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COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-028/22	Acquisition of experimental data

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: homework
Examination: oral examination
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 70/30

Learning outcomes:
After completing the course the student will have the ability to work with various devices to collect data from the experiment (oscilloscopes, pressure gauges, flow meters, temperatures ...), control the devices electronically (via PC), digitize and process the measured data and, ultimately, automate the experiment.

Class syllabus:
Types of sensors in the experiment (current and voltage probes, pressure, flow, temperature meters ...). Data acquisition equipment: AD converters, Oscilloscopes. Data generation equipment: DA converters, function generators. Device control via PC (using AD / DA converters integrated into the PC, communication via GPIB, USB, RS232 ...). Automation of the experiment in LabVIEW.

Recommended literature:
P. Horowitz, W. Hill: The Art of Electronics, 3rd ed., Cambridge University Press, Cambridge, 2015.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Peter Čermák, PhD.
Last change: 11.02.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-803/10	BSc Thesis Supervision

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

Number of credits: 10

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By leading the bachelor's thesis, the doctoral student will be involved in scientific and pedagogical work at the department and will gain experience in leading the thesis.

Class syllabus:
Listing the topic of the bachelor's thesis, work plan for the bachelor's student, guiding the student in scientific work of theoretical or experimental nature, consultations.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/3-FOS-027/22	Biomedical applications of plasma, electric fields, radiation and laser

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: elaboration of professional literature on a selected topic and its presentation
Exam: oral
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
By completing the course, the student will gain a comprehensive overview of selected biomedical applications and therapeutic methods and an understanding of their principles, where different types of plasma and electric discharges, pulsed electric fields, radiation and lasers are used.

Class syllabus:
Basic concepts of plasma physics, plasma formation, the principle of generating low-temperature plasma in electric discharges. Brief overview of low temperature plasma applications.
Low-temperature plasma and pulsed electric fields for biological decontamination and sterilization of microorganisms (bacteria, spores, yeasts, biofilms) in air, water, surfaces, medical instruments, in living organisms. Comparison with thermal and chemical methods of disinfection / sterilization. Food spoilage prevention. Medical in-vivo, ex-vivo and in-vitro applications of plasma, plasma surgery, treatment of skin diseases, disinfection and wound healing, tooth decay and root canals. Induction of apoptosis and cancer treatment, cell manipulation.
Radiodiagnostics in biomedicine: X-rays and computed tomography (CT), Magnetic resonance spectroscopy and tomography, Fluorescence spectroscopy and microscopy, UV-VIS and IR absorption spectroscopy and microscopy, laser methods, beta and gamma radiation in nuclear medicine. Radiotherapy and other biomedical applications of radiation: UV, VIS, IR, Roentgen, beta and gamma radiation, laser,
Interaction of fluids with plasma and plasma activated fluids. Cell interaction with plasma, plasma activated fluid, pulsed electric field, radiation. Induced cellular and systemic processes in organisms. Importance of reactive oxygen and nitrogen forms, electroporation and electropermabilization of cell membranes, effects of UV and vis radiation. Bio-compatible and antimicrobial plasma surface treatment.

The use of laser analytical methods in medicine and biophysics is mainly focused on laser ablation methods (LA ICP OES, LIBS - analysis of hard / calcified tissues, soft tissues, biomedical samples) and laser absorption methods (CRDS, CEAS - patient breath analysis, Helicobacter diagnostics Pyroli). During this course we will focus on the use of LIBS in the field of medical / biomedical applications (application examples, requirements for laser and system equipment). LIBS analysis provides rapid information on the concentration or changes in the concentration of elements present in a biomedical sample to diagnose, monitor or predict a disease state, distinguish between healthy and malignant dental tissue, or distinguish between pathogenic and non-pathogenic bacteria (chemometry + LIBS). One of the latest applications of LIBS in the medical field is laser-guided surgery.

Recommended literature:

• M. Laroussi et al. (eds.): Plasma medicine : applications of low-temperature gas plasmas in medicine and biology. Cambridge University Press, 2012
• Fridman and G. Friedman: Plasma medicine, Wiley 2013
• Z. Machala; K. Hensel; Y. Akishev (Eds.): Plasma for Bio-Decontamination, Medicine and Food Security, NATO Science for Peace and Security Series A: Chemistry and Biology, Springer 2012
• H-R. Metelmann, T. von Woedtke, K-D. Weltmann: Comprehensive Clinical Plasma Medicine, Springer 2018
• Rehse S.J. (2014) Biomedical Applications of LIBS. In: Musazzi S., Perini U. (eds) Laser-Induced Breakdown Spectroscopy. Springer Series in Optical Sciences, vol 182. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-45085-3_17
• Own electronic texts of the subject published through the subject's website.

Languages necessary to complete the course:
Slovak in combination with English (study literature in English).

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Zdenko Machala, DrSc., doc. RNDr. Mário Janda, PhD.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-704/10	Citation Registered in SCI or SCOPUS

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

Number of credits: 4

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student gained experience with scientific work and publishing their results, which provoked a response in the form of a citation in a peer-reviewed scientific journal or proceedings. Citation registered in SCI or SCOPUS.

Class syllabus:
Research work on a topic related to the dissertation, processing of results, publication of results, citation registered in SCI or SCOPUS.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-501/15	Completion of PhD Research Project Stage (1)

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

Number of credits: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student proved by the continuous scientific work the completion of a significant stage of his scientific work on the topic of the dissertation thesis.

Class syllabus:
Completion of a new experimental device, introduction of a new measurement method, development of a new theoretical model, etc.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 11

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-507/15	Completion of PhD Research Project Stage (2)

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

Number of credits: 10

Recommended semester: 6.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student proved by the continuous scientific work the completion of a significant stage of his scientific work on the topic of the dissertation thesis.

Class syllabus:
Completion of a new experimental device, introduction of a new measurement method, development of a new theoretical model, etc.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 4

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/3-MXX-101/15	Course of English for PhD Studies (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 218

A	ABS	B	C	D	E	FX	NEABS
38,53	57,34	0,46	0,0	0,0	1,83	0,0	1,83

Lecturers: PhDr. Alena Zemanová, Mgr. Simona Dobiašová, PhD.

Last change: 13.01.2025

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/3-MXX-102/15	Course of English for PhD Studies (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites: FMFI.KJP/3-MXX-101/15 - Course of English for PhD Studies (1)

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 210

A	ABS	B	C	D	E	FX	NEABS
41,9	52,38	0,0	0,0	0,0	0,0	0,0	5,71

Lecturers: PhDr. Alena Zemanová, Mgr. Simona Dobiašová, PhD.

Last change: 13.01.2025

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-102/15	Department Seminar (1)

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

Number of credits: 5

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 20

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-103/15	Department Seminar (2)

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

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 18

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-104/15	Department Seminar (3)

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

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 18

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-105/15	Department Seminar (4)

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

Number of credits: 5

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 13

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-106/15	Department Seminar (5)

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

Number of credits: 5

Recommended semester: 5.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 11

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-107/15	Department Seminar (6)

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

Number of credits: 5

Recommended semester: 6.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-108/15	Department Seminar (7)

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

Number of credits: 5

Recommended semester: 7.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
91,67	8,33

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-109/15	Department Seminar (8)

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

Number of credits: 5

Recommended semester: 8.

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By actively participating in the scientific seminar of the workplace, the student will learn the form of presentation and discussion of scientific results. They will deepen their knowledge of scientific problems covered at the seminar.

Class syllabus:
Active participation in the workplace seminar. Preparation of materials for performance at the workplace seminar. Presentation at the workplace seminar.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
ENglish

Notes:

Past grade distribution
Total number of evaluated students: 13

ABS	NEABS
92,31	7,69

Lecturers: prof. RNDr. Pavel Veis, CSc.

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-801/15	Direct pedagogical activity (1)

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

Number of credits: 4

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience with direct pedagogical activities in conducting computer exercises or laboratory practices.

Class syllabus:
Conducting computational exercises or laboratory practices.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-802/15	Direct pedagogical activity (2)

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

Number of credits: 4

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience with direct pedagogical activities in conducting computer exercises or laboratory practices.

Class syllabus:
Conducting computational exercises or laboratory practices.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 4

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-811/15	Direct pedagogical activity (3)

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

Number of credits: 4

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience with direct pedagogical activities in conducting computer exercises or laboratory practices.

Class syllabus:
Conducting computational exercises or laboratory practices.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-812/15	Direct pedagogical activity (4)

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

Number of credits: 4

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience with direct pedagogical activities in conducting computer exercises or laboratory practices.

Class syllabus:
Conducting computational exercises or laboratory practices.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

STATE EXAM DESCRIPTION

Academic year: 2025/2026	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FOS-990/15	**Course title:** Dissertation Thesis Defense
Number of credits: 30	
Educational level: III.	
Learning outcomes: The student prepared and defended the dissertation, in which he presents the results of his scientific work.	
Class syllabus: Študent pripravil dizertačnú prácu, naštudoval problematiku študovanú v rámci dizertačnej práce, popísal experimentálne a teoretické metódy využívané v rámci dizertačnej práce, prezentoval vedecké výsledky získané v rámci dizertačnej práce a ich interpretáciu a na záver obhájil dizertačnú prácu.	
State exam syllabus:	
Recommended literature: Current scientific papers relevant to topic.	
Languages necessary to complete the course: english	
Last change: 11.02.2022	
Approved by: prof. RNDr. Pavel Veis, CSc.	

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-804/15	Guidance of a Project for the Students´ Conference

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

Number of credits: 7

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The doctoral student will gain experience in leading a student of a lower level of study in the creation of the work of the Students Scientific Conference.

Class syllabus:
Listing the topic of the work of SSC, work plan for the student, guiding the student in scientific work of theoretical or experimental nature, consultations.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-703/10	Home Project Co-researcher

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

Number of credits: 10

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience in scientific work on homework projects.

Class syllabus:
Scientific work on tasks arising from the objectives of a domestic scientific project.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 21

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FOS-101/15	**Course title:** Individual Study of Science and Research Resources (1)
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning, distance learning	
Number of credits: 10	
Recommended semester: 1.	
Educational level: III.	
Prerequisites:	
Course requirements: Indicative rating scale: passed> 50%, failed <50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: After completing the 2-semester course, the student will be able to independently study professional and scientific literature and critically assess its content.	
Class syllabus: The doctoral student will study the professional and scientific literature recommended by the supervisor related to the topic of the dissertation.	
Recommended literature: Selection of current articles from the area.	
Languages necessary to complete the course: English	
Notes:	
Past grade distribution Total number of evaluated students: 17	

ABS	NEABS
100,0	0,0

Lecturers:
Last change: 19.02.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-111/15	Individual Study of Science and Research Resources (2)

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

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
After completing the 2-semester course, the student will be able to independently study professional and scientific literature and critically assess its content.

Class syllabus:
The doctoral student will study the professional and scientific literature recommended by the supervisor related to the topic of the dissertation.

Recommended literature:
Selection of current articles from the area.

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 20

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-702/10	International Project Co-researcher

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

Number of credits: 15

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience in scientific work on the tasks of an international scientific project.

Class syllabus:
Scientific work on tasks arising from the goals of an international scientific project.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-022/15	Laser Processes and Chemical Reactions

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Antirequisites: FMFI.KEF/3-FOS-022/10

Course requirements:
Continuous assessment: elaboration of professional literature on a selected topic and its presentation
Exam: oral
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The student will gain theoretical knowledge and practical experience in the field of laser processes, photophysical and photochemical processes, in the processes of melting and evaporation of material, subsequent atomization and plasma formation. Furthermore, the processes of reassociation and cluster formation during the expansion of the laser-excited flame. He will also gain practical experience with analytical techniques using laser-induced processes.

Class syllabus:
(series of lectures, excursions and laboratory exercises)
Thermal, photophysical and photochemical processes. Reaction kinetics and particle transport. Atomization and formation of clusters. Surface melting processes. Material evaporation and plasma formation processes. Material deposition. Transformation and synthesis of material, creation of structures. Measurement and diagnostic techniques. Laser-induced penetration in gases, liquids and on the surface of solids, processes of ablation of solids. Laser-induced plasma (LIBS) and its morphology. Chemical analysis of surfaces and possibilities of non-calibration quantitative analysis. Analysis of samples using LIBS. Measurement and diagnostic techniques. Laser-induced penetration in gases, liquids and on the surface of solids, processes of ablation of solids. Laser-induced plasma (LIBS) and its morphology. Chemical analysis of surfaces and possibilities of non-calibration quantitative analysis. Analysis of samples using LIBS.

Recommended literature:
Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981
Principles of laser plasmas / Edited by George Bekefi. New York : John Wiley, 1976

Selection of current articles from the area.

Languages necessary to complete the course:
Slovak in combination with English (study literature in English)

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc., doc. RNDr. Mário Janda, PhD.

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/3-FOS-021/22	Laser Spectroscopy

Educational activities:
Type of activities: lecture / independent work
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning, distance learning

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: independent problem solving
Exam: oral oral and written test Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The result of the training will be a deepening of the theoretical knowledge needed in the use of various techniques of laser spectroscopy.

Class syllabus:
Principles of tunable lasers, spectral line profiles and their extensions. Laser spectroscopic techniques: LIF, Raman spectroscopy, high-sensitivity absorption techniques: frequency and amplitude modulation, ion rate modulation, cavity enhanced spectroscopy, pulsed and cw CRDS, optical-feedback CRDS, ICLAS, mode-locked cavity enhanced spectroscopy; saturation spectroscopy, sub-doppler spectroscopy, time-resolved spectroscopy.

Recommended literature:
Laserová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1992
Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981
• Selection of current articles from the area

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 14

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Mário Janda, PhD., prof. RNDr. Pavel Veis, CSc.
Last change: 19.02.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-701/10	Obtaining a University Grant

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

Number of credits: 20

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student gains experience in preparing a scientific project.

Class syllabus:
Scientific project proposal, setting project goals, work progress, and budget projects

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 14

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/3-FOS-024/22	Optical Spectroscopy of Gases and Plasma

Educational activities:
Type of activities: lecture / independent work
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning, distance learning

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Examination: oral and written test Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
After completing this course, the student will be able to independently interpret atomic and diatomic molecular spectra, will be able to simulate simple molecular spectra depending on experimental conditions. Gain an overview of new trends in optical spectroscopy.

Class syllabus:
Atomic and molecular spectra - electron states and electron transitions, classification of electron states, potential curves, vibrational structure, rotational structure, Franck-Condon principle, multiplets, Hund cases, selection rules, allowed transitions, forbidden transitions. Synthetic molecular spectra - thermodynamic equilibrium, line broadening (spectrometer instrument function, Doppler and Stark effect, ...). Classical emission and absorption spectrometry - determination of atom concentration resp. radicals (resonant VUV absorption, titration and actinometric method), determination of characteristic temperatures of gases and plasma (Te, Ti, Tvib, Trot). Molecular vibrational spectroscopy (IR, Raman and CARS). Time-resolved spectroscopy in a wide range of spectra. Elemental analysis using laser and spark induced plasma spectroscopy (LIBS).

Recommended literature:
Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981
Laserová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1992
Molekulová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1987
G.V. Maar: Plasma Spectroscopy, Elsevier Amsterdam 1968
H. R. Griem: Principles of plasma spectroscopy, Cambridge Unibersity Press 1997

Languages necessary to complete the course:
English

Notes:	
Past grade distribution Total number of evaluated students: 12	
ABS	NEABS
100,0	0,0
Lecturers: prof. RNDr. Pavel Veis, CSc., doc. RNDr. Mário Janda, PhD.	
Last change: 19.02.2022	
Approved by: prof. RNDr. Pavel Veis, CSc.	

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-025/22	Optical diagnostics of laser induced plasma - applications from low temperature to high temperature

Educational activities:
Type of activities: lecture / independent work
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning, distance learning

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Examination: oral and written test Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The student will gain knowledge in the field of laser-generated plasma, the accuracy and possibilities of using laser induced generated plasma and its applications from low-temperature to high-temperature plasma.

Class syllabus:
Laser-generated plasma, history, laser-generated spark spectrophy (LIBS), laser ablation of solids using femto, pico and nano-second lasers, qualitative elemental analysis using LIBS, atomic constants database, trace element detection using LIBS, detection limits (LOD), options sensitivity increases - two-pulse LIBS, LIBS in vacuum UV range, laser ablation in combination with low pressure electric discharge (LA ICP OES), quantitative LIBS - method of calibration-free CF LIBS, calculation of electron concentration and temperature, self-absorption correction, Saha Boltzmann L diagram, (CCD, CMOS, iCCD, EM CCD), possibilities of resolution and detection of stable isotopes by LIBS, molecular emission spectroscopy by LIBS. LIBS applications (biomedical, pharmaceutical, chemical, geological, capture of D/T fuel in the walls of thermonuclear reactors).

Recommended literature:

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Pavel Veis, CSc.
Last change: 19.02.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF+KAFZM/3-FOS-026/22	Optical methods for analysis and treatment of thin films

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Examination: oral and written test
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The student will learn the basics of thin film characterization using a wide range of optical methods, including material modification processes.

Class syllabus:
Overview of experimental techniques for the analysis of surfaces and thin layers of materials using electromagnetic radiation. The lecture will be an introduction to the following experimental techniques: IR spectroscopy and FTIR, spectroscopic and imaging ellipsometry, optical profilometry, dynamic and static scattering, confocal Raman / fluorescence microscopy, energy and wave dispersive X-ray spectroscopy, X-ray scattering and diffraction analysis, basics synchrotron radiation and X-ray laser, X-ray microscopy and X-ray phase contrast. Treatment of materials using electromagnetic radiation, absorption, ablation, radiation chemistry, optical lithography.

Recommended literature:
Gamma- nd X-Ray spectrometry with semiconductor detectors / Klaus Debertin, Richard G. Helmer. Amsterdam : Elsevier, 1988
Molecular spectra and molecular structure : volume 2 : Infrared and raman spectra of polyatomic molecules / Gerhard Herzberg. New York : D. Van Nostrand Company, 1949
Thin film analysis by X-ray scattering, M.Birkholz, Wiley-VCH Verlag GmbH, Weinheim, 2006, ISBN 3-527-31052-5
Základy strukturní analýzy, V. Valvoda, M. Polcarová, P. Lukáč, Karolinum Praha, 1992
Selection of current overview articles from the area.

Languages necessary to complete the course:
Slovak in combination with English (study literature in English and Slovak)

Notes:	
Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: doc. RNDr. Tomáš Roch, Dr. techn., doc. RNDr. Karol Hensel, PhD.	
Last change: 11.02.2022	
Approved by: prof. RNDr. Pavel Veis, CSc.	

STATE EXAM DESCRIPTION

Academic year: 2025/2026	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FOS-950/15	**Course title:** Passing Dissertation Examination
Number of credits: 20	
Educational level: III.	
Learning outcomes: Passing the dissertation exam and defending the dissertation project.	
Class syllabus: Presentation of the dissertation project, objectives of the dissertation. In the second part, an oral exam in Laser Physics and Optical Spectroscopy.	
State exam syllabus:	
Languages necessary to complete the course: english	
Last change: 11.02.2022	
Approved by: prof. RNDr. Pavel Veis, CSc.	

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-008/15	Physics of Ultrashort Pulses

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Antirequisites: FMFI.KEF/3-FOS-008/10

Course requirements:
Final assessment: Examination: oral and written test,
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The student will gain basic theoretical knowledge in the field of ultrashort pulse physics, experience in the implementation of ultrashort experiments.

Class syllabus:
Fundamentals of ultrashort pulse theory, propagation and interaction with matter (GVD, TOD), generation and amplification (modelocking, free-electron laser, CPA, OPCPA), practical implementation of femtosecond systems (oscillators, multi-pass amplifiers, regenerative amplifiers, stretcher - compressor, fs -optics), classical applied nonlinear optics (SHG, THG, NOPA, THz radiation, etc.), pulse length and phase measurement (FROG, SPIDER, etc.), femtosecond spectroscopy, sub-10-fs pulses and absolute phase stabilization of pulses, nonlinear optics at intensities> 1014 W / cm2, attosecond generation and photoelectron spectroscopy.

Recommended literature:
Optics and lasers : Including fibers and optical waveguides / Matt Young. Berlin : Springer, 2000
Svetlo : Vlny, lúče, fotóny / Anton Štrba, Vladimír Mesároš, Dagmar Senderáková. Nitra : Enigma, 2011
Selection of current articles from the area.
Selection of current overview articles from the area.

Languages necessary to complete the course:
Slovak in combination with English (study literature in English)

Notes:

Past grade distribution Total number of evaluated students: 5	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Tomáš Roch, Dr. techn., Dr. rer. nat. Peter Šiffalovič, DrSc.	
Last change: 21.06.2022	
Approved by: prof. RNDr. Pavel Veis, CSc.	

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-403/15	Presentation at Domestic Conference

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

Number of credits: 8

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience in presenting the results of scientific work to domestic and foreign scientific audiences.

Class syllabus:
Acquisition and processing of results, preparation of presentation, presentation at domestic conference.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-402/15	Presentation at Domestic Conference with International Participation

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

Number of credits: 10

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience in presenting the results of scientific work to domestic and foreign scientific audiences.

Class syllabus:
Acquisition and processing of results, preparation of presentation, presentation at domestic conference.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-401/10	Presentation at an International Conference

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

Number of credits: 20

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will gain experience in presenting the results of scientific work to a foreign scientific audience.

Class syllabus:
Obtaining and processing the results, preparation of the presentation, presentation at a foreign conference.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 26

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FEM-111/22	Professional Oral Communication in English

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Regular and active presence at the seminars, student's professional presentations in various formats. The course will be classified provided that the PhD student proves the fulfilment of obligations at the level of at least 51 %. The conditions for successful completion of the course are in accordance with the Study Regulations of the Faculty of Mathematics, Physics and Informatics.

Learning outcomes:
The aim of the course is to help the student improve his/her communication and presentation skills and stimulate discussion in a simulated scientific conference/symposium setting.

Class syllabus:
The students will be trained to deliver various formats of professional communication tools: Elevator talk (1 min). Brief poster talk (3-5 min overview of the student's research topic and key achievements), flash (3 min) and full (15-45 min) oral presentation. Technique and delivery of a good (scientific) presentation. Asking questions and adding comments, addressing peers' questions and comments. The students' topics for presentation: their current research activities or other related topics to the student's field of study. By the end of the course the student will be able to present and discuss their topic effectively in English with using a variety of tools and tips.

Recommended literature:
Armer, T.: Cambridge English for Scientists

Languages necessary to complete the course:
English

Notes:
Knowledge of English minimum at B1 level.

Past grade distribution
Total number of evaluated students: 23

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Zdenko Machala, DrSc.
Last change: 14.04.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KTF/3-FOS-007/15	Quantum Optics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning, distance learning

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Antirequisites: FMFI.KTFDF/3-FOS-007/10

Course requirements:
Continuous assessment: individual work
Examination: written, oral
Indicative rating scale: passed> 50%, failed <50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
After completing the lecture, the student will master the basic principles of theoretical quantum optics and their use in experiments.

Class syllabus:
Quantization of free electromagnetic field. Interaction of radiation with an atom. Photon experiments. Cavity quantum electrodynamics. Elements from the theory of laser radiation. Photon crystals. Macroscopic quantum phenomena and their experimental observation.

Recommended literature:
Quantum optics of small structures : Proceedings of the colloquium, Amsterdam, 23-24 September 1999 / Edited by Daan Lenstra, Taco D. Visser and K. A. H. van Leeuwen. Amsterdam : Academie van Wetenschappen verhandlingen, 2000
Ch. C. Gerry, P.L.Knight, Introductory Quantum Optics, Cambridge University Press, 2005
Selection of current articles from the area

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: doc. RNDr. Tomáš Blažek, PhD.
Last change: 11.02.2022
Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-302/15	Scientific Publication in a Current Contents-registered Periodical

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

Number of credits: 30

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By publishing the work in a peer-reviewed journal, the student will gain practical experience in preparing the achieved scientific results for publication.

Class syllabus:
Preparation of results for publication, preparation of the article, sending the article to the editorial office, incorporation of comments from the review continuation, proofreading and communication with the editor of the journal.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-304/15	Scientific Publication in a Foreign Reviewed Periodical (Almanac)

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

Number of credits: 20

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By publishing the work in a foreign peer-reviewed journal or peer-reviewed proceedings, the student will gain practical experience in preparing the achieved scientific results for publication.

Class syllabus:
Preparation of results for publication, preparation of the article, sending the article to the editorial office, incorporation of comments from the review continuation, proofreading and communication with the editor of the journal.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-303/15	Scientific Publication in a Reviewed Periodical (Almanac)

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

Number of credits: 15

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By publishing the work in a peer-reviewed journal or peer-reviewed proceedings, the student will gain practical experience in preparing the achieved scientific results for publication.

Class syllabus:
Preparation of results for publication, preparation of the article, sending the article to the editorial office, incorporation of comments from the review continuation, proofreading and communication with the editor of the journal.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-301/15	Scientific Publication in an A-category Periodical

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

Number of credits: 35

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Preparation of results for publication, preparation of the article, submission of the article, comment procedure, proofreading. A category A magazine is one whose ISI Thomson impact factor or Elsevier Scopus SNIP factor is at least 1.25.

Class syllabus:
Preparation of results for publication, preparation of the article, sending the article to the editorial office, incorporation of comments from the review continuation, proofreading and communication with the editor of the journal.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 13

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-305/15	Scientific Published Contribution in a Non-reviewed Almanac

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

Number of credits: 7

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
By publishing the work in a non-peer-reviewed journal or peer-reviewed proceedings, the student will gain practical experience in preparing the achieved scientific results for publication.

Class syllabus:
Preparation of results for publication, preparation of the article, submission of the article.

Recommended literature:
Current scientific papers relevant to topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.

COURSE DESCRIPTION

Academic year: 2025/2026

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FOS-808/10	Writing Diploma Thesis Assessment Protocol

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

Number of credits: 4

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Elaboration of an opinion on the final work of a bachelor's or master's student.

Class syllabus:
Critical reading of the final thesis of a bachelor's or master's student. Assessment of work in terms of professional and formal.
Deficiencies. Evaluation of work with a mark. Elaboration of an opinion and participation in the defense of the thesis.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 11.02.2022

Approved by: prof. RNDr. Pavel Veis, CSc.