická chémia pre farmaceutov. Martin : Osveta, 2013. 805 s. (textbook);
2. Devínsky, F., Heger, J.: Názvoslovie organických zlúčenín. Bratislava : UK, 2010. 259 s. (textbook);
3. Čižmáriková, R. a kol.: Laboratórne cvičenia z organickej chémie. Bratislava, : UK, 2007, 2009. 116 s.;
4. Lukáč M., Devínsky F.: Organická syntéza. Laboratórny manuál.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the winter semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Jindra Valentová, PhD., doc. PharmDr. Miloš Lukáč, PhD., RNDr. Roman Mikláš, PhD., Ing. Patrícia Oláh Paračková, PhD., Mgr. Klára Oláhová, Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/13-Mgr/24	Pathology

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
Mandatory 100% participation in laboratory exercises and lectures and sufficiently demonstrated readiness for practical exercises. Students' readiness for the exercises is continuously verified by tests (written, oral). Excused absence from exercises (max. 2x) is replaced by: a) substitution; b) by preparing a written work; c) written or oral examination. During the semester, students take 2 interim assessment tests (pre-tests), whose writing on at least 60% of each test conditions the possibility to participate in the final exam. Students take the final (examination) test in computer form. A pass rate of at least 60% is required for recognition of the examination test. Evaluation (mark and score): A 92-100%, B 84-91%, C 76-83%, D 68-75%, E 60-67%, FX < 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Completing the subject, students will gain knowledge of general pathology - focused on the fundamental cellular and tissue responses to pathologic stimuli, and special pathology – oriented on the specific responses of specialized organs and systems of the diseased organism. Students recognize the causes of disease, underlying mechanisms that result in the clinical signs, symptoms, and subsequent complications. Student could understand the structural and functional changes at the level of cells, tissues, organs, and systems of the diseased organism, as well as the disturbances in the regulatory mechanisms. The obtained knowledge helps him to bridge basic science to pharmacology and clinically oriented subjects.

Class syllabus:
Introduction to pathology. Concept of disease and illness, etiology, pathogenesis, clinical manifestations, classification, and incidence of diseases. Principles of molecular pathogenesis and genetics. Genetic abnormalities, developmental disorders. Hereditary diseases. Pain – etiopathogenesis, symptomatology, consequences, prophylaxis. Mechanisms of disturbances in vascular circulation. Inflammation - etiology, acute, chronic, pathomechanisms, role of blood elements, mediators. Edema. Fever. General symptomatology – causes, pathomechanisms. Alterations in blood pressure and circulation. Hypertension. Etiopathogenesis, symptomatology, compensatory mechanisms, complications. Shock (hypovolemic, cardiogenic, septic, anaphylactic, neurogenic, endocrine). Alterations in coronary circulation. Ischemic disease of the

heart. Myocardial Infarction. Definition, type/form/clinical manifestation, etiopathogenesis, symptomatology, compensatory mechanisms, consequences. Rhythm disturbances. Heart failure.
Diseases of the respiratory system. Cough, Asthma. Bronchitis, Obstructive airways disease. Respiratory insufficiency. Alterations of the digestive function. Basic manifestations of GIT disorders. Peptic ulceration - disturbances of the Gastric Juice Production. Liver diseases - jaundice, hepatitis, cirrhosis, failure.
Alterations of the Hormonal Regulation. Pathophysiology of renal disorders. General symptomatology, Glomerular diseases. Tubulo-interstitial disorders. Renal Failure. Selected disorders of the nervous system. Epilepsy, neurodegenerative disorders (Alzheimer Disease, Parkinson Disease). Sleeping disorders, memory disturbances, pathophysiology of ANS. Psychiatric disorders - anxiety and personality disorders, depression, bipolar disorder, schizophrenia. Basic concepts in oncology. Definitions and epidemiology. Classification. Benign and malignant neoplasia. Clinical manifestation, Metastasis, Prognosis. Disorders of the Sensory System.
In the practical part of subject students practice communicating ideas, interpret relevant data, analyze problems, and solve them. Students will focus on practicing basic terminology, pathophysiology of symptoms, cases in selected systems, diagnostic tests, e.g. cognitive ability testing, analysis of records of pathologically altered functions of selected organs, investigative techniques, biochemical examinations. Pathophysiology of skin changes in childhood, adulthood, older age, and infectious diseases. Diets and recommendations for special diets.
Teaching includes self-study of educational videos, assigned problems and independent student work.

Recommended literature:

MOHAN, Harsh. 2011. Patológia. 1. slovenské vyd. Bratislava: Balneotherma. ISBN 9788097015664.
MAČÁK, Jirka. 2002. Obecná patologie. 1. vyd. Olomouc: Univerzita Palackého, Lékařská fakulta. ISBN 8024404362.
MAČÁK, Jirka, MAČÁKOVÁ, Jana a DVOŘÁČKOVÁ, Jana. 2012. Patologie. 2. dopl. vyd. Praha: Grada. ISBN 9788024735306.
SILBERNAGL, Stefan a LANG, Florian. 2012. Atlas patofyziologie. 2. české vyd. Praha: Grada, ISBN 9788024735559.
NEČAS, Emanuel a kol. 2004. Patologická fyziologie orgánových systémov: Část I. Praha: Karolinum. ISBN 8024606151.
NEČAS, Emanuel a kol. 2004. Patologická fyziologie orgánových systémov: Část II. Praha: Karolinum. ISBN 8024606747.
NEČAS, Emanuel. 2006. Obecná patologická fyziologie. Praha: Karolinum. ISBN 9788024616889.
HULÍN, Ivan a kol. 2005. Patofyziológia a klinická fyziológia pre magisterské a bakalárske štúdium. Bratislava: Slovak Academic Press. ISBN 8089104665.
PLANK, Lukáš a HANÁČEK, Ján. 2007. Patologická anatómia a patologická fyziológia. Martin: Osveta. ISBN 8080632410.
KOSÍROVÁ, Stanislava a kol. 2022. Vybrané otázky ku skúške z patológie pre študentov farmácie. 1. vyd. Bratislava: Univerzita Komenského v Bratislave, 9788022355070

Languages necessary to complete the course:

Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 294

A	ABS	B	C	D	E	FX
0,34	0,0	7,48	21,09	23,81	35,03	12,24

Lecturers: doc. PharmDr. Tomáš Rajtík, PhD., doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., PharmDr. Dominika Dingová, PhD., PharmDr. Attila Kulcsár, PhD., Mgr. Kristína Ferenczyová, PhD., Mgr. Barbora Kaločayová, PhD., PharmDr. Zuzana Kiliánová, PhD., PharmDr. Nikola Chomaničová, PhD., Mgr. Linda Bartošová, PhD.

Last change: 12.09.2024

Approved by: doc. PharmDr. Stanislava Kosírová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/27-Mgr/20	Pathology of Rare Diseases

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
Mandatory attendance at 100% of lectures and seminar work: The seminar work consists of a professional translation of an ORPHANET article on a selected rare disease into the Encyclopedia of Rare Diseases, an article for the public, which will be published on the website www.sazch.sk

Learning outcomes:
By completing the course, the student will gain basic information on a heterogeneous and large group of diseases with low prevalence (6 - 8000 rare diseases with a prevalence of no more than 5 per 10 000 EU population). The aim is to inform students about basic approaches, scientific knowledge and information sources where they will be able to find important information about rare diseases in the future. Afterwards, the student will be introduced to selected rare diseases, which are already treated in Slovakia within the national network of rare disease centres. An interest in physiology and pathology, or completion of courses in this field, as well as a good knowledge of the English language are an advantage.

Class syllabus:
- The concept and definition of rare diseases in Europe and worldwide
- Rare disease diagnosis and prevention
- The importance of patient groups for the development of the topis
- Practical examples of selected rare diseases - metabolic diseases, diseases of the respiratory system, diseases of the nervous system, neuromuscular diseases, diseases of the blood, diseases of the immune system

Recommended literature:
• Kubáčková K. kolektív: Vzácná onemocnění, Mladá fronta 2014, s 304, ISBN ISBN 9788020431493
• www. orpha.net
• http://www.rd-action.eu/
• https://www.health.gov.sk/Clanok?2-vyzva-ERN-30-11-2019
• https://ec.europa.eu/health/ern_en
• https://ec.europa.eu/health/non_communicable_diseases/rare_diseases_sk

• http://sazch.sk/pracoviska-pre-zch/
• www. orpha.net
• http://www.rd-action.eu/
• https://www.health.gov.sk/Clanok?2-vyzva-ERN-30-11-2019
• https://ec.europa.eu/health/ern_en
• https://ec.europa.eu/health/non_communicable_diseases/rare_diseases_sk
• http://sazch.sk/pracoviska-pre-zch/

Languages necessary to complete the course:
slovak, english

Notes:

Past grade distribution
Total number of evaluated students: 151

A	ABS	B	C	D	E	FX
46,36	0,0	35,1	11,92	5,96	0,66	0,0

Lecturers: PharmDr. Eva Malíková, PhD., PharmDr. Eva Kráľová, PhD., MUDr. Viera Nemčeková, PhD., Ing. arch. Radoslav Herda, PharmDr. Jana Schweigertová, PhD., RNDr. Daniela Gašperíková, DrSc., doc. Mgr. Peter Vavrinec, PhD.

Last change: 12.09.2024

Approved by: doc. PharmDr. Tatiana Foltánová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/03-Mgr/26	Pharmaceutical Botany

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 3 **per level/semester:** 28 / 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Lectures: attendance on lectures
Practical lessons: active attendance on practical lessons, students have to pass two tests: 1. Anatomy of the plants (20 points); 2. Identification of the plants (20 points)
Final exam: test (60 points)
Final grade: A = 100 - 94 pts.; B = 93 – 85 pts.; C = 84 – 78 pts.; D = 77 – 71 pts.; E = 70 – 60 pts. FX = 59 pts. and less (not pass)
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Students will learn the fundamentals of plant anatomy, plant morphology and plant systematic with special emphasis on medicinal plants. Students will benefit from acquired knowledge in subjects: Medicinal plants and Pharmacognosy.

Class syllabus:
The lessons concentrate on the following topics: plant cell and plant cell organelles, plant anatomy and morphology – plant tissues and plant organs, plant reproduction, plant systematics with special emphasis on medicinal plants.

Recommended literature:
Habán M., Ďuriška O., 2025: Farmaceutická botanika - prednášky v elektronickej forme (dostupné cez MS Teams).
Habán M., Ďuriška O., Mistríková I., 2025: Vybrané kapitoly z laboratórnych cvičení v elektronickej forme (dostupné cez MS Teams).
Habán M., Žitniak Čurná V., Korczyk-Szabó J., 2025: Rozšírenie liečivých rastlín v prírodných a kultúrnych agroekologických podmienkach Slovenska. Nitra : SPU, 200 s. ISBN 978-80-552-2817-4
Eftimová J., Megyesy Eftimová J., Balážová Ľ., 2023. Farmaceutická botanika. Košice : UVLF, 258 s. ISBN 978-80-807-7816-3.
Peciar M., Bielik M., Gajdoš M., 2019. Farmaceutická botanika. Nové Mesto n. Váhom , 369 s. ISBN 978-80-570-0762-3

Jahodář L., 2012: Farmakobotanika. Praha : Karolinum.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. Ing. Miroslav Habán, PhD., Mgr. Ondrej Ďuriška, PhD., RNDr. Ingrid Mistríková, CSc.

Last change: 27.05.2026

Approved by: prof. Ing. Miroslav Habán, PhD., prof. PharmDr. Pavel Mučaji, PhD.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/500-Mgr/25	**Course title:** Pharmaceutical Chemistry
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the following subjects: Analytical Chemistry (1), Analytical Chemistry (2), Drug Analysis, Biochemistry, Pharmaceutical Physics, Pharmaceutical Chemistry (1), Pharmaceutical Chemistry (2), Physical Chemistry, Organic Chemistry (1), Organic Chemistry (2), General and Inorganic Chemistry.	
Learning outcomes: By passing the exam, the student demonstrates comprehensive knowledge from the entire field of theoretical chemistry, analytical chemistry, molecular biology and pharmaceutical chemistry. The graduate understands the connection of professional knowledge from various areas of pharmaceutical chemistry and is able to analyze and apply theoretical knowledge while providing pharmacy health care and performing other professional activities of a pharmacist.	
Class syllabus: The state exam consists of an oral theoretical exam before a state examination committee. The student randomly selects one question from the designated categories.	
State exam syllabus:	
Last change: 12.09.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFCh/05-Mgr/26	Pharmaceutical Chemistry (1)

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Recommendation. The KCHTL/01-Mgr-A/00 Organic Chemistry (1), KCHTL/02-Mgr-A/00 Organic Chemistry (2), KFANF/01-Mgr-A/00 Analytical Chemistry (1), KFANF/02-Mgr-A/00 Analytical Chemistry (2) and KBMBL/03-Mgr-A/00 Biochemistry courses are very strongly recommended to be successfully passed (with the final evaluation A-E) for the Pharmaceutical Chemistry (1) course.

Course requirements:
Conditions for successful completion of lectures and seminars from the Pharmaceutical Chemistry (1) course
a) Personal attendance at lectures (mandatory part of the education!) – a student is rigorously required to attend to all lectures following the schedule published at an official dashboard/web site of the Department of Pharmaceutical Chemistry CU; personal attendance at seminars – a student si rigorously required to attend to all seminars following the schedule published at an official dashboard/web site of the Department of Pharmaceutical Chemistry CU.
b) Successful course completion based on successful passing of all semestral preliminary evaluations with achievement of adequate (percentage) success
Students´ knowledge will be verified in a written form at 3rd and 5th seminar, respectively (two prelininary tests have to be passed); the content of preliminary tests, their evaluation as well as granting of preliminary evaluation will be the competence of the teachers responsible for teaching (supervising) of the seminars.
Each preliminary evaluation (each test) will constist of the questions following the topics listed in Syllabus of Lectures as well as Syllabus of Seminars. To pass all scheduled Seminars and semestral preliminary evaluations (2 preliminary tests), 60% or higher rate of the maximum point score must be achieved from each test.
c) The Granting of the Final Evaluation (Exam) from the Pharmaceutical Chemistry (1) Course
The final written exam from the Pharmaceutical Chemistry (1) course will last 120 minutes; particular terms, times and rooms for the exams will be listed in AIS-2.

Student is obliged to register for a particular term of the exam from the Pharmaceutical Chemistry (1) course via AIS-2 only. Only a student who is properly registered for the final exam via given electronic system will be allowed to take the exam.
The attendance of a student at the exam from the Pharmaceutical Chemistry (1) course is allowed only when all requirements listed in both a) and b) sections are fulfilled.
The exam from the Pharmaceutical Chemistry (1) course will be in a written form, i.e., a student will complete the test consisting of 25 questions. Each question will be evaluated by 2 points (the maximum number of points from the exam: 50 pts.).
The set of questions will be based on the topics listed in Syllabus of Lectures as well as Sylabus of Seminars. Thus, the questions will cover i) knowledge from general Pharmaceutical Chemistry, ii) definitions and chemical classifications (divisions) of particular pharmacodynamic classes (with a very precise chemical division of particular compounds – drugs), iii) chemical structures of selected compounds – drugs, iv) structure-biological activity relationships, structure-pharmacokinetics relationships as well as structure–toxicity relationships in detail (including a general chemical structure the compounds belonging into a relevant pharmacodynamic group as well as one drug, which chemical structure is precisely drawn), and (v) general biotransformation pathways related to particular compounds – drugs.
Evaluation of the exam from the Pharmaceutical Chemistry (1) course will be as follows: 50–47 points (evaluation level „A“), 46–44 points („B“), 43–39 points („C“), 38–35 points („D“), 34–30 points („E“), less than 30 points („FX“; not passed).
Thus, minimal requirements for the Pharmaceutical Chemistry (1) course to be successfully passed are as follows: 60% (60% and more) from the maximum point score.
Scale of assessment (preliminary/final): 0 / 100. a) Seminars from the Pharmaceutical Chemistry (1) course.Successful completion of Seminars, thus, the opportunity to participate in the final evaluation (exam) from the Pharmaceutical Chemistry (1) course, is based on successful completion of two preliminary evaluations. There is the requirement to obtain at least 60% or more of the maximum point score from each preliminary evaluation. The obtained (point) evaluation from the preliminary ones is not explicitly taken into account in the final evaluation (exam).b) Exam from the Pharmaceutical Chemistry (1) - weight in the final evaluation: 100%.
The evaluation of exam from the Pharmaceutical Chemistry (1) course and the assignment of relevant classification grades is given in the „Conditions for Successful Completion of Lectures and Seminars from the Pharmaceutical Chemistry (1) Course“ section. The exact point score from the seminars will be considered in the final evaluation (exam) from the Pharmaceutical Chemistry (1) course.

Learning outcomes:
Pharmaceutical/Medicinal Chemistry (the Pharmaceutical Chemistry (1) course) is a science unto itself, a central science positioned to provide a molecular bridge between basic science of biology and clinical science of medicine (analogous to chemistry being the (central) science between traditional disciplines of biology and physics). From a very broad perspective, a drug design may be divided into two phases fundamental concepts about: a) drugs, receptors, and drug–receptor interactions; b) drug–receptor interactions applied to human disease.
Pharmaceutical/Medicinal Chemistry is interdisciplinary, drawing very suitably on theoretical chemistry, organic chemistry, analytical chemistry, molecular biology, pharmacology, and biochemistry. Despite these complexities, Pharmaceutical/Medicinal Chemistry has its own clear line – the design and discovery of drug molecules with a comprehensive and precise definition and characterization of their properties, taking into account i) structural integrity of the drug molecules (in pharmaceutical, pharmacokinetic and pharmacodynamic phase, respectively), ii) their structural fragments (pharmacophore, toxicophore, metabophore, biophore; interchangeable bioisosteres), iii) their structural properties, iv) physicochemical features (solubility, surface activity, acid-

base and lipohydrophilic properties), v) shape properties (geometric, conformational, topological, steric), vi) stereochemical properties (optical isomers, enantiomers, geometric isomers), vii) electronic properties. Following that knowledge, structure–biological activity relationships are comprehensively investigated (SAR, QSAR).
Thorough and deep knowledge, understanding and correct interpretation of all relationships that are explained via this course is extremely important for (almost) all fields of pharmaceutical study.

Class syllabus:

Syllabus of Lectures

1st WEEK: Pharmaceutical Chemistry – General Principles, Current Concepts and Prospectives. Definitions of Terms Used in Pharmaceutical Chemistry (drug, prodrug, drug-like, ligand, receptor, bioavailability, structure–activity relationships (SAR), quantitative structure–activity relationships (QSAR), biotransformation, etc.). Classification of Drugs. Basic Principles in Lead (Drug) Development and Optimization (including some strategies of the optimization). Some Requirements for an „Ideal" Drug.

The Fate of a Drug in the Body (pharmaceutical, pharmacokinetic and pharmacodynamic aspects).

2nd WEEK: Ligand–Biomacromolecule Interactions, part 1. Types of Interactions Between Ligand and Receptor; Definitions of Some Fundamental Terms (bioactive structural part of a drug, pharmacophore, metabophore, toxicophore, etc.); Enzymes; Interactions Between a Ligand and Enzyme; Interactions Between Lingand and Nucleic Acid, Orthosteric and Allosteric Interactions; Allosteric Modulators (examples of drugs); Interactions from a Chemical Point of View (interactions involved in molecular recognition, non-bonded interactions, i.e., hydrogen bonding, ionic interactions, van der Waals interactions, interactions CH–π, interactions cation–π, hydrophobic interactions, metal chelation interactions, halogen bonding; all issues explained using examples of drugs from various pharmacodynamic groups).

3rd WEEK: Ligand–Biomacromolecule Interactions, part 2. Covalent Interactions; Covalent Bonds; Comparison of Non-Covalent, Irreversible Covalent and Reversible Covalent Inhibitors; Design of Covalent Drugs – Inhibitors; Potential Benefits and Risks Associated with Covalent Inhibitors; Mechanism of Covalent Bond Formation Between a Ligand and Effector Site (all issues explained using examples of drugs from various pharmacodynamic groups); Types of Reactive Functional Groups (irreversible covalent inhibitors, reversible covalent inhibitors); Covalent Inhibitors used in Therapeutic Practice; Covalent Inhibitors in Clinical Trials (all issues explained using examples of drugs from various pharmacodynamic groups).

4th WEEK: Prodrugs; Definition of Some Fundamental Terms; Prodrug Concepts; Basics of Prodrug Design; Purpose of Designing Prodrugs; Classification of Prodrugs; Optimization of Bioavailability (all issues explained using examples of drugs from various pharmacodynamic groups); Advantages of Prodrugs with Optimized Pharmacokinetic Properties. Some Newly Approved Drugs.

Stereochemical Aspects of Drug Development; Definition of Some Fundamental Terms (constitution, configuration, chirality, torsion angles, isomerisms, etc.); Importance of Stereochemical Properties of Drugs for Their Biological Activity (all issues explained using examples of drugs from various pharmacodynamic groups);

Hybrid Molecules, the Privileged Scaffold for Various Pharmaceuticals. Ideal Hybrid Drug Molecules´ Characteristics; Different Strategies of Hybrid Design (all issues explained using examples of drugs from various pharmacodynamic groups); Some Hybrid Drugs in Clinical Practice; Brief Introduction into Structure–Activity Relationships within Some Pharmacotherapeutic Classes of Drugs.

5th WEEK: General Anesthetics; Sedatives; Hypnotics; Anticonvulsant Drugs (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).

6th WEEK: Psychoactive Drugs, part 1. – Psycholeptic Drugs. Neuroleptics; Anxiolytics (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
7th WEEK: Psychoactive Drugs, part 2. – Psychoanaleptic Drugs. Antidepressants; Psychostimulants; Nootropics (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
Psychoactive Drugs, part 3. – Psychodysleptic Drugs. Psychedelics (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
8th WEEK: Antiparkinsonian Drugs; Emetic Agents; Anti-Emesis Drugs; Antivomitics (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
9th WEEK: Analgesics. Centrally-Acting (Opioid) Analgesics; Analgesics–Antipyretics; Antitussive Drugs; Drugs for the Treatment of Migraine (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
10th WEEK: Non-Steroidal Anti-Inflammatory Drugs (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
11th WEEK: Local Anesthetics; Muscle Relaxants (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
Discussion connected with the topics lectured previously.
12th WEEK: Adrenergics; Antiadrenergics; Antiarrhythmic Agents (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
13th WEEK: Parasympathomimetics; Parasympatholytics; Spasmolytics; Antihistamine Drugs (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
Syllabus of Seminars
1st - 2nd WEEK: Physicochemical Properties of Drugs. Solubility – Increase or Decrease in Solubility of Drugs in Aqueous or Lipophilic Environment; Lipophilic Properties of Drugs; Parameters Describing Lipophilicity. Acid-Base Properties of Drugs; Parameters Describing Acid-Base Properties; Surface Activity of Drugs; Micellar Properties of Drugs.
3rd - 4th WEEK: Biotransformation of Drugs. Phases of the Biotransformation; Biotransformation Pathways and Their Significance (all issues explained using examples of drugs from various pharmacodynamic groups).
5th - 6th WEEK: Vitamins Soluble in Water or Fat (Definitions, fundamental functions of vitamins, chemical structures of chosen vitamins, vitamins´ mechanisms of actions, structure–activity relationships, biotransformation pathways).
7th - 8th WEEK: Hormones, part 1. Hormones Derived from Amino Acids; Peptide Hormones and Proteohormones – Hypothalamic Hormones, Pituitary Hormones, Placental Hormones, Ovarian Hormones, Thyroid Hormones, Antithyroideal Compounds – Thyreostatics, Parathyroid Hormones, Pancreatic Hormones, Tissue Hormones (Definitions, fundamental functions of hormones, chemical structures of chosen hormones, hormones´ mechanisms of actions, structure–activity relationships, biotransformation pathways).
Eicosanoids (Prostacyclins, Thromboxanes, Prostaglandins, Dihydroxyleukotrienes, Peptidoleukotrienes, Lipoxins)

Peroral Antidiabetic Drugs (Definitions, drugs - systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
Pharmacotherapy of Osteoporosis (Definitions, drugs – systematic chemical classification, chemical structures of chosen drugs, mechanisms of action, structure–activity relationships, biotransformation pathways).
9th - 10th WEEK: Hormones, part 2. Steroidal Hormones – Sexual Hormones and Their Regulators; Hormones of Adrenal Cortex (Definitions, drugs – systematic chemical classification, chemical structures of chosen hormones, mechanisms of action, structure–activity relationships, biotransformation pathways).
11th - 12th WEEK Pharmaceutical Chemistry of Excipients.
Discussion connected with the topics lectured previously.

Recommended literature:

The Lectures from the Pharmaceutical Chemistry (1) Course; In Slovak
Beale, J. M., & Block, J. H. (2011). Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry. 12th Ed. Wolters Kluwer Health (Lippincott Williams & Wilkins), Philadelphia, USA, 1022 pp.
Doležal, M. a kol. (2014). Farmaceutická chemie léčiv působících na centrální nervový systém (In Czech). Praha, Karolinum, Czech Republic, 188 pp.
Doležal, M. a kol. (2016). Farmaceutická chemie léčiv působících na autonomní nervový systém (In Czech). Praha, Karolinum, Czech republic, 134 pp.
Chackalamannil, S., Rotella, D., Ward, S. (2017). Comprehensive Medicinal Chemistry III, 3rd Ed. Elsevier, Amsterdam, Netherlands, 4536 pp.
Malík, I. (2022). Farmaceutická chémia protivírusových a vybraných protinádorových liečiv (In Slovak), 1st Ed. Publishing House of the Comenius University Bratislava, Bratislava, Slovakia, 468 pp.
Patrick, G. L. (2017). An Introduction to Medicinal Chemistry. 6th Ed. Oxford University Press, New York, USA, 832 pp.
Pearson, P. G., & Wienkers, L. C. (2019). Handbook of Drug Metabolism. 3rd Ed. (Drugs and the Pharmaceutical Sciences). CRC Press, New York, USA, 616 pp.
Remko, M. (2019). Základy medicínskej a farmaceutickej chémie (In Slovak), 3. Vyd. Remedika, Bratislava, Slovakia, 480 pp.
Roche, V. F., Zito, S. V., Lemke, T. L., & Williams, D. A. (2019). Foye´s Principles of Medicinal Chemistry, 8th Ed. Wolters Kluwer Health Adis (ESP), Baltimore, USA, 1168 pp.
Silverman, R. B., & Holladay, M. W. (2015). The Organic Chemistry of Drug Design and Drug Action. 3rd Ed. Elsevier, Waltham, USA, 521 pp.

Languages necessary to complete the course:
Slovak language, Czech language, English language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., PharmDr. Vladimír Garaj, PhD., Ing. Stanislava Šoralová, PhD., doc. PharmDr. Miroslava Sýkorová, PhD.,

Ing. Jaroslav Galba, PhD., PharmDr. Iva Kapustíková, PhD., PharmDr. Matej Maruniak, PhD., PharmDr. Eva Salanci, PhD., PharmDr. Lenka Stopková, PhD., Mgr. Róbert Šandrik, PhD.
Last change: 27.05.2026
Approved by: doc. Mgr. Fils Andriamainty, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFCh/06-Mgr/26	Pharmaceutical Chemistry (2)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 5 **per level/semester:** 28 / 70
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Recommendation. The KCHTL/04-Mgr/00 Organic Chemistry (1), KCHTL/05-Mgr/00 Organic Chemistry (2), KBMBL/03-Mgr/22 Biochemistry and KFCH/05-Mgr/00 Pharmaceutical Chemistry (1) courses are very strongly recommended to be successfully passed (with the final evaluation A-E) for the Pharmaceutical Chemistry (2) course.

Course requirements:
a) The Attendance at All Required Forms of Education
Attendance at Lectures - active participation is strongly required (Lectures are the mandatory form of education!);
Attendance at Laboratory Practicals - Student is obliged to complete all Laboratory Practicals following the schedule published at an official dashboard/web site of the Department of Pharmaceutical Chemistry FPharm CU (100% attendance at the Laboratory Practicals).
b) Successful Course Completion Based On Successful Passing of All Semestral Preliminary Evaluations with Achievement of Adequate (Percentage) Success
Students´ knowledge will be verified in a written form at 3rd and 5th Laboratory Practical, respectively (two prelininary tests have to be passed); the content of preliminary tests, their evaluation as well as granting of preliminary evaluation will be the competence of particular teachers responsible for the teaching (supervising) of the Practicals.
To pass successfully all scheduled Laboratory Practicals and semestral preliminary evaluations (2 preliminary tests), 60% or higher rate of the maximum evaluation score must be achieved from each test (in other words, 60% and more).
The attendance of a student at a final evaluation (exam) from the Pharmaceutical Chemistry (2) course is based on successful passing of the requirements listed in both a) and b) sections.
c) Successful Passing of the Final Evaluation (Exam) from the Pharmaceutical Chemistry (2) Course
The exam from the Pharmaceutical Chemistry (2) couse will be in a written form, i.e., a student will complete the test consisting of 25 questions. Each question will be evaluated by 2 points (the maximum number of points from the exam: 50 pts.).

The set of questions will be based on the content of all pharmacodynamic groups listed in Syllabus of Lectures as well as Syllabus of Laboratory Practicals. Thus, the questions will cover i) definitions, chemical classifications of particular pharmacodynamic classes (with a very precise division of particular compounds – drugs), ii) chemical structures of selected compounds – drugs, iii) structure–(biological) activity, structure–pharmacokinetics as well as structure–toxicity relationships in detail (including comprehensible general chemical structure of the compounds from a relevant pharmacodynamic group as well as chemical structure one relevant compound at least) using the knowledge from general Pharmaceutical Chemistry as well as iv) knowledge regarding general biotransformation pathways applied for particular compounds – drugs.
The final written exam from Pharmaceutical Chemistry (2) course will last 120 minutes; particular terms, times and rooms for the exam will be listed in AIS-2.
Evaluation of the exam from the Pharmaceutical Chemistry (2) course will be as follows: 50–47 points (evaluation level „A“), 46–44 points („B“), 43–39 points („C“), 38–35 points („D“), 34–30 points („E“), less than 30 points („FX“; not passed).
Thus, minimal requirements for the Pharmaceutical Chemistry (2) course to be successfully passed are as follows: 60% (60% and more of the maximum point score.
Scale of assessment (preliminary/final): 0 / 100.a) Laboratory Practicals from the Pharmaceutical Chemistry (2) course.Successful completion of Laboratory Practicals, thus, the opportunity to participate in the final evaluation (exam) from the Pharmaceutical Chemistry (2) course, is based on successful completion of two preliminary evaluations. There is a requirement to obtain at least 60% or more of the maximum point score from each preliminary evaluation. The obtained (point) evaluation from the preliminary ones is not explicitly taken into account in the final evaluation (exam).b) Exam from the Pharmaceutical Chemistry (2) course - weight in the final evaluation: 100%.The evaluation of the exam from the Pharmaceutical Chemistry (2) course and the assignment of relevant classification grades is provided in the „Conditions for Successful Completion of Lectures and Laboratory Practicals from the Pharmaceutical Chemistry (2) Course“ section. The exact score from the Laboratory Practicals will be not taken into consideration in the final evaluation (exam) from the Pharmaceutical Chemistry (2) course.

Learning outcomes:
Pharmaceutical/Medicinal Chemistry (the Pharmaceutical Chemistry (2) course) is a science unto itself, a central science positioned to provide a molecular bridge between basic science of biology and clinical science of medicine (analogous to chemistry being the (central) science between traditional disciplines of biology and physics). From a very broad perspective, a drug design may be divided into two phases fundamental concepts about: a) drugs, receptors, and drug–receptor interactions; b) drug–receptor interactions applied to human disease.
Pharmaceutical/Medicinal Chemistry is interdisciplinary, drawing very suitably on theoretical chemistry, organic chemistry, analytical chemistry, molecular biology, pharmacology, and biochemistry. Despite these complexities, Pharmaceutical/Medicinal Chemistry has its own clear line – the design and discovery of drug molecules with a comprehensive and precise definition and characterization of their properties, taking into account i) structural integrity of the drug molecules (in pharmaceutical, pharmacokinetic and pharmacodynamic phase, respectively), ii) their structural fragments (pharmacophore, toxicophore, metabophore, biophore, etc.; interchangeable bioisosteres), iii) structural properties, iv) physicochemical features (solubility, surface activity, acid-base and lipohydrophilic properties), v) shape properties (geometric, conformational, topological, steric), vi) stereochemical properties (optical isomers, enantiomers, geometric isomers), vii) electronic properties. Following that knowledge, structure–biological activity relationships, structure-pharmacokinetics relationships as well as structure-toxicity relationships are comprehensively investigated (SAR, QSAR).

Thorough and deep knowledge, understanding and correct interpretation of all relationships that are explained via this course is extremely important for (almost) all fields of pharmaceutical study.

Class syllabus:

Syllabus of Lectures

1ST WEEK: Drugs Influencing a Cardiovscular System. Cardiotonics, Cardiostimulants. Vasodilating Agents (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

2ND WEEK: Antihypertensives. Drugs Influencing Veins (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

3RD WEEK: Drugs Regulating Blood Coagulation Processes. Blood Substitutes. Lipid-Lowering Drugs – Treatment of Hypercholesterolemia. Treatment of Hypertriglyceridemia (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

4TH WEEK: Hepatoprotective Agents. Diuretics, Anti-Diuresis Drugs. Ligands of Vasopressin Receptors (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

5TH WEEK: Anthelmintics. Isecticidal Agents (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Discussion connected with the topics lectured previously

6TH WEEK: Cystic Fibrosis. Emerging Cystic Fibrosis Transmembrane Conductance Regulator Modulators as New Drugs for Cystic Fibrosis (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

7TH WEEK: Antifungal Drugs. Anti-Protozoal Agents (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

8TH WEEK: Antimalarial Drugs. Anti-Tuberculosis Drugs. Anti-Leprosy Drugs (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

9TH WEEK: Antibacterial Chemotherapeutics/Antibiotics, part 1. beta-Lactam Antibiotics, beta-Lactamase Inhibitors (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

10TH WEEK: Antibacterial Chemotherapeutics/Antibiotics, part 2. Diaminopyrimidines. Quinolones (Gyrase Inhibitors). Nitrofurans (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Discussion connected with the topics lectured previously.

11TH WEEK: Antiviral Agents (Definitions, drugs - systematic division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

12TH WEEK: Cytostatics, part 1. Alkylating Agents. Compounds Forming Complexes with DNA. Compounds Generating Reactive Entities. Antimetabolites. Protein Synthesis Inhibitors. Antimitotic Drugs (Definitions, drugs - systematic division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

13TH WEEK: Cytostatics, part 2. Angiogenesis Inhibitors. PROTAC Technology, PROTAC Molecules. Inhibitors of Histone Deacetylases and Other Protein Deacetylases. Inhibitors

of Histone Methyltransferases. MAPK Signaling Pathway Inhibitors. Proteasome Inhibitors (Definitions, drugs - systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Syllabus of Laboratory Practicals

1ST-12TH WEEK – PART A

At the Laboratory Practicals, students will calculate theoretical yields of particular reactions steps from convenient syntheses of biologically active compounds – drugs.

Selected drugs to be synthesized: Acetylsalicylic Acid, Paracetamol, Phenacetine, Methyl Salicylate, Parabens (Methyl Paraben, Ethyl Paraben, Propyl Paraben, Isopropyl Paraben, Butyl Paraben etc.), Benzocaine, Lidocaine (Lignocaine), Trimecaine, Sulfanilamide, Phthalylsulfathiazole, Succinylsulfathiazole, Disulfiram, Isoniazid.

Knowledge about the methods, which can be used to purify synthesized compounds (crystallization, adsorption thin-layer chromatography, distillation), purity verification (TLC), methods to determine their melting points; practical using of the knowledge.

Principles of spectral methods to confirm structural identity of compounds (Nuclear Magnetic Resonance (1H NMR, 13C NMR), Infrared Spectrometry, Ultraviolet/Visible Spectrophotometry, etc.), and chromatographic methods (High-Performance Liquid Chromatography; HPLC); spectral identification of synthesized compounds.

Knowledge about the determinations of some physicochemical properties and/or physicochemical constants related to reaction intermediates and final compounds – drugs, i.e., solubility in various solvents, melting point values, surface properties – surface tension γ (Traube stalagmometric method), electronic properties – log ε values (UV/Visible Spectrophotometry), electronic properties – acid-base dissociation constants pKa (titration methods), lipohydrophilic properties – retention factor k (Reversed-Phase High-Performance Liquid Chromatography), partition coefficient log Pexp (shake-flask method), stability properties in acidic, alkaline and oxidizing media as well as kinetics studies; estimation of relevant parameters.

1ST-12TH WEEK – PART B

Extended knowledge regarding pharmacodynamic classes / particular drugs (introduced by a teacher; structure of the presentation: definitions, division of a pharmacodynamic class from a chemical point of view, chemical structures of particular compounds, brief but precise mechanisms of action, structure–activity relationships, structure–pharmacokinetics or structure–toxicity relationships eventually, biotransformation pathways of particular compounds) as follows:

a) Analgesics–Antipyretics,
b) Disulfiram,
c) Drugs Supporting Acidosis. Antacids and Anti-Ulcer Drugs,
d) Disinfectants and Antiseptics,
e) Sulfonamides.

Recommended literature:

The Lectures from the Pharmaceutical Chemistry (2) Course (In Slovak).

Malík, I. (2022). Farmaceutická chémia protivírusových a vybraných protinádorových liečiv (In Slovak), 1st Ed. Publishing House of the Comenius University Bratislava, Bratislava, Slovakia, 468 pp.

Andriamainty, F., & Malík, I. (2011). Farmaceutická chémia Vybrané liečivá - ich príprava a štúdium fyzikálno-chemických parametrov (In Slovak), 1st Ed. Publishing House of the Comenius University Bratislava, Bratislava, Slovakia, 216 pp.

Avendaño, C., & Menéndez, J.C. (2015). Medicinal Chemistry of Anticancer Drugs, 2nd Ed. Elsevier, Amsterdam, the Netherlands; Elsevier, Kidlington, Oxford, United Kingdom; Elsevier, Waltham, MA, USA, 744 pp.

Beale, J.M., & Block, J.H. (2011). Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, 12th Ed. Wolters Kluwer Health (Lippincott Williams & Wilkins), Philadelphia, USA, 1022 pp.
Desai, M.C., Meanwell, N.A., Thurston, D.E., Ganellin, R., Fox, D., Guccione, S., Martinez, A., Rotella, D., Belema, M., Sperandio, D.,ʃShi, P.-Y.,ʃJordan, R., Halcomb, R., Roberts, Ch., Johns, B.A., Griffin, S., Beaulieu, P.L., McCauley, J.A., Sofia, M., Xu, L., Guyer, B., & Peel, M.R. (2013). Successful Strategies for the Discovery of Antiviral Drugs: RSC (Drug Discovery). Drug Discovery Series No. 32, Royal Society of Chemistry, Cambridge, United Kingdom, 533 pp.
Firestine, S.M., Lister, T., Abel-Santos, E., Hedstrom, L., Melander, Ch., Fisher, S., Khursigara, C., Lazarides, L., Garneau-Tsodikova, S., & Balibar, C.J. (2017). Antibiotic Drug Discovery: New Targets and Molecular Entities, 1st Ed., Kindle Ed. Drug Discovery Series No. 58, Royal Society of Chemistry, Cambridge, United Kingdom, 285 pp.
Hartl, J., Doležal, M., Miletín, M., Opletalová, V., & Zimčík, P. (2012). Farmaceutická chemie IV (chemoterapeutika; In Czech), Karolinum, Praha, Czech Republic, 168 pp.
Hartl, J., Doležal, M., Krinková, J., Miletín, M., & Opletalová, M. (2012). Farmaceutická chemie III (oběhová a krevní soustava, trávící a vylučovací soustava; In Czech), Karolinum, Praha, Czech Republic, 117 pp.
Chackalamannil, S., Rotella, D., & Ward, S. (2017). Comprehensive Medicinal Chemistry III, 3rd Ed. Elsevier, Amsterdam, Netherlands, 4536 pp.
Patrick, G.L. (2017). An Introduction to Medicinal Chemistry, 6th Ed. Oxford University Press, New York, USA, 832 pp.
Remko, M. (2019). Základy medicínskej a farmaceutickej chémie (In Slovak), 3rd Ed. Remedika, Bratislava, Slovakia, 480 pp.
Roche, V.F., Zito, S.V., Lemke, T.L., & Williams, D.A. (2019). Foye´s Principles of Medicinal Chemistry, 8th Ed. Wolters Kluwer Health Adis (ESP), Baltimore, USA, 1168 pp.
Silverman, R.B., & Holladay, M.W. (2015). The Organic Chemistry of Drug Design and Drug Action, 3rd Ed. Elsevier, Waltham, USA, 521 pp.
Wermuth, C., Aldous, D., Raboisson, P., & Rognan, D. (2015). The Practice of Medicinal Chemistry, 4th Ed. Academic Press (Elsevier), San Diego, CA, USA; Kidlington, Oxford, United Kingdom, 903 pp.

Languages necessary to complete the course:
Slovak language, Czech language, English language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Fils Andriamainty, PhD., doc. PharmDr. Ivan Malík, PhD., PharmDr. Vladimír Garaj, PhD., Ing. Stanislava Šoralová, PhD., doc. PharmDr. Miroslava Sýkorová, PhD., Ing. Jaroslav Galba, PhD., PharmDr. Iva Kapustíková, PhD., PharmDr. Lenka Stopková, PhD., Mgr. Róbert Šandrik, PhD., PharmDr. Eva Salanci, PhD., Ing. Ondrej Cehlár, PhD., Mgr. Henrich Szabados, PhD.

Last change: 27.05.2026

Approved by: doc. Mgr. Fils Andriamainty, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/06-Mgr/26	Pharmaceutical Informatics

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Compulsory completion of all teaching (lectures, seminars). During the semester, 2 credit tests are written. The final exam takes place in the form of a written test. The minimum success rate is 60%. Grading scale: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-70%, E = 69-60%, FX = 59% and less.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The course connects the world of drugs and medicines with informatics and its current methods and tools. After completing the course, the student is able to independently and creatively work with information systems of drugs and drugs, interpret data on drugs and drugs in their wide range of pharmaceutical and clinical issues. By completing the course the student is able to understand pharmacotherapy as an information process, is able to use a computer as a clinical tool for treatment decisions, generate and interpret outputs, is able to communicate with drug databases, including search in digital spaces (including evidence-based pharmacy) and use advances in e-pharmacy and e-health. Upon successful completion of this course, students are qualified to use procedures and techniques of working with pharmaceutical databases and understand the flow of information in the field of drugs and medicines, including the ability to work with bibliographic databases as a source of new knowledge. The student is able to use current versions of application software in their professional activities.

Class syllabus:
The subject of the discipline Pharmaceutical Informatics is drugs and a complex of structured data about them. The course suitably synthesizes the professional pharmaceutical need for knowledge about drugs and drugs with the current necessary electronic form of collection, processing and routine use of pharmaceutical data and information.
· Information system as a central concept of pharmacoinformatics,
· Pharmaceutical computing,
· Computer as a means of implementing the professional requirements of a pharmacist for the handling of professional pharmaceutical data and media,
· Current information systems, drug and drug databases,

· Compatibility of pharmaceutical data, their current types and shapes.
· Drugs and medicines, their properties in terms of their IT specificity and with regard to the needs formulated by the information process,
· Local and network technologies in the field of medicines and drugs and work with them,
· Seminars are active and individual communication with a computer on workstations of computer laboratories in solving pharmacoinformatics problems,
· Creation of abilities, knowledge and skills in solving theoretical and practical information problems associated with drugs and medicines,
· Revellation, virtual libraries, bibliographic databases.

Recommended literature:
Professional magazine and internet resources according to individual topics.

Languages necessary to complete the course:
Slovak language, English language.

Notes:
The course is taught only in the summer semester of the academic year, the capacity of the course is limited to individual student work at the computer workplaces of the faculty, which requires the organization of capacities due to the great interest of students.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/VP-2/22	Pharmaceutical Intership

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 37,5s
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 2.., 3., 4.., 5., 6.., 7., 8.., 9., 10..

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 126

A	ABS	B	C	D	E	FX
92,86	0,0	0,0	0,0	0,0	0,0	7,14

Lecturers: PharmDr. Miroslava Snopková, PhD.

Last change: 30.09.2024

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/21-Mgr/21	Pharmaceutical Physics

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
Students are obliged to perform all laboratory experiments prescribed by the teacher and hand in all reports (assessment 0-8 points per report). Students will write at least two tests during semester regarding preparedness to experiment (assessment 0-6 points per test). In the middle and at the end of semester special tests will be written - problem solving regarding preparation and composition of solutions (assessment 0-3 points per test). The total assessment of laboratory practical is the sum of the average value of reports, average value of tests plus two special tests. Laboratory practical is successfully completed when the student achieves at least 10 points, the highest evaluation is 20 points.
During examination period students will take an exam with max. points 80. The assessment of this exam is added to the assessment of the laboratory practical and this sum determines the final mark. Students will be given details of the exam in the first week of the semester.
The total assessment of the subject: A 92-100 %, B 84-91 %, C 76-83 %, D 68-75, E 60-67, Fx 59% and less.
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
By the completion of the subject Pharmaceutical Physics student will achieve basic knowledge from these areas of physics that are necessary for understanding logical relationships in other subjects especially Physical Chemistry and Pharmaceutical Technology. Student will acquire skills needed for successful experimental work in laboratory. Student acquaints with simple physical methods described in pharmacopeia (measurement of density of liquids, surface tension of liquids, viscosity, measurement of meting and boiling point, electrical conductance of liquids, etc.). Emphasis is placed on elaboration, evaluation and interpretation of measured data.

Class syllabus:
Lectures:
Physical quantities and units.
Kinematics and dynamics of mass point: uniform motion, accelerated motion, circular motion, harmonic vibrations.
Newton’s laws. Mass and gravity. Mechanical work and power. Kinetic and potential energy.

Solid body mechanics: rotational motion, friction, distortion.
Hydrostatics: Pascal law, hydrostatic pressure, Archimedes principle, density and its measurement, surface tension and its measurement.
Hydrodynamics: flow of ideal liquid, continuity principle, Bernoulli's principle. flow of nonideal liquid. Poiseuille's law.
Heat and temperature: absolute temperature scale, thermal expansion, processes in ideal gas, state equation of ideal gas, van der Waals equation of real gas, Dalton principle, Avogadro principle, Calorimetry. Phase transitions in single-component systems. Transport of heat. 1. Fick's principle. Reversible thermodynamics: internal energy and other thermodynamic potentials. Zero, first, second and third 0, I., II. and III. law of thermodynamics.
Electrostatics: Coulomb law. Intensity and potential of electric field. electrical properties of matter. Electrical current. Ohm's law. Galvanic cells.
Magnetism: Induction of magnetic field. Magnetic properties of matter Mass spectrometry. Electromagnetic radiation and its dual nature. Geometrical optics, refraction index and its measurement. Interference and polarization of light. RTG radiation. Absorption of electromagnetic radiation. Lambert-Beer law.
List of laboratory exercises:
Mass and weight – Weighing on the analytical balance.
Weighing and preparation of aqueous solutions.
Density determination by pycnometer.
Density determination by densimeter.
Polarimetry.
Conductometry – determination of the conductivity of acetic acid solutions.
Boiling point and melting point.
Surface tension of liquids measured by stalagmometer.
Determination of viscosity using Hőppler viscosimeter.
Calorimetry – determination of the specific melting heat of ice.
Refractometry.
UV VIS spectrometry.

Recommended literature:

Oremusová J., Sarka K., Vojteková M.: FYZIKA. Laboratórne cvičenia pre farmaceutov. Bratislava, Univerzita Komenského, 2009. 102 s. (skriptá)
Video k laboratórnym cvičeniem dostupné v MS Teams.
Kopecký, F.: Prehľad fyziky pre farmaceutov I. (Mechanika, hydromechanika a náuka o teple). 4. vydanie, Bratislava, Univerzita Komenského, 1999. 184 s. (skriptá, http://www.fpharm.uniba.sk/index.php?id=2665).
Sarka, K., Kopecký, F.: Prehľad fyziky pre farmaceutov II. (Elektrina, magnetizmus a žiarenie). Bratislava, Univerzita Komenského, 1988. 104 s. (skriptá, http://www.fpharm.uniba.sk/index.php?id=2665).
Krempaský, J.: Fyzika. Bratislava, Alfa 1982. 752 s.
Halliday D., Resnick R., Walker J: Fyzika. Prometheus. Praha, 2000

Languages necessary to complete the course:

slovak language

Notes:

Past grade distribution
Total number of evaluated students: 1091

A	ABS	B	C	D	E	FX
5,59	0,0	8,62	16,41	20,35	27,96	21,08

Lecturers: RNDr. Alexander Búcsi, PhD., doc. RNDr. Jana Gallová, CSc., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Mgr. Lukáš Hubčík, PhD., Ing. Jarmila Oremusová, CSc., RNDr. Tomáš Fazekaš, PhD.

Last change: 17.06.2025

Approved by: doc. RNDr. Jana Gallová, CSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/07-Mgr/26	Pharmaceutical Propaedeutics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
Student evaluation is in the form of an exam, in writing, the minimum scale to pass is 60%. Grades: A: 92-100%, B: 83-91%, C: 76-82%, D: 68-75%, E: 60-67%, Fx: 59% and less.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing a course, students obtain a general overview of pharmacy history, pharmaceutical training, the organization and management of a pharmacy, the role of the pharmacist in the healthcare system, selected legislative standards in the field of health and pharmacy and professional pharmaceutical literature.

Class syllabus:
- Higher education in the Slovak Republic- university functions and the role of universities.
- Historical aspects of pharmacy development.
- Pharmacy and its role in the health system.
- Pharmaceutical sciences and pharmaceutical industries - their characteristics and importance.
- Development of training in pharmacy.
- Selected legislative standards in the field of healthcare and pharmacy. Pharmacy organisation and management system.
- The role of the pharmacist in the healthcare system.
- Pharmacies as medical facilities - types, expertise, activities and employees.
- Professional literature in pharmacy, work with information sources.

Recommended literature:
Chalabala, M. a kol. Encyklopédia farmácie. Martin: Osveta, 1991, 439 s. ISBN 80-217-0260-5
Dohnal, F. Studijní texty k dějinám farmacie. Praha: Karolinum, 2014, 154 s. ISBN: 978-80-246-2608-6
Meško, D. a kol. Akademická príručka. 3. vydanie, Martin: Osveta, 2013, 495 s. ISBN 80-8063-200-6
Zákon NR SR č. 362/ 2011 Z. z. o liekoch a zdravotníckych pomôckach o zmene a doplnení niektorých zákonov v znení neskorších predpisov

Zákon NR SR č. 131/ 2002 Z. z. o vysokých školách a o zmena a doplnení niektorých zákonov v znení neskorších predpisov
Vyhláška MZ SR č. 129/ 2012 o požiadavkách na správnu lekárenskú prax

Languages necessary to complete the course:
Slovak language.

Notes:
The course is optional and available only in the winter semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Miroslava Snopková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD., PharmDr. Miriam Vulevová

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/600-Mgr/25	**Course title:** Pharmaceutical Technology
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the following subjects: Biopharmaceutical Technology, Pharmaceutical Physics, Pharmaceutical Technology (1), Pharmaceutical Technology (2), Physical Chemistry.	
Learning outcomes: By passing the exam, the student demonstrates comprehensive knowledge in the entire field of pharmaceutical technology and the formulation, evaluation, production and quality assurance of drugs. The graduate understands the connection of professional knowledge from various areas of pharmaceutical technology and is able to analyze and apply theoretical knowledge in the provision of pharmacy health care and the performance of other professional activities of a pharmacist.	
Class syllabus: The state exam consists of an oral theoretical exam before a state exam committee. The student randomly selects one question from the designated categories.	
State exam syllabus:	
Last change: 03.04.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/05-Mgr/26	Pharmaceutical Technology (1)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 4 / 5 **per level/semester:** 56 / 70
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
KFCHL/08-Mgr-A/00 Physical Chemistry, KFANF/02-Mgr-A/00 Analytical Chemistry (2)
KFB/05-Mgr-A/00 Pharmacognosy (2); KFCH/06-Mgr-A/00 Pharmaceutical Chemistry (2)

Course requirements:
Course requirements:
Attendance of the lectures and practical exercises is obligatory. On each practical a test is written, and at least 60% must be achieved from each test. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final oral exam. Assessment: A: 93.00–100.00%, B: 85.00–92.99%, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: less than 60.00%

Learning outcomes:
Medicines have dosage forms which is given by the necessity of their administration and coexistence of present drugs (active pharmaceutical ingredients) and additives. Students of Pharmaceutical Technology (galenic) study the formulation of medicines (dosage form design), the manufacture of these medicines on both a small (compounding) and a large (pharmaceutical technology) scale, evaluation, and safety of the medicines. They study the conditions of how drugs and additives (pharmaceutical ingredients) can be converted into medicines, then the regularities that rule the relations between medicines and the effect of administered drugs. By passing the course Pharmaceutical Technology (1 and 2), the student will have a complex theoretical knowledge of the drugs as dispersion and application systems and practical experience with the preparation of dosage forms.

Class syllabus:
Introduction to the subject. Pharmaceutical technology (galenics). Biogalenics.
Medicine as an application and dispersion system.
Systematic classification of medicines and their forms.
Technological procedures and equipment for the preparation and production of medicines.
Pharmaceutical auxiliary substances - excipients.

Colloidal dispersion systems, lyophilic and lyophobic colloids.
Dispersion system - emulsions, suspensions, powders.
Medicines obtained by extraction methods.
Oral and oral liquid medications.
Oral and oral solid medicines - granules, tablets, films, lozenges and chewing gum
Parenteral drugs - injections, infusion solutions - production, use.
Parenteral drugs with controlled distribution.
Eye medicines, nasal medicines, ear medicines.
Technology of preparation of vaccines and radiopharmaceuticals
Rectal and vaginal medications
Quality control of medicines

Recommended literature:

Komárek, P.: Technologie léků, Praha: Galén, 2006. 399 s.
Žabka, M. a kol: Moderné lieky vo farmaceutickej technológii. Bratislava: SAP, 1999. 487 s.
European Pharmacopoeia Strassbourg: current eddition, EDQM.
Slovenský farmaceutický kódex. (Vestník MZ SR special edition) Bratislava: Obzor, 2015.
Vitková Z., Úvod do farmakokinetickej analýzy. Bratislava: STU, 2002.
Vitková Z., Herdová P.: Roztoky. Bratislava: Felia s r.o., 2017.
Mikušová V., Šimunková V., et al.: Farmaceutická technológia – návody na laboratórne cvičenia. 2020. Available online after login at: https://www.fpharm.uniba.sk/pracoviska/galenika/pedagogicka-cinnost/farmaceuticka-technologia-1/
Aulton, M. E.: Aulton's Pharmaceutics: the design and manufacture of medicines. Edinburgh: Churchill Livingstone, 2021.
European Directorate for the Quality of Medicines and HealthCare: https://www.edqm.eu/
Tichý E., Starýchová L., Čuchorová M.: Solid dosage forms – Laboratory practices, Bratislava UK, 2015
Tichý E., Špaglová M., Bartoníková K.: Liquid dosage forms – Laboratory practices, Bratislava UK, 2016
Tichý E., Šimunková V., Halenárová A.: Emulsions, suspensions, ointments, creams, pastes, suppositories and pessaries – Laboratory practices, Bratislava UK, 2017
Current lectures of Pharmaceutical Technology available on-line (on MS-Teams, Moodle)

Languages necessary to complete the course:
Slovak (+English/French for studying European Pharmacopoeia)

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Alžbeta Lengyelová, PharmDr. Veronika Šimunková, PhD., PharmDr. Veronika Mikušová, PhD., PharmDr. ThLic. Mária Raučinová, PhD., PharmDr. Mária Čuchorová, PhD., Mgr. Jana Selčanová, PharmDr. Miroslava Špaglová, PhD., doc. RNDr. Miroslava Šupolíková, PhD., PharmDr. Desana Matušová, PhD., doc. PharmDr. Juraj Piešťanský, PhD., PharmDr. Miroslava Potúčková, PhD., PharmDr. Jozef Zima, PharmDr. Jarmila Prieložná, PhDr. Eva Nováková, Ing. Silvia Molnárová, PharmDr. Daniel Krchňák, DiS, PharmDr. Andrej Kováč, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KGF/06-Mgr/26	Pharmaceutical Technology (2)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 4 / 5 **per level/semester:** 56 / 70
Form of the course: on-site learning

Number of credits: 9

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Attendance of the lectures and practical exercises is obligatory. On each practical exercise, a test is written, and at least 60 % must be achieved from each test. Methods and options for compensating absences will be defined in the course syllabus.
The course is completed when at least 60% is achieved in the final oral exam. Assessment: A: 93.00–100.00%, B: 85.00–92.99%, C: 77.00–84.99%, D: 69.00–76.99%, E: 60.00–68.99%, FX: less than 60.00%

Learning outcomes:
Medicines have dosage forms which is given by the necessity of their administration and coexistence of present drugs (active pharmaceutical ingredients) and additives. Students of Pharmaceutical Technology (galenics) study the formulation of medicines (dosage form design), the manufacture of these medicines on both a small (compounding) and a large (pharmaceutical technology) scale, evaluation, and safety of the medicines. They study the conditions of how drugs and additives (pharmaceutical ingredients) can be converted into medicines, then the regularities that rule the relations between medicines and the effect of administered drugs. By passing the course Pharmaceutical Technology (1 and 2), the student will have a complex theoretical knowledge of the drugs as dispersion and application systems and practical experience with the preparation of dosage forms.

Class syllabus:
• Semi-solid preparations for cutaneous application. The basis of for semi-solid drugs preparations. Production.
• Transdermal therapeutic systems. Medicinal and cutaneous patches.
• Solid dosage forms for oral application (tablets, coated tablets, capsules).
• Preparations for inhalation. Aerodispersions.
• Modified release dosage forms. Time- and site-specific drugs.
• Dosage microforms. Drug carriers - lipid and polymeric nanoparticles.
• Drug release, release, and absorption kinetics.
• Biopharmacy, mechanism of drug transfer through biological membranes, bioavailability.
• Stability and stabilization of drug products.

• Quality assurance in pharmaceutical production and quality control.
• Pharmaceutical packs and packaging.
• Biologics and biosimilars.

Recommended literature:

Komárek, P.: Technologie léků, Praha: Galén, 2006. 399 s.
Chalabala, M. a kol.: Technologie léků. 3. vyd. Praha: Galén, 2001. 408 s.
Žabka, M. a kol: Moderné lieky vo farmaceutickej technológii. Bratislava: SAP, 1999. 487 s.
European Pharmacopoeia current edition. Strasbourg: EDQM.
https://www.fpharm.uniba.sk/pracoviska/ustredna-kniznica/externe-informacne-zdroje/
Slovenský farmaceutický kódex. (Vestník MZ SR – osobitné vydanie) Bratislava: Obzor, 2015.
Vitková Z.: Úvod do farmakokinetickej analýzy. Bratislava: STU, 2002.
Vitková Z.: Rektálne a vaginálne lieky. Bratislava: Felia s. r. o., 2016.
Vitková Z.: Dermálne polotuhé lieky, Bratislava: Felia s. r. o., 2017.
Vitková Z.: Fyzikálno-technologické princípy emulzií. Bratislava: Felia s. r. o., 2019.
Mikušová V., Šimunková V., et al.: Farmaceutická technológia ¬ návody na laboratórne cvičenia. 2022. Available on-line after login in: https://www.fpharm.uniba.sk/pracoviska/galenika/pedagogicka-cinnost/farmaceuticka-technologia-1/
Current lectures of Pharmaceutical Technology available on-line (on MS-Teams, Moodle)
Aulton, M. E.: Aulton´s Pharmaceutics: the design and manufacture of medicines- Edinburgh: Churchill Livingstone, 2021.
European Directorate for the Quality of Medicines and HealthCare: https://www.edqm.eu/
Tichý, E., Starýchová L., Čuchorová, M.: Solid dosage forms – Laboratory practises. Bratislava, UK, 2015.
Tichý, E., Špaglová M., Bartoníková K.: Liquid dosage forms – Laboratory practises. Bratislava, UK, 2016.
Tichý, E., Šimunková, V., Halenárová, A.: Emulsions, suspensions, ointments, creams, pastes, suppositories and pessaries – Laboratory practises. Bratislava, UK, 2017.

Languages necessary to complete the course:
Slovak (+ English/French for studying European Pharmacopoeia)

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Alžbeta Lengyelová, PharmDr. Veronika Šimunková, PhD., PharmDr. ThLic. Mária Raučinová, PhD., Mgr. Jana Selčanová, PharmDr. Veronika Mikušová, PhD., PharmDr. Mária Čuchorová, PhD., PharmDr. Miroslava Špaglová, PhD., PharmDr. Miroslava Potúčková, PhD., doc. PharmDr. Juraj Piešťanský, PhD., PharmDr. Jarmila Prieložná, PharmDr. Jozef Zima, PhDr. Eva Nováková, Ing. Silvia Molnárová, PharmDr. Daniel Krchňák, DiS, PharmDr. Andrej Kováč, PhD., doc. RNDr. Miroslava Šupolíková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/700-Mgr/25	**Course title:** Pharmacognosy
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the following subjects: Biochemistry, Pharmaceutical Botany, Pharmaceutical Physics, Pharmacognosy (1), Pharmacognosy (2), Physical Chemistry, Organic Chemistry (1), Organic Chemistry (2), General and Inorganic Chemistry, General Biology.	
Learning outcomes: By passing the exam, the student demonstrates comprehensive knowledge of the entire field of pharmaceutical botany and pharmacognosy. The graduate understands the interconnection of professional knowledge from various areas of pharmacognosy and is able to analyze and apply theoretical knowledge in the provision of pharmacy health care and the performance of other professional activities of a pharmacist.	
Class syllabus: The state exam consists of an oral theoretical exam before a state exam committee. The student randomly selects one question from the designated categories.	
State exam syllabus:	
Last change: 03.04.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/04-Mgr/26	Pharmacognosy (1)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 3 **per level/semester:** 28 / 42
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Conditions for successful completion of laboratory practices:
– students are obliged to wear a white lab coat, which is necessary for laboratory work
– a 100-% attendance at the laboratory practices is required
– written protocols/reports from each laboratory practice are to be handed in
– microscopic slides shall be handled with care
– the fee to be paid for a broken microscopic slide is 2 €
– students must pass two tests in the course of the semester, each of maximum 100 points;
the point yield should be at least 60 % (each test). To students who fail to reach at least 60 % of points in any of
the semestral tests, the chance to write a reparative test (once each) will be given and they should then reach an average of at least 60 % of points (average is to be calculated of both tests.
Note:
Successful passing of the laboratory practices, including the written tests, is the basic requirement to attend the exam in Pharmacognosy (1). The examiners will take into account the grades from the written tests when classifying the course of Pharmacognosy (1). Students may enter Pharmacognosy (2) in the summer semester even though been graded FX in Pharmacognosy (1).
Scale of assessment (preliminary/final): 1/1

Learning outcomes:
After successful completion the student is able to discriminate basic structural classes of secondary metabolites and their biogenetic origin, to determine the plant drug identity by its macroscopic and microscopic properties.

Class syllabus:
During lectures students will be informed on pharmacognostical part of pharmacopoeia, especially about herbal drug monographs, on plant constituents biogenesis from primary and secondary metabolites point of view, on their function and importance in plant bodies, on classification systems and characterisation of all secondary metabolites classes based on chemical properties. Students will acquire overview about used drugs and their main constituents, which could be a part of official phytoremedies. Content of macroscopical and microscopical part of practice: anatomical

and morphological drug characterisation, macroscopical drug recognition in tea mixtures based on diacritic values.
Teaching includes self-study of educational videos, assigned problems and independent student work.

Recommended literature:
Nagy-Grančai-Mučaji: Farmakognózia - Biogenéza prírodných látok, 1. vyd.
Mučaji-Bittner Fialová-Czigle-Grančai-Nagy: Farmakognózia – Biologicky aktívne prírodné látky a ich zdroje, 3. vyd. (2025)
Silvia Bittner Fialová – Elena Kurin Farmakognózia: Mikroskopická a makroskopická kontrola rastlinných drog. Učebné texty. 1. časť., Univerzita Komenského v Bratislave, 2025 (1. vydanie), 129 strán, ISBN 978-80-223-6125-5 (online)
Nátherová, Ľ. a kol.: Farmakognózia (Makroskopická a mikroskopická časť I).
Nátherová, Ľ. a kol.: Farmakognózia (Makroskopická a mikroskopická časť II).
European pharmacopoeia. (current edition + supplements)
Slovak pharmaceutical codex. 1. edition.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., doc. PharmDr. Szilvia Czigle, PhD., doc. PharmDr. Silvia Bittner Fialová, PhD., PharmDr. Vladimír Forman, PhD., PharmDr. Mgr. Elena Kurin, PhD., Mgr. Andrea Malastová, PhD., Mgr. Petra Mitrengová, PhD., Mgr. Jaroslav Tóth, PhD., PharmDr. Kamila Dokupilová, PharmDr. Ema Kostovčíková, Mgr. Nina Madajová, Mgr. Diana Stehlíková, Mgr. Michaela Vinceová

Last change: 27.05.2026

Approved by: prof. PharmDr. Pavel Mučaji, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/05-Mgr/26	Pharmacognosy (2)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 5 **per level/semester:** 28 / 70
Form of the course: on-site learning

Number of credits: 8

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
1. Conditions for successful completion of the exercise:
- obtaining a minimum of 60% points in each of the tests,
- development and presentation of an analytical protocol,
- complete the prescribed exercises.
2. Continuous evaluation of practical exercises:
- 2 semester tests - always with a maximum of 100 points;
- a student who fails to obtain at least 60% of the marks in each of the two tests is entitled to one retake test in each of the prescribed tests. The result of a given retake test, if at least 60% of the points, will be substituted for the number of points of the retake prescribed test. The focus of the retake test will be the same as that of the failed test.
If the student does not score at least 60% on both of the semester tests, the focus of the retake test will include the topics of both failed tests.
If the student fails to meet the minimum average score requirement of 60% on the above tests, the instructor will award the student a grade of FX, which will prevent the student from attending the Pharmacognosy (2) examination. Such student shall be required to take the failed/absent prescribed tests when the Pharmacognosy (2) course is carried forward to the next academic year.
The final average % grade (score of at least 60%) for the tests will be included in the overall course grade by 1/3, with the remaining 2/3 being the exam grade.
Scale of assessment (preliminary/final): 1/2

Learning outcomes:
After successful completion of the training process, the student is able to classify herbal medicines according to their use in prevention and therapy, to correlate their biological effects with their main types of content substances, to know the classification of adverse effects and interactions of natural medicines, and to assess the quality of a herbal drug on the basis of pharmacognostic pharmacopoeial evaluation.

Class syllabus:
Students receive information on the classification of drugs according to therapeutic use, including basic information on side effects and drug interactions caused by ingredients of natural origin.

Emphasis is placed on herbal drugs and their active substances, which are part of the registered phytopharmaceuticals in EU countries or are registered in the current edition of the European Pharmacopoeia. In the chemical part of the practical exercises, students are introduced to selected pharmacopoeial methodologies for testing the identity of drugs and the determination of the content of active substances. They are also trained in the basic procedures of extraction and isolation of substances from plant material with emphasis on chromatographic methods.

Recommended literature:

Mučaji-Bittner Fialová-Czigle-Grančai-Nagy: Farmakognózia – Biologicky aktívne prírodné látky a ich zdroje, 3. vyd. (2025)
Nagy-Grančai-Mučaji: Farmakognózia – Biogenéza prírodných látok, 1. vyd. (2011)
Liekové interakcie. Mechanizmy a manažment klinicky významných interakcií. (vybrané kapitoly, autori: Czigle, Tóth)
Bučková a kol.: Praktické cvičenia z farmakognózie.
Current version of the European Pharmacopoeia.
Slovak pharmaceutical codex.

Languages necessary to complete the course:

English

Notes:

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., doc. PharmDr. Szilvia Czigle, PhD., doc. PharmDr. Silvia Bittner Fialová, PhD., PharmDr. Vladimír Forman, PhD., PharmDr. Mgr. Elena Kurin, PhD., Mgr. Andrea Malastová, PhD., Mgr. Petra Mitrengová, PhD., Mgr. Jaroslav Tóth, PhD., PharmDr. Kamila Dokupilová, PharmDr. Ema Kostovčíková, Mgr. Nina Madajová, Mgr. Diana Stehlíková, Mgr. Michaela Vinceová

Last change: 27.05.2026

Approved by: prof. PharmDr. Pavel Mučaji, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/16-Mgr/26	Pharmacokinetic Modelling and Drug Development

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Mathematics for Pharmacists, Physical Chemistry, Pharmaceutical Chemistry, Pharmacology, Toxicology

Course requirements:
The exam consists of a written test worth 80 points. To obtain an A rating, a total of 74 points or more is required, to obtain a B rating at least 68 points, to obtain a C rating at least 62 points, to obtain a D rating at least 55 points, and to obtain an E rating at least 48 points.

Learning outcomes:
After completing the course, students will be acquainted with mathematical models of the kinetics of the disposition of chemical substances in the body and will master the physicochemical principles of the relationship between the pharmacokinetic profile and the molecular structure of substances. They will learn the methods of modeling and determining the transport properties of potential drugs. Students will gain a broader picture of the complex issues of research and optimization of the properties of drugs. They will use this knowledge in practice to research new drugs.

Class syllabus:
Phenomenological view of the transport and fate of the drug in the body. Principles and mathematical models of drug kinetics, disposition and effect. Pharmacokinetic compartmental distribution models based on human physiology. Kinetic parameters and their importance for drug design. Methods for predicting physicochemical properties and kinetic parameters from the molecular structure of biologically active substances. Optimization of biological tests and interpretation of measured activities.

Recommended literature:

Languages necessary to complete the course:
Slovak language

Notes:

The capacity of the course is limited to 10 to 15 students. Priority is given to students with good grades (weighted study average determined according to the rules of the FaF UK study regulations). Therefore, a consultation with the teacher is required before enrolling in the course.

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. Ing. Vladimír Frecer, DrSc., Mgr. Mária Klacsová, PhD.

Last change: 27.05.2026

Approved by: prof. Ing. Vladimír Frecer, DrSc.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/800-Mgr/25	**Course title:** Pharmacology
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the following courses: Analytical monitoring of drug levels in practice, Anatomy and physiology, Biochemistry, Pharmacology (1), Pharmacology (2), Genetics and pharmacogenomics, Immunology, Clinical pharmacy and pharmacotherapy, Clinical pharmacology and pharmacotherapy, Microbiology, Pathology, Biotechnology, Toxicology, General biology.	
Learning outcomes: By passing the exam, the student demonstrates comprehensive knowledge in the entire field of basic and clinical pharmacology, pharmacotherapy and clinical pharmacy. The graduate understands the connection of professional knowledge from various areas of pharmacology and is able to analyze and apply theoretical knowledge in the provision of pharmacy health care and in the performance of other professional activities of a pharmacist.	
Class syllabus: The state exam consists of an oral theoretical exam before a state examination committee. The student randomly selects one question from the designated categories.	
State exam syllabus:	
Last change: 03.04.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/08-Mgr/26	Pharmacology (1)

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 3 **per level/semester:** 28 / 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
During the semester, students pass 2 midterm tests; to pass the test at least 60% of maximum score is required.
Successful completion of the semester is followed by a comprehensive exam test.
The student must demonstrate mastery of at least 60% of the required knowledge. The exam result is graded: A (at least 92%), B (at least 83%), C (at least 76%), D (at least 68%), E (at least 60%) and Fx (less than 60% of the maximum number points).
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
The knowledge gained by successfully completing the course is the basis for understanding other scientific disciplines in the pharmaceutical study.

Class syllabus:
Introduction to the study of pharmacology - basic terminology and subdisciplines. Pharmacodynamics of drugs - mechanisms of drug effects, non-specific and specific effect. Receptors, their function, structure and classification. Intercellular signal transduction, G-regulatory proteins in receptor systems.
The effects of drugs on the whole organism. Drugs of the autonomic nervous system, sympathotropic and parasympathotropic drugs. Local hormones and modulators, drugs affecting their production and pharmacological regulation. Pharmacology of neuromuscular tonus and its regulation.

Recommended literature:
Švihovec J., Bultas J., Anzenbacher P. a kol.: Farmakologie, Grada, Praha 2018
Martinková J. a kol. Farmakologie pro studenty zdravotnických oboru, Grada, Praha 2018
Máťuš, M., Křenek P., Ondriašová, E.: Farmakológia: Študijné otázky 1. časť. - 1. vyd. - Bratislava : Univerzita Komenského v Bratislave, 2019. [online], ISBN 978-80-223-4777-8
Ritter JM, Flower R, Henderson G, a kol.: Rang & Dale's Pharmacology, 10th Edition, Elsevier 2024, ISBN: 978-0-323-87395-6

Heinz Lulmann, Klaus Moh, Lutz Hein: : Barevný atlas farmakologie, Preklad 5. anglického vydania, Grada, 2020
Mirossay L, Mojžiš J. a kolektív: Základná farmakológia a farmakoterapia, Equilibria s.r.o., Košice, 2021

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 321

A	ABS	B	C	D	E	FX
33,96	0,0	37,38	13,08	9,03	4,67	1,87

Lecturers: doc. PharmDr. Peter Křenek, PhD., doc. RNDr. Ingrid Tumová, CSc., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., doc. PharmDr. Marek Máťuš, PhD., PharmDr. Gabriel Dóka, PhD., doc. PharmDr. Anna Paul Hrabovská, PhD., doc. PharmDr. Tomáš Rajtík, PhD., prof. PharmDr. Adriana Duriš Adameová, DrSc., PharmDr. Peter Galis, PhD., PharmDr. Kristína Szmicseková, PhD., PharmDr. Katarína Hadová, PhD.

Last change: 27.05.2026

Approved by: doc. PharmDr. Peter Křenek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/09-Mgr/26	Pharmacology (2)

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 4 / 2 **per level/semester:** 56 / 28
Form of the course: on-site learning

Number of credits: 7

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
100% attendance at seminars and lectures and sufficient demonstrated preparation for seminars are mandatory. During the semester, students take 2 continuous assessment tests within the seminars. To be recognized for these tests, it is necessary to obtain at least 60% of the maximum number of points for each of them. After successfully completing the semester, a combined written and oral exam follows.
The student must demonstrate mastery of at least 60% of the required knowledge in both the written and oral parts. A maximum of 10% of the average of the continuous tests can be added to the assessment of the written part. The final assessment of the subject is the weighted average of the assessment of all parts with the following weighting: 10% continuous tests, 50% written exam, 40% oral exam.
The result is graded on a scale: A (at least 92%), B (at least 83%), C (at least 76%), D (at least 68%), E (at least 60%) and Fx (less than 60% of the maximum number of points).
Scale of assessment (preliminary/final): 10/90

Learning outcomes:
The knowledge gained by successfully completing the course is the basis for understanding other scientific disciplines in the pharmaceutical study.

Class syllabus:
Pharmacology of pain - general and local anesthetics, analgesics, antipyretics, opioid analgesics. CNS pharmacology - neuromediators, classification. Drugs in neurodegenerative diseases. Antiparkinson drugs. Antiepileptics. Hypnotics and sedatives, psychostimulants. Anxiolytics. Antipsychotics. Antidepressants. Pharmacology of the uropoietic system (diuretics, drugs affecting electrolyte metabolism). Pharmacology of the respiratory system (expectorants, antitussives, antiasthmatics). Pharmacology of CVS - therapy of heart failure. Antianginal drugs. Antihyperlipidemics. Antihypertensives. Antidysrhythmics. Pharmacology of blood (anticoagulants, antiplatelet agents, thrombolytics). GIT pharmacology. Pharmacology of the endocrine system. Pharmacology of antibacterial drugs and chemotherapeutics. Therapy of oncological diseases, immunomodulatory substances. Biological drugs.

Recommended literature:

Kuželová M., Ondriašová E.: Farmakológia kardiovaskulárneho systému pre farmaceutov. Vydavateľstvo UK Bratislava, 2014
Kuželová M., Kovácsová B., Švec P.: Farmakológia antiinfekčných liečiv. Osveta, 2010
Ritter JM, Flower R, Henderson G, a kol.: Rang & Dale's Pharmacology, 10th Edition, Elsevier 2024, ISBN: 978-0-323-87395-6
Švihovec J., Bultas J., Anzenbacher P. a kol.: Farmakologie, Grada, Praha 2018
Martinková J. a kol. Farmakologie pro studenty zdravotnických oboru, Grada, Praha 2018
Heinz Lulmann, Klaus Moh, Lutz Hein: : Barevný atlas farmakologie, Preklad 5. anglického vydania, Grada, 2020
Mirossay L, Mojžiš J. a kolektív: Základná farmakológia a farmakoterapia, Equilibria s.r.o., Košice
2021

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 151

A	ABS	B	C	D	E	FX
19,87	0,0	42,38	25,17	7,95	3,97	0,66

Lecturers: doc. RNDr. Ingrid Tumová, CSc., doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., doc. PharmDr. Marek Máťuš, PhD., PharmDr. Gabriel Dóka, PhD., doc. PharmDr. Peter Křenek, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, doc. PharmDr. Anna Paul Hrabovská, PhD., doc. PharmDr. Tomáš Rajtík, PhD., prof. PharmDr. Adriana Duriš Adameová, DrSc., PharmDr. Peter Galis, PhD., Mgr. Izabela Jarabicová, PhD., PharmDr. Kristína Szmicseková, PhD., PharmDr. Katarína Hadová, PhD.

Last change: 27.05.2026

Approved by: doc. PharmDr. Peter Křenek, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/29-Mgr/20	Pharmacology of Orphan Drugs

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Recommended prerequisites:
Completion of Pathology of Rare Diseases and Pharmacology 1 is an advantage

Course requirements:
Mandatory attendance at 100% of lectures and processing of information about the selected medicine in the form of a professional contribution, which will be published in the journal of the Slovak Pharmacy Chamber - Lekárnické listy (Pharmacy Letters).
Scale of assessment (preliminary/final): Interim assessment consists of evaluating ppt presentations on the assigned topics.The final evaluation is based on the interim assessment together with evaluation of the presentation of the contribution to the journal of the Slovak Chamber of Pharmacist - Lekárnické listy (Pharmacy Letters).

Learning outcomes:
The course develops the topic of rare diseases from the point of view of pharmacology but also current research projects in this field. It introduces students to treatable rare diseases. It explains the mechanisms of action of drugs on rare diseases, indications and contraindications. The course provides students with basic information on treatable rare diseases, orphan drug development and authorisation, the effectivity and safety of orphan drugs. The student is gradually introduced to selected drugs for metabolic rare diseases, rare diseases of the cardiovascular, respiratory, nervous and immune systems, or rare neuromuscular diseases and rare blood diseases. Completion of Pathology of Rare Disease or Pharmacology 1 is an advantage.

Class syllabus:
The concept and definition of orphan drugs in Europe and worldwide
- Rare disease research
- Practical examples of selected drugs for rare diseases - metabolic diseases, diseases of the respiratory system, diseases of the nervous system, neuromuscular diseases, diseases of the blood, diseases of the immune system

Recommended literature:

KUBÁČKOVÁ K.: Vzácná onemocnení v kosce, Maldá fronta 2014, ISBN 9788020431493, KUBÁČKOVÁ K.: Vzácné nádory v onkologii, Mladá fronta, 2015, ISBN 9788020436580, www.orpha.net, http://www.irdirc.org/, https://www.ema.europa.eu/en, www.sukl.sk,

Languages necessary to complete the course:
Slovak and English

Notes:

Past grade distribution
Total number of evaluated students: 86

A	ABS	B	C	D	E	FX
54,65	0,0	26,74	15,12	2,33	0,0	1,16

Lecturers: doc. PharmDr. Tatiana Foltánová, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, PharmDr. Eva Malíková, PhD., PharmDr. Eva Kráľová, PhD., doc. PharmDr. Peter Křenek, PhD., PharmDr. Jana Schweigertová, PhD., Anna Antalová, MUDr. Katarína Juríčková, PhD., MUDr. Mária Giertlová, PhD.

Last change: 12.09.2024

Approved by: doc. PharmDr. Tatiana Foltánová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/22-Mgr/22	Physical Chemistry

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 3 **per level/semester:** 28 / 42
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
Laboratory practicals: An accomplishment of all experiments assigned by the teacher and completed by experimental reports is compulsory. Reports are evaluated (0 – 4 points/report). The student's preparation for the assigned experiment is monitored by short tests (0 – 6 points/test). Final evaluation of laboratories (10 points maximum) is assessed as a sum of both averages, from reports and tests. Five point score is the minimum for successful completion of laboratories.
Final exam is by written form and is worth maximally 60 points, including the points gained from laboratories. Grade expressed by percentage: A 92-100%, B 84-91%, C 76-83%, D 68-75%, E 60-67%, Fx< 59%
Scale of assessment (preliminary/final): 10/50

Learning outcomes:
The course is addressed to selected areas of physical chemistry to achieve the necessary theoretical background for professional qualifications of pharmacists and their competences according to European pharmacopoeia. The aim of the course is to provide understanding of theoretical principles and methods applied in specialized pharmaceutical areas like:
-technology of preparation of pharmaceutics, drug formulae optimization and quality control
-analysis and control of drugs, pharmaceutics, radiopharmaceuticals, and excipients
-action of drugs on the molecular level, drug absorption, transport through biological membranes, its distribution in living body, pharmaco-dynamics and pharmaco-kinetics.
Students will acquire necessary skills for proper experimental work in the laboratory. Emphasis is put on elaboration, evaluation and interpretation of measured data.

Class syllabus:
Introduction to physical chemistry, chapters selected for pharmacists, terminology
Structure of matter, atoms and molecules, forces and interactions
Stability of elements, nuclear decay, kinetics of nuclear decay
Basic principles of molecular spectroscopy (UV-VIS, luminescence, IR, Raman, NMR spectroscopy). Chemical thermodynamics. Gibb's free energy, entropy, spontaneity of processes. Chemical potential, activity.
Phase equilibria, Gibb's phase rule, phase diagrams. Mono-, di- and multi-compounds systems.

Solutions. Ideal and real solutions. Osmotic pressure, isotonic solutions. Condensed systems, eutectic mixtures in pharmacy
Chemical equilibria, standard thermodynamic functions
Electrochemistry. Strong and weak electrolytes, solubility product constant. Acid-base equilibria.
Chemical kinetics. Simple and complex reactions. Catalysis. Enzymatic catalysis.
Colloidal systems. Surfactants. Sedimentation and diffusion. Membranes and related phenomena. Donnan's equilibria.
The lectures from physical chemistry are completed by practical exercises, where the students verify their theoretical knowledge in practice. We put the accent on acquiring the basic knowledge necessary for professional qualifications of pharmacists and their competences according to European pharmacopoeia and additional subjects, mainly pharmaceutical technology.

Recommended literature:

Oremusová J., Greksáková O.: Fyzikálna chémia, Zbierka úloh pre študentov farmácie, 1.vyd. Bratislava UK, 2019
Kopecký F.: Fyzikálna chémia pre farmaceutov I. : štruktúra a vlastnosti atómov a molekúl. 3. vyd. Bratislava: UK, 2000 (skriptá).
Oremusová J., Greksáková O.: Fyzikálna chémia: Laboratórne cvičenia pre farmaceutov, 2010, Univerzita Komenského Bratislava (skriptá)
Kopecký, F. a kol.: Praktické a výpočtové cvičenia z fyzikálnej chémie. Bratislava : UK, 1989 (skriptá).
Atkins, P. W.: Fyzikálna chémia : časť 1, 2a, 2b, 3. 6.vyd.. Bratislava : STU 1999.
Lázníčková A., Kubíček V.: Základy fyzikální chemie. Vybrané kapitoly pro posluchače Farmaceutické fakulty. Praha: Karolinum, 2014, ISBN 978-80-246-2791-5
Reguli J.: Fyzikálna chémia pre bakalárske štúdium. VEDA, 2015

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 661

A	ABS	B	C	D	E	FX
4,39	0,0	6,66	12,41	17,25	32,83	26,48

Lecturers: prof. RNDr. Daniela Uhríková, CSc., RNDr. Alexander Búcsi, PhD., RNDr. Tomáš Fazekaš, PhD., doc. RNDr. Jana Gallová, CSc., Mgr. Lukáš Hubčík, PhD., doc. Mgr. Marcela Chovancová, PhD., Mgr. Mária Klacsová, PhD., Ing. Jarmila Oremusová, CSc., PharmDr. Dalibor Nakládal, PhD.

Last change: 04.04.2022

Approved by: prof. RNDr. Daniela Uhríková, CSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/01-Mgr/19	Physical Education and Sport (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
- activity, 100% attendance
- passing physical performance testing
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing the course, the student has developed motor skills and improved motor skills according to the sport he has chosen.

Class syllabus:
Our aim is an educated student and his active approach to correct and healthy movement. Students can complete the course Physical Education through sports, which they choose from the offer at the department: Aerobic, Step aerobic, Tabata, Fitball, Badminton, Volleyball, BodyArt, Cross fit, Fitness training, Frisbee, collective Sports games, Floorball, Futsal, Table tennis, Water tourism. The best students have the opportunity to participate in the representation of the faculty in the University League in Volleyball, Futsal, Floorball. In the block form of teaching, they can complete the course by active participation in the Ski and Snowboard course and the Tourist (hiking) course. The final evaluation is 100% active participation in classes.

Recommended literature:

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 868

A	ABS	B	C	D	E	FX
94,7	0,0	1,04	0,58	0,23	0,0	3,46

Lecturers: PaedDr. Martina Tibenská, PhD., Mgr. Lenka Nagyová, PhD., Mgr. Dalibor Ludvig, PhD., Mgr. Michal Tokár, PhD.

Last change: 23.11.2021
Approved by: PaedDr. Martina Tibenská, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/02-Mgr/19	Physical Education and Sport (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
- activity, 100% attendance
- passing physical performance testing
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing the course, the student has developed motor skills and improved motor skills according to the sport he has chosen.

Class syllabus:
Our aim is an educated student and his active approach to correct and healthy movement. Students can complete the course Physical Education through sports, which they choose from the offer at the department: Aerobic, Step aerobic, Tabata, Fitball, Badminton, Volleyball, BodyArt, Cross fit, Fitness training, Frisbee, collective Sports games, Floorball, Futsal, Table tennis, Water tourism. The best students have the opportunity to participate in the representation of the faculty in the University League in Volleyball, Futsal, Floorball. In the block form of teaching, they can complete the course by active participation in the Ski and Snowboard course and the Tourist (hiking) course. The final evaluation is 100% active participation in classes.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 668

A	ABS	B	C	D	E	FX
92,07	0,15	1,05	0,3	0,15	0,0	6,29

Lecturers: PaedDr. Martina Tibenská, PhD., Mgr. Lenka Nagyová, PhD., Mgr. Dalibor Ludvig, PhD., Mgr. Michal Tokár, PhD.

Last change: 23.11.2021
Approved by: PaedDr. Martina Tibenská, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/05-Mgr/19	Physical Education and Sport (5)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
- activity, 100% attendance
- completion of FMS testing
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Our goal is an educated student and his active approach to proper and healthy movement. Based on the latest knowledge in the field of functional disorders of the movement system of the general population and incorrect movement stereotypes, based on the FMS (Functional Movement Screen) method and the DNS (Dynamic Neuromuscular Stabilization) concept, after completing the course, students can theoretically and practically evaluate and correct wrong movement stereotypes of a person. By obtaining information about the correct technique of exercises, it will lead to the elimination of overloading of individual parts of the body in their ordinary life, which often results in chronic pain, for example in the back. They will learn to restore, protect or improve the movement function of the body, restore correct posture and correct movement patterns, gradually eliminate muscle imbalances. Students will also learn proper breathing.

Class syllabus:
• Diagnostics – Functional Movement Screen (FMS), a system for evaluating movement patterns.
• Correct synchronization, anatomical positions of body segments.
• Postural reactivity – punctum fixum, punctum mobile.
• Postural stabilization – improvement of body posture, even during movements.
• Change-correction of movement patterns – DNS.
• Activation of reflex locomotion patterns.
• Ipsilateral and contralateral movement pattern.
• By stimulating reflex points - quadropedal walking.
• Use of exercise aids (Flowin, Bosu, Valslide, Theraband, Swiss Ball, Kettlebell).
• Postural disharmony in anatomical disorders.

Recommended literature:

BARDENET, S.,M., MICCA, J.,J., DeNOYELLES, J.,T. et al. Functional movement screen normative values and validity in high schol athletes: can the FMS be used as a predictor of injury? [online]. Int J sports Phys Ther v.10(3) [cit. 2018-03-28]. 2015, Dostupné z: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4458917/
CHORBA, R,.S. CHORBA, D.,J., BOUILLON,L.,E., et al.. Use of a functional movement screening tool to determine injury risk in female collegiate athletes. 2010 ,[online]. [cit. 2018-03-26]. Dostupné z: https://www.ncbi.nlm.nih.gov/pubmed/21589661
ČERMÁK, J. a kol., Záda už mě nebolí. Praha, 4. rozšířené a doplněné vydání, 2005. ISBN: 80-7236-117-1.
HAVLÍČKOVÁ, L. Fyziologie tělesné zátěže I., Nakladatelství Karolinum, Praha, 2004. ISBN 80-7184-875-1.
COOK, G. et. al. Movement: Functional Movement Systems: Screening, Assessment and Corrective Strategies. On Target Publications. 2010. pp. 373-379. ISBN: 978-1931046725.
REIMAN, M. P. a R. C. MANSKE. Functional testing in human performance. Champaign, IL; Leeds: Human Kinetics, 2009. s. 31. ISBN: 9780736068796.
KOLÁŘ, P. et al., Rehabilitace v klinické praxi. 1. vydání. Praha: Galén. 2009. ISBN: 978-80-7262-657-1.
KOLÁŘ, P. Posturálni reaktibilita. 2017. [online].[cit.2017-5-5]. Dostupné z: http://www.dns-cz.com/diagnostika-poruch-dle-dns
KRAČMAR, B. Kineziologická analýza sportovního pohybu, Nakladatelství: TRITON, ISBN 2002. 80-7254-292-3.
LEWIT, K. Manipulační léčba v rámci léčebné rehabilitace, Praha, 1990. ISBN: 80-7030-096-5.
LEWIT, K. Maniuplační léčba v myoskeletárni medicíne 5. Přepracované vydání, Nakladatelství Sdelovací technka spol s.r.o., 1996. ISBN 80-86645-04-5
MACHOVÁ, J. , D. KUBÁTOVÁ, et al. Výchova ke zdraví. Praha: Grada, 2009. ISBN: 9788024727158
MUŽÍK, V., P. VLČEK, et al., Škola, pohyb a zdraví: výzkumné výsledky a projekty. 1. vyd. Brno: MU. 2010. ISBN 978-80-210-5371-7.
VÉLE, F., Kineziologie pro klinickou praxi Vydání. 1. Praha: Grada Publishing, 1997. ISBN 80-7169-256-5.
VÉLE, F., Kineziologie, Praha: Triton. 2006. ISBN 80-7254-837-9.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 153

A	ABS	B	C	D	E	FX
98,69	0,0	0,0	0,0	0,0	0,0	1,31

Lecturers: Mgr. Dalibor Ludvig, PhD., Mgr. Lenka Nagyová, PhD., PaedDr. Martina Tibenská, PhD., Mgr. Michal Tokár, PhD.

Last change: 28.07.2022

Approved by: PaedDr. Martina Tibenská, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/11-Mgr/26	Pohybová terapia 1

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers:

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KTV/12-Mgr/26	Pohybová terapia 2

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers:

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/09-Mgr/26	Practice in Community Pharmacy (1)

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 20t
Form of the course: on-site learning

Number of credits: 20

Recommended semester: 9.

Educational level: I.II.

Prerequisites:

Course requirements:
The student after each month of the five-months internship in a pharmacy has an obligation to complete and send an electronic protocol record (e-protocol) within the set deadline. Not sent in time protocol, not-sent e-protocolat all and an e-protocol that does not meet the formal and content criteria is considered a reason for not completing the course. The necessary formal and content criteria of the e-protocol are published at the beginning of the summer semester and are available in the Moodle application or on the course website. At the end of the internship a pharmacy worker responsible for the student's internship will issue a written assessment of the student's knowledge, skills and activities during practice (Evaluation). The exam is written. Rating A: 100-93%, B: 92-85%, C: 84-77%, D: 76-69%, E: 68-60%, Fx: 59% and less. The condition for passing the exam is sending the e-protocol via Moodle (in compliance with its formal and content criteria) and obtaining at least 60% of the pharmacy evaluation.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the subject, the student orients himself in the pharmacy environment, knows the assortment and basic pharmacy and pharmaceutical activities carried out in the pharmacy. uses skills in all levels of pharmacy care delivery.

Class syllabus:
Safety and health protection at work, protection of personal data, operating procedures, hygiene regime and sanitation program, spatial, material and personnel equipment of the pharmacy, assortment of the pharmacy, verification of the authenticity of medicines, work with pharmacy software, overview of individually and collectively prepared medicines, self-medication (medicines non-prescription, nutritional supplements, complementary assortment). Warehouse management, functionality of pharmacy software, individually and collectively prepared medicines, requirements of a medical prescription and prescription record, dispensary care and consultancy in the provision of pharmaceutical care, including individual assistance in the management of medicines, non-prescription medicines and self-medication, nutritional supplements, supplementary assortment, medical aids, dietetic foods.

Recommended literature:

Snopková M. a kol.: Lekárenská prax, Vydavateľstvo UK, 2017
Zákon č. 362/2011 Z. z. o liekoch a zdravotníckych pomôckach a o zmene a doplnení niektorých zákonov
Zákon č. 363/2011 Z. z. o rozsahu a podmienkach úhrady liekov, zdravotníckych pomôcok a dietetických potravín na základe verejného zdravotného poistenia a o zmene a doplnení niektorých zákonov
Zákon č. 139/1998 Z. z. o omamných látkach, psychotropných látkach a prípravkoch
Zákon č. 576/2004 Z. z. o zdravotnej starostlivosti, službách súvisiacich s poskytovaním zdravotnej starostlivosti a o zmene a doplnení niektorých zákonov
Zákon č. 578/2004 Z. z. o poskytovateľoch zdravotnej starostlivosti, zdravotníckych pracovníkoch, stavovských organizáciách v zdravotníctve a o zmene a doplnení niektorých zákonov
Zákon č. 152/1995 Z. z. o potravinách
Vyhláška č. 129/2012 Z. z. o požiadavkách na správnu lekárenskú prax
Nariadenie vlády SR č. 296/2010 Z. z. o odbornej spôsobilosti na výkon zdravotníckeho povolania, spôsobe ďalšieho vzdelávania zdravotníckych pracovníkov, sústave špecializačných odborov a sústave certifikovaných pracovných činností Európsky liekopis 10. vydanie (European Pharmacopoeia – Ph. Eur. 10th Edition)
Slovenský farmaceutický kódex
Vestníky MZ SR

Languages necessary to complete the course:

Slovak language

Notes:

During the internship, the student prepares and after each month of the internship sends via electronic application (e-learning UK - Moodle) e-protocols. The e-protocol is a formal document about completion of the prescribed length of professional pharmacy practice in accordance with the valid wording of Act no. 131/2002 Coll. on higher education institutions, as amended, in accordance with the legislation in force in the European Union,requirements for the study of pharmacy and the recognition of professional qualifications. A week of practice is a time period characterized by five calendar days, including public holidays and non-working days. Public holidays and non-working days are included in the internship period, a student does not have to overwork them.

Past grade distribution

Total number of evaluated students: 1318

A	ABS	B	C	D	E	FX
71,17	0,0	22,08	5,69	0,61	0,46	0,0

Lecturers: PharmDr. Miroslava Snopková, PhD., PharmDr. Ľubica Lehocká, PhD.

Last change: 27.05.2026

Approved by: PharmDr. Miroslava Snopková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/08-Mgr/26	Practice in Community Pharmacy (2)

Educational activities:
Type of activities: practice
Number of hours:
per week: **per level/semester:** 4t
Form of the course: on-site learning

Number of credits: 6

Recommended semester: 10.

Educational level: I.II.

Prerequisites:

Course requirements:
The student after one month internship in a pharmacy has an obligation to complete and send an electronic protocol record (e-protocol) within the set deadline. Not sent in time protocol, not-sent e-protocolat all and an e-protocol that does not meet the formal and content criteria is considered a reason for not completing the course. The necessary formal and content criteria of the e-protocol are published at the beginning of the summer semester and are available in the moodle application or on the course website. At the end of the internship a pharmacy worker responsible for the student's internship will issue a written assessment of the student's knowledge, skills and activities during practice (Evaluation). The exam is written. Rating A: 100-93%, B: 92-85%, C: 84-77%, D: 76-69%, E: 68-60%, Fx: 59% and less.The condition for passing the exam is sending the e-protocol via Moodle (in compliance with its formal and content criteria) and obtaining at least 60% of the pharmacy evaluation
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the subject, the student uses skills in all levels of providing pharmacy care in a pharmacy. The combination of theoretical and practical training ends the Master's study in a targeted and comprehensive way.

Class syllabus:
Warehouse management, functionality of pharmacy software, individually and collectively prepared medicines, requirements of a medical prescription and prescription record, dispensary care and consultancy in the provision of pharmaceutical care, including individual assistance in the management of medicines, non-prescription medicines and self-medication, nutritional supplements, supplementary assortment, medical aids, dietetic foods, pharmacovigilance practice, contributing to local and national campaigns in the field of public health, basic economic skills, ethical aspects of practicing the profession of a pharmacist, code of ethics for a healthcare professional, legal responsibilities.

Recommended literature:

Snopková M. a kol.: Lekárenská prax, Vydavateľstvo UK, 2017 Zákon č. 362/2011 Z. z. o liekoch a zdravotníckych pomôckach a o zmene a doplnení niektorých zákonov
Zákon č. 363/2011 Z. z. o rozsahu a podmienkach úhrady liekov, zdravotníckych pomôcok a dietetických potravín na základe verejného zdravotného poistenia a o zmene a doplnení niektorých zákonov
Zákon č. 139/1998 Z. z. o omamných látkach, psychotropných látkach a prípravkoch
Zákon č. 576/2004 Z. z. o zdravotnej starostlivosti, službách súvisiacich s poskytovaním zdravotnej starostlivosti a o zmene a doplnení niektorých zákonov
Zákon č. 578/2004 Z. z. o poskytovateľoch zdravotnej starostlivosti, zdravotníckych pracovníkoch, stavovských organizáciách v zdravotníctve a o zmene a doplnení niektorých zákonov
Zákon č. 152/1995 Z. z. o potravinách Vyhláška č. 129/2012 Z. z. o požiadavkách na správnu lekárenskú prax
Nariadenie vlády SR č. 296/2010 Z. z. o odbornej spôsobilosti na výkon zdravotníckeho povolania, spôsobe ďalšieho vzdelávania zdravotníckych pracovníkov, sústave špecializačných odborov a sústave certifikovaných pracovných činností Európsky liekopis 10. vydanie (European Pharmacopoeia – Ph. Eur. 10th Edition)
Slovenský farmaceutický kódex
Vestníky MZ SR

Languages necessary to complete the course:
Slovak language

Notes:
During the internship, the student prepares and after completing a one-month internship sends via electronic application (e-learning UK - Moodle) e-protocol. The e-protocol is a formal document about completion of the prescribed length of professional pharmacy practice in accordance with the valid wording of Act no. 131/2002 Coll. on higher education institutions, as amended, in accordance with the legislation in force in the European Union, requirements for the study of pharmacy and the recognition of professional qualifications. A week of practice is a time period characterized by five calendar days, including public holidays and non-working days. Public holidays and non-working days are included in the internship period, a student does not have to overwork them. The one-month internship takes place in the summer semester according to the approved schedule.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Miroslava Snopková, PhD., PharmDr. Ľubica Lehocká, PhD.

Last change: 27.05.2026

Approved by: PharmDr. Miroslava Snopková, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/10-Mgr/26	Principles of Molecular Modelling

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Continuous assessment: completion of exercises and submission of results in the form of assignments or a comprehensive seminar paper
Final assessment: final test
A: 90.01% – 100.00%; B: 82.01% – 90.00%; C: 74.01% – 82.00%; D: 66.01% – 74.00%; E: 60.01% – 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The course Principles of Molecular Modeling will familiarize students with the basic operations and principles used in the computer-aided design of molecules and drugs in an accessible format.

Class syllabus:
To acquire skills in the subject Principles of Molecular Modeling, knowledge from the subject Organic Chemistry 1 is important. Students work with programs available at the Department of Chemical Theory of Drugs - ALCHEMY, CHEMWIND or CHEMSKETCH, RASMOL, WORD, using the Internet and available databases (PDB). They solve tasks primarily from the field of drugs, namely finding the optimal conformation of a molecule, electron distribution, the relationship between the structure and properties of a molecule. They learn to search the protein database PDB. During the course, each student develops their own project on an assigned molecule.

Recommended literature:
Lintnerová, L.: Základy molekulového modelovania (učebný materiál), 2019.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the summer semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Lucia Lintnerová, PhD., doc. Ing. Martin Pisárčik, CSc., Mgr. Peter Herich, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/13-Mgr/22	Problem solving in Physics

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 3., 5., 7., 9.

Educational level: I.II.

Prerequisites:

Course requirements:
Student writes at least two tests during semester and the assessment of these tests determines the final mark. The limit for successful completion of the subject is 60%.
Conditions for Course Completion could be changed in the case of distance form of study.
Assessment: A 92-100 %, B 84-91 %, C 76-83 %, D 68-75, E 60-67, Fx 59% and less.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By completion of the subject student acquires skills in solving problems in physics in the extent needed for pharmacy students. Physical principles are applied to problems regarding different parts of pharmacy, medicine and daily life.

Class syllabus:
Problems solved during seminar are related to the topic of lectures in the subject Pharmaceutical physics:
Physical quantities and units. Kinematics and dynamics of mass point. Newton's laws. Mass and gravity. Mechanical work and energy. Solid body mechanics. Hydrostatics and hydrodynamics. Heat, thermodynamics. Electrostatics. Electrical current. Magnetism. Radiation.

Recommended literature:
Kopecký, F.: Prehľad fyziky pre farmaceutov I. (Mechanika, hydromechanika a náuka o teple). 4. vydanie, Bratislava, Univerzita Komenského, 1999. 184 s. (skriptá, http://www.fpharm.uniba.sk/index.php?id=2665).
Sarka, K., Kopecký, F.: Prehľad fyziky pre farmaceutov II. (Elektrina, magnetizmus a žiarenie). Bratislava, Univerzita Komenského, 1988. 104 s. (skriptá, http://www.fpharm.uniba.sk/index.php?id=2665).
Krempaský, J.: Fyzika. Bratislava, Alfa 1982. 752 s.
Halliday D., Resnick R., Walker J: Fyzika. Prometheus. Praha, 2000

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 255

A	ABS	B	C	D	E	FX
61,96	0,0	25,49	5,49	1,57	1,18	4,31

Lecturers: RNDr. Alexander Búcsi, PhD., doc. RNDr. Jana Gallová, CSc., Ing. Jarmila Oremusová, CSc., Mgr. Mária Klacsová, PhD.

Last change: 17.06.2025

Approved by: doc. RNDr. Jana Gallová, CSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFChL/14-Mgr/22	Problem solving in physical chemistry

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Course requirements:
Continuous assessment by tests (minimum 2 per semester) and final test. Evaluation/grade: A 92-100 %, B 84-91 %, C 76-83 %, D 68-75, E 60-67 %, Fx <60 %
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
The course help students to acquire skill in solving selected problems in Physical chemistry using adequate mathematics and numerical calculation. At the same time this course provides understanding of theoretical principles applied in specialized pharmaceutical areas like analysis of drugs, drug formulae quality control, pharmacokinetics, action of drugs on the molecular level, drug absorption, etc.

Class syllabus:
Students will improve their theoretical knowledge obtained at lectures on Physical chemistry by solving problems related to selected chapters as structure of molecules and spectral methods (UV-VIS, IR, NMR), kinetics of radioactive decay, chemical thermodynamics esp. phase equilibriums and solutions, electrochemistry and acid-base equilibriums, chemical kinetics, colloids and surfaces.

Recommended literature:
Oremusová J., Greksáková O.: Fyzikálna chémia, Zbierka úloh pre študentov farmácie, 2019, 1. vyd., Bratislava, UK.
Kopecký F.: Fyzikálna chémia pre farmaceutov I. : štruktúra a vlastnosti atómov a molekúl. 3. vyd. Bratislava: UK, 2000 (skriptá).
Oremusová J., Greksáková O.: Fyzikálna chémia: Laboratórne cvičenia pre farmaceutov, 2010, Univerzita Komenského Bratislava (skriptá)
Kopecký, F. a kol.: Praktické a výpočtové cvičenia z fyzikálnej chémie. Bratislava : UK, 1989 (skriptá).
Atkins, P. W.: Fyzikálna chémia : časť 1, 2a, 2b, 3. 6.vyd.. Bratislava : STU 1999.

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 228

A	ABS	B	C	D	E	FX
65,79	0,0	23,25	6,58	0,44	2,19	1,75

Lecturers: Ing. Jarmila Oremusová, CSc., RNDr. Alexander Búcsi, PhD., Mgr. Lukáš Hubčík, PhD., prof. RNDr. Daniela Uhríková, CSc.

Last change: 29.03.2022

Approved by: prof. RNDr. Daniela Uhríková, CSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/30-Mgr/26	Public Health and Pharmaceutical Care

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
1. Obligatory participation in exercises. Absence on the laboratory practical must be proved by the reason for absence and the practical must be replaced in agreement with the teacher.
2. Continuous test with a minimum success rate of 60%. Rating: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-65%, E = 64-60%, Fx = 59% and less. In the case of Fx assessment, the student has one alternative attempt.
3. Completion of the subject is done by a written final exam. Rating: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-65%, E = 64-60%, Fx = 59% and less. Only students who have met the above conditions (required participation in exercises, mid-term test minimum 60%) are accepted for the exam.

Learning outcomes:
By completing the course, the student will gain basic theoretical and practical knowledge about the public health of the population, health determinants, health education and promotion, protection and prevention of chronic and infectious diseases. The student masters the basic principles of epidemiology and pharmacoepidemiology, epidemiological methods, studies and indicators. The student has an overview of the organization and implementation of intervention programs to protect and promote health in the provision of pharmaceutical care and pharmaceutical services in public pharmacies in cooperation with other departments, especially general practitioners. They will also be acquainted with forensic activity in pharmacy. By completing the exercises, the student will gain practical skills in reducing the risk factors for chronic diseases and infectious diseases in primary prevention, screening programs, biochemical measurements performed in public pharmacies ("Point-of-Care Testing"), which can connect with proper dispensing and counselling activities and patient education.

Class syllabus:
Public health care - legislation, content, content. Public health - national and international strategies, programs and institutions to protect and promote the health of society. Determinants of health and health status of the population. Basics of epidemiology and pharmacoepidemiology - methods, studies, indicators. Epidemiology and prevention of infectious diseases - vaccine-preventable diseases, immunization program. Surveillance as a method of work in epidemiology. Epidemiology

of non-communicable diseases - risk factors, population impacts, monitoring. Health education and support. Health prevention and protection. Forensic aspects in pharmacy. Public health programs and interventions in public pharmacies - primary prevention, screening and biochemical measurements in public pharmacies and related dispensing and counselling and patient education in public pharmacies.

Recommended literature:

1. Šulcová M. a kol.: Verejné zdravotníctvo, Veda 2012, s. 651, ISBN 978-80-224-1283-4
2. Rovný I.: Verejné zdravotníctvo, Herba 2009, s. 125, ISBN 978-80-891-7160-6
3. Hegyi L., Bielik I.: Základy verejného zdravotníctva, Herba 2011, s. 288, ISBN 9788089171842
4. Bražinová A.: Epidemiologické metódy a ich uplatnenie v epidemiológii vybraných ochorení, LF UK v Bratislave 2020, s. 70, ISBN 978-80-223-4982-6
5. Bazovská S. a kol. Špeciálna epidemiológia. UK Bratislava, 2017, s. 337, ISBN 978-80-223-2301-7
6. Bašková M. a kol. Výchova k zdraviu. Martin: Osveta, 2009, s. 226, ISBN 978-80-806-3320-2
7. Zákon NR SR č. 355/2007 Z.z. o ochrane, podpore a rozvoji verejného zdravia a o zmene a doplnení niektorých zákonov

Materials in Moodle:

1. Štandardné postupy, MZ SR
2. Elmore J.G. et al. Jekel´s Epidemiology, biostatistics, preventive medicine and public health. 8th edition, Elsevier 2020, ISBN 978-0-323-64201
3. Strategický rámec starostlivosti o zdravie pre roky 2014 – 2030
4. Pharmacy 2030: A Vision for Community Pharmacy in Europe, PGEU
5. Health 2020. A European policy framework and strategy for the 21st century, WHO 2013, ISBN 978-92-890-0279-0
6. Matejka P. a kol. Štandardný postup pre výkon prevencie KVO v podmienkach verejných lekární, Vestník Ministerstva zdravotníctva SR, osobitné vydanie, 15.1.2023, roč. 71, str. 394.
7. Matejka P. a kol. Štandardný postup pre výkon skríningu porúch glukózového metabolizmu a diabetes mellitus 2. typu v podmienkach verejných lekární. Vestník Ministerstva zdravotníctva SR, osobitné vydanie, 15.1.2024, roč. 72, str. 367.
8. Mináriková D. a kol. Štandardný postup pre výkon skríningu a prevencie (pre)obezity v podmienkach verejných lekární. Vestník Ministerstva zdravotníctva SR, osobitné vydanie, 15.1.2024, roč. 72, str. 292.
9. Jeník P. 2023. Štandardný postup pre výkon prevencie pečeňových ochorení v podmienkach verejných lekární. Vestník Ministerstva zdravotníctva SR, osobitné vydanie, 15.1.2024, roč. 72, str. 326.
10. Pôčik L. a kol. Štandardný postup pre manažment pacientov s podozrením na akútne infekcie horných dýchacích ciest. Vestník Ministerstva zdravotníctva SR, osobitné vydanie, 15.1.2024, roč. 72, str. 1513.

Languages necessary to complete the course:

Slovak language, English language.

Notes:

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Daniela Mináriková, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Ľubica Lehocká, PhD.
Last change: 27.05.2026
Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/13-Mgr/26	Radiopharmaceuticals

Educational activities:
Type of activities: practicals / lecture
Number of hours:
per week: 1 / 2 **per level/semester:** 14 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 5.

Educational level: I.II.

Prerequisites:

Course requirements:
Compulsory participation on the course educational activities is one of the conditions. For the admission to the final exam, it is necessary to complete the continuous assessment from laboratory practicals to at least 60% of total points (consisting of fulfilment of all assigned tasks, submission of protocol (report) from every topic, as well as 1 control written test to at least 60%).
The final exam (in written form) - it is necessary to obtain at least 60% of total points for successful passing the exam. Exam evaluation: A = 100-92%; B = 91.99-83%; C = 82.99-74%; D = 73.99-67%; E = 66.99-60%; FX = less than 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The completion of the course contributes to the achievement of a comprehensive qualification and knowledge of a pharmacist and is connected with the laboratory of the faculty with distinctive requirements. It is the only educational opportunity for future pharmacists to learn the specifics of the work and usage of radioactive sources and to acquire practical skills in a radiopharmaceutical preparation, the use of analytical methods for their control, as well as in ensuring radiation protection and safety.
This course contributes to the completion of pharmacist´s knowledge in areas such as: - preparation, quality control, and the use of radiopharmaceuticals, as a specific category of drugs, in the departments of nuclear medicine and other specialized departments in the diagnostic and/or therapeutic process of various diseases; - personal assistance to patients in cooperation with physicians in the departments of nuclear medicine, but also in dispensation within this specific area in a public pharmacy. The acquired knowledge can also be utilized in research and development of new radiolabeled substances.

Class syllabus:
The content and syllabus of the course is in compliance with requirements of the European Pharmacopoeia, which includes several monographs on Radiopharmaceutical Preparations, as well as with current guidelines and requirements for radiation protection.
• Radiopharmaceuticals: basics of radioactivity and related physical phenomenon; properties and importance.

• Legislation and requirements in the use of ionizing radiation sources and health protection against ionizing radiation in relation to various types of exposure.
• Dosimetry and detection of ionizing radiation.
• Effects of ionizing radiation on human organism.
• Preparation of radiopharmaceuticals – basic synthetic procedures and radiolabeling of biomolecules, preparation from kits.
• Quality control of radiopharmaceuticals.
• Radiolabeled substances in the research versus Radiopharmaceuticals in practice – clinical use for diagnostic and/or therapeutic purposes.
• Nuclear medicine imaging techniques.
• Professional excursion to departments specialized in the field of preparation, quality control and use of radiopharmaceuticals.

Recommended literature:
HAVRÁNEK, E., et al. Rádiofarmaká. Bratislava : UK, 2017. (textbook)
SÝKOROVÁ, M., HAVRÁNEK, E. Rádiofarmaká laboratórne cvičenia pre farmaceutov. Bratislava : UK, 2013.
SAHA, G.P. Fundamentals of Nuclear Pharmacy. New York : Springer, 2010, p.409. (textbook)
Council of Europe. European Pharmacopoeia online, current version. Strasbourg : EDQM.
Current laws/ordinances/guidelines on radiation protection and on handling of the radioactive materials and substances.
Summary of product characteristics (SPC) of selected radiopharmaceuticals

Languages necessary to complete the course:
slovak language

Notes:
The course is provided only in winter semester

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Jozef Motyčka, PhD., Ing. Miroslav Taranda

Last change: 27.05.2026

Approved by: RNDr. Jozef Motyčka, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/VP-1/20	Research Project

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 1

Recommended semester: 1., 2.., 9., 10..

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 16

A	ABS	B	C	D	E	FX
93,75	0,0	0,0	0,0	0,0	0,0	6,25

Lecturers: doc. PharmDr. Silvia Bittner Fialová, PhD., Mgr. Bibiána Bábiková, PharmDr. Andrea Balažová, PhD., PharmDr. Ema Balažová, RNDr. František Bilka, PhD., doc. Mgr. Andrea Bilková, PhD., Mgr. Eva Drobná, PhD., PharmDr. Boris Dudík, PhD., Simona Ďurčová, PharmDr. Gabriela Greifová, PhD., PharmDr. Barbora Hans, PhD., PharmDr. Barbora Hlubinová, Mgr. Ivana Holková, PhD., doc. Mgr. Martina Hrčka Dubničková, PhD., Mgr. Jana Hricovíniová, PhD., PharmDr. Hana Kiňová Sepová, PhD., Mgr. Juraj Kóňa, PhD., prof. Ing. Peter Kovács, DrSc., PharmDr. Renáta Kubíková, PhD., prof. RNDr. Dušan Mlynarčík, DrSc., Mgr. Ľudmila Nemčeková, Mgr. Peter Novák, Mgr. Mária Nováková, PhD., doc. PharmDr. Marek Obložinský, PhD., Ing. Ľudmila Pašková, Dr.rer.nat., PharmDr. Veronika Vyletelová, PhD., Ing. Ivan Benkovský, PhD., PharmDr. Mária Bodnár Mikulová, PhD., RNDr. Anna Boriková, PhD., Ing. Peter Bystrický, PhD., Terézia Čisáriková, PharmDr. Ivana Čižmárová, PhD., RNDr. Svetlana Dokupilová, PhD., Adriána Faragová, PharmDr. Jarmila Prieložná, PharmDr. Michaela Garlík Matušková, PhD., Mgr. Michal Hanko, PhD., Mgr. Jana Havlíková, prof. RNDr. Emil Havránek, PhD., PharmDr. Andrea Horniaková, PhD., RNDr. Petra Chaľová, PhD., Ing. Flóra Jozefíková, PhD., Zuzana Kohútová, doc. Ing. Dáša Kružlicová, PhD., Mgr. Petra Majerová, PhD., doc. PharmDr. Katarína Maráková, PhD., prof. RNDr. Milan Melník, DrSc., prof. RNDr. Peter Mikuš,

PhD., Ing. Silvia Molnárová, RNDr. Jozef Motyčka, PhD., PharmDr. Martina Opetová, PhD., PharmDr. Kristián Slíž, PhD., Dana Sviteková, Ľubica Szakáčová, PharmDr. Ondrej Štefánik, PhD., Ing. Miroslav Taranda, Ing. Anton Ťažký, PharmDr. Radovan Tomašovský, PhD., PharmDr. Samuel Varényi, PhD., PharmDr. Dominika Žigrayová, PhD., RNDr. Veronika Brindza Lachová, PhD., doc. PharmDr. Szilvia Czigle, PhD., PharmDr. Kamila Dokupilová, Mgr. Ondrej Ďuriška, PhD., PharmDr. Vladimír Forman, PhD., RNDr. Peter Gál, PhD., MBA, prof. Ing. Miroslav Habán, PhD., PharmDr. Ema Kostovčíková, Anna Krchňavá, PharmDr. Mgr. Elena Kurin, PhD., Mgr. Petra Mitrengová, PhD., prof. PharmDr. Pavel Mučaji, PhD., prof. Ing. Milan Nagy, CSc., Magdaléna Országová, Zuzana Sztranyovszká, Mgr. Jaroslav Tóth, PhD., doc. Mgr. Fils Andriamainty, PhD., Lívia Budová, Dr.h.c. prof. RNDr. Jozef Čižmárik, PhD., Viera Današová, Ing. Jaroslav Galba, PhD., PharmDr. Vladimír Garaj, PhD., Vlasta Hanulíková, PharmDr. Iva Kapustíková, PhD., Martina Kysucká, doc. PharmDr. Ivan Malík, PhD., PharmDr. Matej Maruniak, PhD., PharmDr. Dominika Nádaská, PharmDr. Eva Salanci, PhD., PharmDr. Lenka Stopková, PhD., doc. PharmDr. Miroslava Sýkorová, PhD., Mgr. Róbert Šandrik, PhD., Ing. Stanislava Šoralová, PhD., Mgr. Ali Asi Shirazi, PhD., prof. RNDr. Pavol Balgavý, CSc., Adriana Bálintová, RNDr. Alexander Búcsi, PhD., PharmDr. Adriána Čelková, PhD., RNDr. Tomáš Fazekaš, PhD., prof. Ing. Vladimír Frecer, DrSc., doc. RNDr. Jana Gallová, CSc., Mgr. Lukáš Hubčík, PhD., doc. Mgr. Marcela Chovancová, PhD., Ing. PharmDr. Lukáš Kerti, Mgr. Atoosa Keshavarzi, PhD., Mgr. Mária Klacsová, PhD., Mgr. Rastislav Korfanta, Mgr. Nina Královič, PhD., Mgr. Norbert Kučerka, DrSc., Ing. Jarmila Oremusová, CSc., Anna Sláviková, Mgr. Katarína Sujová, Alena Šimnová, prof. RNDr. Daniela Uhríková, CSc., Mgr. Emil Babiak, Mgr. Linda Bartošová, PhD., Mgr. Lenka Bies Piváčková, PhD., JUDr. Mgr. Petra Capandová, PhD., PharmDr. Aneta Čináková, PhD., PharmDr. Dominika Dingová, PhD., PharmDr. Gabriel Dóka, PhD., prof. PharmDr. Adriana Duriš Adameová, DrSc., doc. PharmDr. Tatiana Foltánová, PhD., PharmDr. Peter Galis, PhD., PharmDr. Katarína Hadová, PhD., Veronika Haššová, Mgr. Tibor Hodbod, PharmDr. Csaba Horváth, PhD., MUDr. Marek Hudák, PhD., PharmDr. Nikola Chomaničová, PhD., Mgr. Izabela Jarabicová, PhD., MUDr. PharmDr. Evelín Karim Aziz, MPH, PharmDr. Zuzana Kiliánová, PhD., prof. PharmDr. Ján Klimas, PhD., MPH, Simona Kolembusová, doc. PharmDr. Stanislava Kosírová, PhD., PharmDr. Eva Kráľová, PhD., PharmDr. Jakub Krivý, doc. PharmDr. Peter Křenek, PhD., PharmDr. Attila Kulcsár, PhD., prof. RNDr. Magdaléna Kuželová, CSc., PharmDr. Katarína Lelková, MUDr. Milan Luknár, PhD., PharmDr. Eva Malíková, PhD., Mgr. Andrea Marciníková, doc. PharmDr. Marek Máťuš, PhD., PharmDr. Filip Max, PhD., Lukáš Német, doc. PharmDr. Anna Paul Hrabovská, PhD., Mgr. Marína Púchovská, doc. PharmDr. Tomáš Rajtík, PhD., Mgr. Mária Reinerová, Mgr. Lazaros Salvaras, PhD., Mgr. Parsa Shafieikazerooni, Mgr. Ondrej Sprušanský, PhD., RNDr. Kristína Stahlová, PharmDr. Peter Stanko, doc. MUDr. Tatiana Stankovičová, CSc., PharmDr. Natália Stollárová, PhD., Alexandra Striničová, PharmDr. Ondrej Sukeľ, Mgr. Soňa Sýkorová, PharmDr. Kristína Szmicseková, PhD., doc. RNDr. Ingrid Tumová, CSc., Mgr. Jana Urbánková, MUDr. Annamária Vančová, doc. Mgr. Diana Vavrincová, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Eva Veľasová, PhD., Elena Vilémová, Bc. Monika Zelinová, Marta Bruteničová, PharmDr. Mária Čuchorová, PhD., Iveta Dinková, PharmDr. Daniel Krchňák, DiS, PharmDr. Janka Kubíková, PhD., MPH, Ing. Michael Kenneth Lawson, PhD., PharmDr. Alžbeta Lengyelová, PharmDr. Desana Matušová, PhD., PharmDr. Veronika Mikušová, PhD., PharmDr. Milica Molitorisová, PhD., PhDr. Eva Nováková, doc. PharmDr. Juraj Piešťanský, PhD., Erika Polášková, PharmDr. Miroslava Potúčková, PhD., PharmDr. ThLic. Mária Raučinová, PhD., Iveta Rigáňová, Mgr. Jana Selčanová, PharmDr. Veronika Šimunková, PhD., PharmDr. Miroslava Špaglová, PhD., doc. RNDr. Miroslava Šupolíková, PhD., PharmDr. Jozef Zima, PharmDr. Martin Bajcura, PhD., Ing. Iryna Bondar, doc. Ing. Ladislav Habala, Dr.rer.nat., Mgr. Peter Herich, PhD., RNDr. Lukáš Krivosudský, PhD., Mgr. Lucia Lintnerová, PhD., doc. PharmDr. Miloš Lukáč, PhD., PharmDr. Mário Markuliak, PhD., RNDr. Roman Mikláš, PhD., Mgr. Natalia Lucia Miklášová, PhD., Mgr.

Anna Miňo, PhD., Adrián Nedorost, Alžbeta Nedorostová, PharmDr. Bianka Oboňová, PhD., Mgr. Klára Oláhová, Ing. Patrícia Oláh Paračková, PhD., Ivana Petrová, doc. Ing. Martin Pisárčik, CSc., Ing. Emil Švajdlenka, PhD., Jana Tarabová, doc. PharmDr. Jindra Valentová, PhD., Mgr. Melissa Záteková, PharmDr. Laura Adamkovičová, PharmDr. Monika Čičová, doc. JUDr. PhDr. Lilla Garayová, PhD., LL.M., PharmDr. Peter Jeník, Peter Kečkeš, PharmDr. Zuzana Koblišková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD., PharmDr. Peter Matejka, PhD., doc. PharmDr. Daniela Mináriková, PhD., PharmDr. Zuzana Pagáčová, PharmDr. Slávka Porubcová, PhD., Ing. Mgr. Ingrid Slezáková, MHA, MPH, PharmDr. Miroslava Snopková, PhD., PharmDr. Vasil Šatnik, PhD., prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Miriam Vulevová

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF/PVP/20	Research Project and Presentation

Educational activities:
Type of activities: practicals
Number of hours:
per week: 4 **per level/semester:** 56
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4., 6., 8., 10.

Educational level: I.II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 14

A	ABS	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: PharmDr. Andrea Balažová, PhD.

Last change:

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/10-Mgr/26	Retail Pharmacy, Legislation and Ethics

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 8.

Educational level: I.II.

Prerequisites:

Course requirements:
A student attends lectures and seminars in full extend. Students are evaluated in writing during the semester, the minimum success rate is 60%.
Rating: A: 93-100%, B: 85-92%, C: 77-84%, D: 69-76%, E: 60-68%, Fx: less than 60%.
The final exam takes place in the form of a written test. The minimum success rate is 60%. Rating: A: 93-100%, B: 85-92%, C: 77-84%, D: 69-76%, E: 60-68%, Fx: less than 60%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
After completing the course, the student acquires knowledge and skills in pharmacy care, an overview of the overall content of the course Retail pharmacy and its position in pharmaceutical practice, the subject of which is working with the drug and its administration to the patient under certain conditions. A student masters the work with a prescription, ePrescription and information he/she obtains from it, but also other professional information he obtains from literature and electronic databases. Students are acquainted with basic information on the storage of drugs and medicines, on the individual preparation of medicines and on the control of pharmaceutical raw materials that are subject to an identity test.

Class syllabus:
- Introduction to pharmacy.
- Providing expert information and advice on the use of medicines, including risks and their interactions, in order to ensure the effective and safe use of medicines, with particular emphasis on non-prescription medicines.
- Individual preparation of drugs.
- Control of drugs and medicines.
- Dispensing of human and veterinary medicines, dietetic food and medical devices.
- Provision of expert information and advice on the use of veterinary medicines, including compliance with the withdrawal period for animal keepers.
- Providing information and advice on the dispensing of medical devices to ensure their proper use or function.
- Administration and documentation of material, personnel and professional.

- Agenda of drug preparation, its registration and dispensation.
- Cooperation in the creation of drug forms.
- Performing routine physiological examinations.
- Communication with health insurance companies.
- Cooperation with external applications - drug information system.
- Drug interactions and electronic search.
- Quality management of pharmaceutical activities.
- Revision activity.
- Managerial and statistical communication.
- Categorization of drugs and pricing policy.
- Provision of medicines, drugs, dietetics and medical devices.

Recommended literature:

Tesař, T. a kol.: Lekárenstvo a legislatíva, Osveta, 2017
Zákon č. 362/2011 Z. z. o liekoch a zdravotníckych pomôckach a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
Zákon č. 363/2011 Z. z. o rozsahu a podmienkach úhrady liekov, zdravotníckych pomôcok a dietetických potravín na základe verejného zdravotného poistenia a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
Zákon č. 576/2004 Z.z. o zdravotnej starostlivosti, službách súvisiacich s poskytovaním zdravotnej starostlivosti a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
Zákon č. 578/2004 Z.z. o poskytovateľoch zdravotnej starostlivosti, zdravotníckych pracovníkoch, stavovských organizáciách v zdravotníctve a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
Zákon č. 139/1998 Z. z. o omamných látkach, psychotropných látkach a prípravkoch v znení neskorších predpisov
Zákon č. 147/2001 Z. z. o reklame a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
Zákon č. 152/1995 Z. z. o potravinách v znení neskorších predpisov
Vyhláška MZ SR č. 129/2012 Z. z. o požiadavkách na správnu lekárenskú prax
Nariadenie vlády SR č. 296/2010 Z. z. o odbornej spôsobilosti na výkon zdravotníckeho povolania, spôsobe ďalšieho vzdelávania zdravotníckych pracovníkov, sústave špecializačných odborov a sústave certifikovaných pracovných činností v znení neskorších predpisov
Európsky liekopis aktuálne vydanie (European Pharmacopoeia – Ph. Eur. last Edition)
Slovenský farmaceutický kódex

Languages necessary to complete the course:

Slovak language

Notes:

The subject is compulsory and is taught only in the 8th semester of study.

Past grade distribution

Total number of evaluated students: 1532

A	ABS	B	C	D	E	FX
54,18	0,0	29,83	13,12	2,15	0,59	0,13

Lecturers: PharmDr. Miroslava Snopková, PhD., PharmDr. Ľubica Lehocká, PhD., PharmDr. Lucia Masaryková, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/12-Mgr/22	Safety of Herbal Medicines and Food Supplements

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
A 100-% attendance at the lectures is required. Students have to prepare a seminar work. Only the corrected and accepted version of this seminar work will enable students to take part at the final examination of the subject. The final exams will have the form of a written test. Grading rules: 100-92/A, 91-84/B, 83-76/C, 75-68/D, 67-60/E, 59-0/FX.
Scale of assessment (preliminary/final): 0/1

Learning outcomes:
Upon completion of this course the student is able to assess safety issues of herbal medicines and food supplements, their safety in specific populations and situations, including side effects, contraindications, and potential interactions.

Class syllabus:
The lectures deal with herbal medicines, their safety in specific populations and situations, including their side effects, contraindications (diseases, pregnancy, lactation, children, elderly people), potential interactions. Herbal medicines – Community code related to medicinal products for human use – EMA – recommendations. Food supplements (foods) – General food law – EFSA – health claims. Adulteration problems of (traditional) herbal medicines, foods. Seminars / seminar works include food supplements quality and safety; herbal drugs in herbal medicinal products and food supplements, their active compounds and adulteration; clinically significant herbal medicines-drugs interaction. This course is an addition and follow-up to the information gained in the compulsory subject of Pharmacognosy (1) and (2), supplements it with information necessary in pharmacy practice.

Recommended literature:
European law: Medicinal products for human use; General food; Food supplements; Novel foods; Health claims; etc.
Natural Medicines Comprehensive Database. Stockley's Drug Interactions. The Essential Guide to Herbal Safety. WHO Monographs on Selected Medicinal Plants.
Monographs: EMA, EFSA, Ph. Eur.; Lexicomp Database; Scientific Journals.

Languages necessary to complete the course:

English

Notes:
Winter Semester only, min. 5 students, max. 15 students.

Past grade distribution
Total number of evaluated students: 32

A	ABS	B	C	D	E	FX
78,13	0,0	9,38	12,5	0,0	0,0	0,0

Lecturers: doc. PharmDr. Szilvia Czigle, PhD., Mgr. Jaroslav Tóth, PhD.

Last change: 27.02.2024

Approved by: prof. PharmDr. Pavel Mučaji, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/07-Mgr/26	Selected Chapters in Inorganic Chemistry

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I.II.

Prerequisites:

Course requirements:
Final assessment: exam in the form of a summary text.
A: 90.01% – 100.00%; B: 82.01% – 90.00%; C: 74.01% – 82.00%; D: 66.01% – 74.00%; E: 60.01% – 66.00%; Fx: ≤ 60.00%.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Apply basic knowledge of bioinorganic and biocoordination chemistry in the field of pharmacy.

Class syllabus:
Metal ions in in vivo conditions. Brief basics of coordination chemistry of metal complexes. Stereochemistry of coordination compounds. Which metal ions react with which ligands (complex formation). Biologically significant complex compounds. The role and importance of transition metals in biological systems. Bioinorganic chemistry of oxygen. Trace elements in living organisms – deficiency and excess. Supplementation of trace elements. Antitumor activity of some metal complexes and their stereochemical requirements. Bioinorganic chemistry and its basic pharmaceutical applications.

Recommended literature:
Krätsmár-Šmogrovič, J. a kol.: Všeobecná a anorganická chémia. Martin : Osveta, 2007. 400 s. (textbook).
Taylor, D.M., Williams, D.R.: Bio-inorganic Chemistry and its Pharmaceutical Applications. Chapter 13. In Smith, H.J. Introduction to the Principles of Drug Design and Action. Amsterdam : OPA, 1998. s. 510-537.
Zelewsky, A.: Stereochemistry of Coordination Compounds. Chichester : John Wiley, 1996 (selected chapters).

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the winter semester.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Ing. Ladislav Habala, Dr.rer.nat., doc. Ing. Martin Pisárčik, CSc.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KChTL/08-Mgr/26	Selected Chapters in Organic Chemistry

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I.II.

Prerequisites:

Course requirements:
Final assessment: exam in the form of a comprehensive test.
Assessment: A = 100 – 90.1%, B = 90.0 – 82.1%, C = 82.0 – 74.1%, D = 74.0 – 66.1%, E = 66.0 – 60.1%, Fx = 60.0 – 0%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The course provides comprehensive preparation in the issues of nomenclature, stereochemistry, and chemical-physical properties of organic compounds.

Class syllabus:
Nomenclature (trivial and IUPAC) of organic compounds. Stereochemistry – conformations, geometric isomerism. Chirality. Aromaticity. Tautomerism. Conjugated systems. Electron effects. Acidity and basicity of organic compounds. Fundamentals of organic reactions.

Recommended literature:
Devínsky, F., Ďurinda, J., Lacko, I.: Organická chémia pre farmaceutov. Martin : Osveta, 2013. 806 s. (textbook)
Devínsky, F., Heger, J.: Názvoslovie organických zlúčenín. Bratislava : UK, 2010. 259 s. (textbook)
Buxton, S.R., Roberts, S. M.: Guide to Organic Stereochemistry. London : Longman, 1996. 252 s.

Languages necessary to complete the course:
Slovak language

Notes:
The course is offered only in the summer semester. The minimum number of students to open the course is 5. The maximum number of students who can enroll in the course is 80.

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: RNDr. Roman Mikláš, PhD., doc. PharmDr. Miloš Lukáč, PhD., Ing. Patrícia Oláh Paračková, PhD., Mgr. Klára Stankovianska, PhD., PharmDr. Adrian Lengyel, PhD.

Last change: 29.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KORF/12-Mgr/26	Social Pharmacy and Pharmacoeconomics

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 2 **per level/semester:** 28 / 28
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 4.

Educational level: I.II.

Prerequisites:

Course requirements:
Compulsory completion of teaching (lectures, seminars). During the semester, 2 credit tests are written. The final exam takes place in the form of a written test. The minimum success rate is 60%. Grading scale: A = 100-95%, B = 94-85%, C = 84-75%, D = 74-70%, E = 69-60%, FX = 59% and less.

Learning outcomes:
By completing the course the student will gain knowledge of basic and current legislation in the Slovak and EU conditions, evaluation of medical technologies, evaluation of drug utilization, provision of drugs and drugs, medical ethics but also the relationship to the place and position of pharmacy in the health care system. The student masters the use of statistical, econometric methods for evaluating the use of drugs and the position of drugs in society, working with a list of official prices of drugs, medical devices and dietetic foods, as well as working with a categorization list, ADC code list and basics of health statistics, can work and orient at the ŠUKL, MZSR and NCZI websites.

Class syllabus:
- the relationship of pharmacy to health care and its provision of medicines.
- the position of social pharmacy in the health care system and the evaluation of health technologies.
- current health legislation.
- original and generic medicines and their position in healthcare.
- pharmacoepidemiology and pharmacovigilance, their aspects and basic principles in the healthcare system.
- information on medicinal products, value, structure, content and meaning of the Package Leaflet of the medicinal product and the Summary of Product Characteristics for the patient, for the professional public and the requirements for advertising of medicinal products.
- application of management and marketing in the conditions of the health care system - financial and personnel management in health care.
- improving the system of health care with medicines based on the use of pharmacoeconomics, pharmacoepidemiology and informatics.

- regulatory mechanisms in the field of drug and drug provision, requirements for drug registration, principles of pricing and categorization of drugs, the role of the Ministry of Health, ŠUKL.
- clarification and definition of the concept of utilization and possibilities of evaluating the consumption of drugs and medicines.
- basics of health statistics with the definition of basic concepts and the role of NCZI.

Recommended literature:

Tesař, T., Babeľa R.: Hodnotenie zdravotníckkych technológii. SAP, Bratislava, 2014, 96 s.
Foltán, V.: Sociálna farmácia. Osveta, Martin, 2010. 203 s.
Foltán, V. a kol.: Manažment, marketing a lieky, Herba Bratislava, 2010, s.155
Tesař,T., Foltán V.: Zdravotná starostlivosť, náklady, kvalita a výsledky,
Výkladový terminologický slovník ISPOR, 2008,s.238
Foltán, V. a kol.: Odporúčania pre ATC klasifikáciu liečív a stanovenie hodnoty DDD, Kancelária WHO na Slovensku, 2008, s.203, vybrané časti
Kriška, M. a kol.: Memorix klinickej farmakológie. Bratislava : SAP, 2006. 879 s. vybrané časti
Vlček a kol.: Vybraná farmaceutická odvětví. Praha : Profesional Publishing, 2004.176 s.
Foltán, V. a kol.: Lieky, lieková politika, farmakoekonomika. Bratislava : Propact, 2003. 186 s.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: prof. PharmDr. Tomáš Tesař, PhD., MBA, PharmDr. Zuzana Koblišková, PhD., PharmDr. Miriam Vulevová

Last change: 27.05.2026

Approved by: prof. PharmDr. Tomáš Tesař, PhD., MBA

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/900-Mgr/25	**Course title:** Social Pharmacy and Retail Pharmacy
Number of credits: 4	
Recommended semester: 9., 10..	
Educational level: I.II.	
Course requirements: The state exam can be taken by a student who has successfully completed the following subjects: Practice in Community Pharmacy (1), Practice in Community Pharmacy (2), Pharmacy, Legislation and Ethics, Social Pharmacy and Pharmacoeconomics, Public Health and Pharmaceutical Care.	
Learning outcomes: By passing the exam, the student demonstrates comprehensive knowledge of healthcare systems in the areas of legislative, economic, organizational and information. The graduate understands the connection of professional knowledge from various areas of social pharmacy and pharmacy and is able to analyze and apply theoretical knowledge in the provision of pharmacy healthcare and performing other professional activities of a pharmacist.	
Class syllabus: The state exam consists of an oral theoretical exam before a state examination committee. The student randomly selects one question from the designated categories.	
State exam syllabus:	
Last change: 03.04.2025	
Approved by: prof. PharmDr. Ján Klimas, PhD., MPH	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFB/08-Mgr/22	Technology of Natural Drugs

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
- a 100 % attendance at the course lectures is required;
- students must prepare 2 seminar works. The first one should be submitted by 6th semestral week at the latest, the second one should be submitted by 12th semestral week at the latest;
- successful evaluation of 2 seminary works is required for successful completion of the course seminars. Only the corrected and accepted version of seminary works will enable students to take part at the final examination of the subject.
- The final exams will have the form of a written test. Grading rules: 100-92/A, 91-84/B, 83-76/C, 75-68/D, 67-60/E, 59-0/FX.
Scale of assessment (preliminary/final): 1/1

Learning outcomes:
Upon successful completion of the educational process, the student should gain a comprehensive overview of the processes that precede the emergence of a particular plant-based product and should be able to evaluate drugs and medicinal plants as basic raw materials for the preparation of natural medicines. The acquired knowledge should help the student in the application, especially in the field of research and production of pharmaceutical preparations on a plant basis, but also in other industries, e. g. cosmetics, food industry.

Class syllabus:
The course Technology of Natural Drugs deals with plant raw materials used in the pharmaceutical industry. Their use is very common not only in the form of phytopharmaceuticals or isolated active substances in the form of drugs, but is also possible in the form of nutritional supplements. It focuses on the requirements concerning the quality of plant material and factors influencing the quality of the drug in the whole process of phytopharmaceutical production - from good cultivation practice to good manufacturing practice. Gradually acquaints students with the basic procedures of plant material processing but also with newer methods of active substances obtaining such as supercritical or subcritical fluid extraction, microwave-assisted extraction or ultrasound-assisted extraction. It explains the importance of fingerprint analysis of extracts and standardization of the content of their active substances, which are important indicators of the quality and effectiveness of phytopharmaceuticals. Students will get acquainted with an important area of natural drugs

technology – biotechnology, and the possibilities of their application in the process of obtaining active substances from plants.

Recommended literature:

Nagy –Mučaji: Pharmacognosy : Natural remedies. –1st Ed. -Bratislava : FPharm CU, 2002. –72 pp.

Mučaji –Nagy: Pharmacognosy: Analytical and chromatographic practice. – 2nd revised Ed. – Bratislava, FPharm CU, 2011. –75 pp., ISBN 978-80-223-3108-1.

Actual version of European Pharmacopoiea.

Languages necessary to complete the course:

English

Notes:

The course is opened only in the winter semester if at least 10 students are enrolled for the course. The maximum number of students who can enroll in the course is 16.

Past grade distribution

Total number of evaluated students: 85

A	ABS	B	C	D	E	FX
60,0	0,0	28,24	10,59	0,0	0,0	1,18

Lecturers: PharmDr. Vladimír Forman, PhD., doc. PharmDr. Szilvia Czigle, PhD., RNDr. Veronika Brindza Lachová, PhD.

Last change: 29.06.2022

Approved by: prof. PharmDr. Pavel Mučaji, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/16-Mgr/26	Toxicology

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 7.

Educational level: I.II.

Prerequisites:

Course requirements:
Intermediate and final evaluation:
Compulsory attendance at lectures - at least 80%.
During the semester, students take 2 tests with a required minimum success rate 60%. Upon successful completion of the interim tests, the student can register for the final (exam) test, which will take place by computer or in writing form.
Final test evaluation: A 91-100%, B 81-90%, C71-80%, D 66-70%, E 60-65%, FX <60%

Learning outcomes:
Toxicology is the study of the toxic effects of xenobiotics on a living organism. Knowledge of toxicology is essential for the preparation of pharmacists for clinical practice, whether for work in a pharmacy, at the department of clinical pharmacology and pharmacy, toxicology center, or in national or supranational regulatory authority agencies. The graduate of the course will be acquainted with the safety of the most common xenobiotics, including drugs, and the management of their possible toxic effects, as well as with the methodology and requirements for preclinical and clinical safety of drugs and assessment of their environmental risks.

Class syllabus:
After the general introduction, the course will address the basic toxicological principles, including toxicokinetics and toxicodynamics, teratogenicity, genotoxicity and carcinogenicity of xenobiotics. Subsequently, systemic and organ toxicity will be discussed, especially at the level of the liver, kidneys, respiratory system, nervous system and immune system. Within clinical toxicology, the student will get acquainted with the most common noxa, the way and manner of exposure to them, as well as the management of intoxication. Another important point of the study will be the regulatory aspects of drug safety assessment, including rules of good laboratory practice, clinical trial directives, safety with respect to selected population groups and specific products, as well as post-marketing drug safety assessment or environmental risk assessment. The study focuses on theoretical knowledge as well as practical experience in the analysis of the toxic effect of xenobiotics and in the assessment of drug safety.

Recommended literature:

PATOČKA, J.: Úvod do obecné toxikologie. Praha: Manus, 2003. ISBN 80-86571-04-1.
PROKEŠ, J. et al.: Základy toxikologie. Obecná toxikologie a ekotoxikologie. Praha: Karolinum, 2005. ISBN 80-7262-301-X.
HORÁK, J., LINHART, I., KLUSOŇ, P.: Úvod do toxikologie a ekologie pro chemiky. Praha: VŠCHT, 2010. ISBN 978-80-7080-548-0.
PAVLOV SKÝ, J.: Toxikologie. 1.vyd. Ostrava: Vysoká škola báňská. Technická Univerzita Ostrava, 2014. ISBN 978-80-7385-109-5.
TUMOVÁ I. a kol.: Toxikológia pre farmaceutov. Herba, Bratislava, 2016. ISBN 978-80-89631-56-8
Legáth: a kol: Špeciálna toxikológia, Univerzita veterinárskeho lekárstva a farmácie v Košiciach, 2. prepracované vydanie, 2023.
MULDER G.J. Pharmaceutical toxicology. Pharmaceutical Press 2006
FRIEDMAN L.M. et al.: Fundamentals of Clinical Trials, Springer 2015

Languages necessary to complete the course:
Slovak

Notes:

Past grade distribution
Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Ondrej Sprušanský, PhD., doc. PharmDr. Marek Máťuš, PhD., doc. Mgr. Peter Vavrinec, PhD., PharmDr. Zuzana Kiliánová, PhD., doc. PharmDr. Anna Paul Hrabovská, PhD., doc. PharmDr. Blažena Cagáňová, PhD., PharmDr. Silvia Plačková, PhD., MPH, PharmDr. Kristína Szmicseková, PhD., PharmDr. Katarína Hadová, PhD., PharmDr. Csaba Horváth, PhD.

Last change: 27.05.2026

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Pharmacy	
Course ID: FaF/999/Eplus/20	**Course title:** Trends in the European pharmaceutical education
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1., 2.., 3., 4.., 5., 6.., 7., 8.., 9., 10..	
Educational level: I.II.	
Prerequisites:	
Course requirements: After the production of evidence about completing the course at the foreign university (Transcript of Records), a student graduating ERASMUS plus is graduated with the credit assessment of the imported subject to the faculty, according to academic results at the host university / institution (Table E) and to protocol of the recognition of studies by Faculty / University - recognition of the results at the home institution (Table F).	
Learning outcomes: The Erasmus plus student gets obtained knowledges from the selected course offered from the curriculum of the host university / institution that belongs to the so-called educational component of the study program student. The student by the studying abroad obtains the knowledges in the indispensable subjects that are not in the curriculum at the home university / institution.	
Class syllabus: The student of Erasmus plus graduate under the Learning Agreement for Studies intended subject at another faculty of a university on which has not be completed undergraduate courses of - according to the current curriculum of subject.	
Recommended literature: the recommended reading for the student to the subject at the host university / institution - the topical source for present problems	
Languages necessary to complete the course: the language or combination of languages, knowledge of which is necessary to pass the subject at the host university / institution	
Notes: subject is provided, according to interest, only students who are sent to the host university / institution participating in foreign ERASMUS mobility plus	

Past grade distribution
Total number of evaluated students: 1

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	100,0

Lecturers: doc. PharmDr. Jindra Valentová, PhD.

Last change: 06.08.2020

Approved by: prof. PharmDr. Ján Klimas, PhD., MPH

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFANF/12-Mgr/20	Validation in Analytical and Pharmaceutical Practice

Educational activities:
Type of activities: lecture / seminar
Number of hours:
per week: 1 / 1 **per level/semester:** 14 / 14
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I.II.

Prerequisites:

Course requirements:
Successful completion of the exam consisting of written or oral part (min. 60%). To obtain an A rating it is necessary to obtain at least 92 out of 100 points, to obtain an B rating at least 84 points, to obtain a C rating at least 76 points, to obtain a D rating at least 68 points and to obtain an E rating at least 60 points.
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Course objectives:
• Purposefully develop and apply knowledge in the field of statistics in the process of validation of analytical instrumental methods.
• Briefly get acquainted with special statistical methods (eg biostatistics, or biometrics, which is the application of statistics to biological problems; chemometrics, which is used in the processing of chemical data, etc.).
• Familiarize with standard validation protocols for pharmaceutical and biomedical analysis (ICH, FDA, EMA) and principles of good laboratory practice (GLP).
• Demonstrate applications in pharmaceutical and clinical practice.

Class syllabus:
• Statistical parameters related to the validation of instrumental analytical methods.
• Validation of laboratory methods, types of validation protocols.
• Good laboratory practice. Accreditation of chemical/ biochemical laboratory.
• Analytical control in practice. Quality control, quality assessments, quality assurance.
• Case studies.

Recommended literature:
Recommended Literature:
• D. Kružlicová: Chemometria. Univerzita sv. Cyrila a Metoda v Trnave, Michal Vaško - Vydavateľstvo, Prešov, 2015. ISBN 978-80-8105-671-0
• M. Meloun, J. Militký: Statistické zpracování experimentálních dat. East Publishing, Praha, 1998. ISBN 80-7194-075-5

• M. Otto: Chemometrics: Statistics and Computer Application in Analytical Chemistry, 3rd Edition. Wiley-VCH Verlag, Weinheim, 2016. ISBN: 978-3-527-34097-2
• Mikuš, P., Piešťanský J.: Kapilárna elektroforéza, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2014. 312s. Strana: 2
• Mikuš, P., Piešťanský, J., Dokupilová, S.: Kvapalinová chromatografia, hmotnostná spektrometria a ich kombinácie vo farmaceutickej a biomedicínskej analýze, VEDA, Bratislava, 2018. 365s

Languages necessary to complete the course:
slovak language

Notes:

Past grade distribution
Total number of evaluated students: 285

A	ABS	B	C	D	E	FX
59,65	0,0	23,86	7,02	3,86	3,51	2,11

Lecturers: doc. Ing. Dáša Kružlicová, PhD.

Last change: 02.04.2022

Approved by: doc. Ing. Dáša Kružlicová, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KFT/17-Mgr/26	Veterinary Pharmacology

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 28
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
To be admitted to the exam, student is required to attend all lectures and seminars. The condition for passing the course is passing the final exam test and the oral exam. The test and the oral exam contribute equally to the overall result of the exam and the student must demonstrate mastery of at least 60% of the required knowledge. The exam test result is evaluated on a scale: A (at least 92%), B (at least 83%), C (at least 76%), D (at least 68%), E (at least 60%) and Fx (less than 60% of the maximum number points).
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
By completing the course, the student will gain an overview of the specifics of veterinary medicine and veterinary pharmacology. Student will be familiar with veterinary drugs, which are an important part of pharmaceutical practice.

Class syllabus:
The course pays attention to the specifics of the use of drugs in animals - routes of administration, drug forms, the properties of veterinary drugs, the use of drugs in veterinary practice (medical, biotechnological). Particular attention is paid to drug residues in animal products intended for human consumption and protection periods in animals.
The scope of the course in the form of lectures and seminars is focused on individual specific groups of veterinary drugs:
Specifics of veterinary pharmacology - differences from human pharmacology.
Legislative regulation of veterinary health care.
Veterinary drug forms and routes of administration.
Zoonoses, the most common animal diseases.
Pharmacology of selected groups of veterinary drugs:
- Drugs used in infectious and invasive diseases.
- Drugs affecting the central and peripheral nervous system.
- Medicines that affect the blood circulation.
- Medicinal products acting on the gastrointestinal tract.
- Medicinal products that affect the reproductive organs. Insemination.

- Drugs affecting metabolism.
- Euthanasia, slaughter of livestock.

Recommended literature:

Vodrážka, J. a kol.: Veterinárna farmakológia pre farmaceutov. Bratislava : Príroda, 1980. 344 s.
Ševčík, B., Lamka, J.: Veterinární farmakologie pro farmaceuty. Hradec Králové : FaF UK, 1987. 118 s. (skriptá).
Lamka J., Ducháček L.: Veterinární léčiva pro posluchače farmacie. Hradec Králové : FaF Univerzity Karlovy, 1998.
Šnirc, J. a kol.: Klinická veterinárna farmakológia. Martin: Neografia, 2007, 1182 s.

Languages necessary to complete the course:

Notes:

Past grade distribution

Total number of evaluated students: 0

A	ABS	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. PharmDr. Marek Máťuš, PhD., doc. Mgr. Peter Vavrinec, PhD.

Last change: 27.05.2026

Approved by: doc. PharmDr. Marek Máťuš, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Pharmacy

Course ID:	**Course title:**
FaF.KBMBL/14-Mgr/22	Xenobiochemistry

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 28 / 14
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 6.

Educational level: I.II.

Prerequisites:

Course requirements:
The course ends with a written exam. The student will be admitted to the written exam after achieving the following requirements:
1. 100% participation in practical exercises
2. submission of seminar work
Scale of assessment (preliminary/final): Written exam. Evaluation A corresponds to obtaining min. 92% of the maximum number of points, B – 84%, C – 76%, D – 68%, E – 60%, Fx less than 60%.

Learning outcomes:
Students after completion of the Xenobiochemistry course should identify and outline the main biotransformation way of the production of the metabolites according to the structure of drugs. Moreover, graduates should gain good knowledge about biotransformation enzymes, their isoforms, properties and interactions on the cellular level as well as specifics of human organism on genotypic and phenotypic levels.

Class syllabus:
- Principle of xenobiotic (drug) metabolism and phases of biotransformation reactions based on chemical structure.
- Characterization and function of biotransformation enzymes, mechanism of the 1st phase reaction on CYP-450 level
- CYPs isoenzymes – substrate specificity, tissue and subcellular distribution.
- Meaning of the second biotransformation phase, drug transporters.
- The impact of enzyme induction or inhibition on pharmacotherapeutic effect of drugs, possible interactions or side effects.
- Intra- and interindividual variability in biotransformation enzyme activity.
- Epigenetic factors affecting the biotransformation of xenobiotics.
- Effect of circadian rhythms on the gene expression of biotransformation enzymes.
- Knowledge of xenobiochemistry allows a modern view on safe and efficient pharmacotherapy, toxicology of drugs.

Recommended literature:

Skálová, L. a kol.: Metabolismus léčiv a jiných xenobiotik, Karolinum, 2017.
Helia, O., Pauliková, I.: Xenobiochémia, Bratislava UK, 2004.
A Handbook of Bioanalysis and Drug Metabolism, Ed. Gary Evans, CRC Press, London, NewYork, 2004.
Testa B., Kramer S.D: Chemistry and Biodiversity vol.3, Verlag, 2006.

Languages necessary to complete the course:
Slovak language

Notes:

Past grade distribution
Total number of evaluated students: 120

A	ABS	B	C	D	E	FX
25,83	0,0	31,67	25,83	10,83	4,17	1,67

Lecturers: PharmDr. Andrea Balažová, PhD.

Last change: 17.02.2025

Approved by: PharmDr. Andrea Balažová, PhD.