Course descriptions

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COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-022/22	Advanced Modelling of Molecular Systems

Educational activities:
Type of activities: seminar
Number of hours:
per week: 3 **per level/semester:** 39
Form of the course: on-site learning

Number of credits: 10

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: homework
Exam: oral
The evaluation of the subject takes place in the form of continuous (individual work) and final evaluation (oral exam). Successful completion of the course reflects the student's sufficient orientation in the issue.
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 60/40

Learning outcomes:
Students will master the quantum-chemical description of molecules of molecular clusters, interpret experimental results by applying computational methods. They will improve in the use of standard software packages of quantum chemistry and chemical physics, will be able to understand the results and relevance of their applications in the literature, the choice of appropriate methods.

Class syllabus:
Introduction to molecular modeling, use of CHEMCRAFT program to edit molecules, use of GAUSSIAN program to determine electronic and geometric structure. Program for quasi-classical trajectories: calculation of the effective cross section of the reaction, the rate constant for the elementary reaction. Potential energy surface (curve). Solution of the electron Schrodinger equation MO-LCAO approximation. Electron repulsion - model of independent particles. Huckel approximation, Hartré approximation, Hartree-Fock approximation, Coulomb and exchange integral. Practical applications for solving the structure of molecules. Calculation of vibrational and rotational motion, spectroscopic constants of a diatomic molecule. Symmetry of molecular systems. Transit state methods, collision theory, quasiclassical trajectory method.

Recommended literature:
http://www.gaussian.com/g_tech/g_ur/g09help.htm http://www.ccl.net/cca/documents/dyoung/topics-orig/contents.html
Atkins P, Friedman R (2005) Molecular Quantum Mechanics Fourth Edition
Szabo A, Ostlund NS Modern Quantum Chemistry

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. RNDr. Peter Papp, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-005/22	Automatisation of Experiments

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

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Evaluation during semester: homeworks
Exam: oral
Approximate evaluation grade scale: A 90%, B 80%, C 70%, D 60%, E 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: 5

ABS	NEABS
100,0	0,0

Lecturers: doc. Mgr. Peter Čermák, PhD., doc. RNDr. Matej Klas, PhD.
Last change: 28.01.2022
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-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

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

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

Learning outcomes:
The student will gain experience in supervising a bachelor's degree student during preparation of bachelor's 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:
Current scientific literature and publications in the corresponding field.

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FFP-203/22	Bioapplication of Plasma

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

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Evaluation during semester: individual work
Approximate grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Obtain an overview of modern trends in the use of plasma and electric discharges in biological and medical applications and understanding the principles of plasma bioapplications.

Class syllabus:
Low-temperature plasma in various biological applications in medicine (sterilization, wound healing, cancer terapy, dentistry, bio-compatibility of materials), food industry (modification of food shelf life, reduction of toxic substances, treatment of packaging materials) and agriculture (seed treatment, improvement of germination and growth of plants, etc.). Plasma treatment of materials for bio-compatibility, antibacterial surface preparation.
Overview of suitable plasma sources and plasma technologies and comparison with conventionally used chemical and thermal methods.
Plasma decontamination and sterilization, plasma interaction with microorganisms (bacteria, spores, yeast, biofilms) and biological material.
Significance and effect of individual components of plasma (reactive oxygen and nitrogen species, UV and VIS radiation, electric field). Direct and indirect plasma action, plasma interaction with liquids, plasma activated water.
An overview of current trends in research and development of plasma sources for bioapplications.

Recommended literature:
NN Misra, O. Schlüter, PJ Cullen: Cold Plasma in Food and Agriculture: Fundamentals and Applications, Academic Press, 2016
A. Fridman and G. Friedman: Plasma medicine, Wiley 2013
Z. Machala, K. Hensel, Y. Akishev: Plasma for Bio-Decontamination, Medicine and Food Security, Springer Science & Business Media, 2012
Selection of current articles from the area.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Zdenko Machala, DrSc., doc. RNDr. Veronika Medvecká, PhD., doc. RNDr. Matej Klas, PhD.

Last change: 27.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-704/10	Citation Registered in Web of Science or SCOPUS

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

Number of credits: 4

Recommended semester: 6.

Educational level: III.

Prerequisites:

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

Learning outcomes:
The citing paper broadens the student's horizons in terms of the reach of his / her cited research and may inspire further research.

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

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 09.03.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FFP-706/15	**Course title:** Citation in Peer-Reviewed Scientific Journal or Proceedings
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 4.	
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 induced a response in the form of a citation in a peer-reviewed scientific journal or proceedings.	
Class syllabus: Research work on a topic related to the dissertation, processing of results, publication of results, citation registered in a peer-reviewed scientific journal or collection.	
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: 27.01.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-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

Number of credits: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Approximate grade scale: A 90%, B 80%, C 70%, D 60%, E 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:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 10

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-502/15	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

Number of credits: 10

Recommended semester: 6.

Educational level: III.

Prerequisites:

Course requirements:
Approximate grade scale: A 90%, B 80%, C 70%, D 60%, E 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:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 9

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

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: 239

A	ABS	B	C	D	E	FX	NEABS
35,15	61,09	0,42	0,0	0,0	1,67	0,0	1,67

Lecturers: Mgr. Simona Dobiašová, PhD., Mgr. Aneta Barnes

Last change: 13.01.2025

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

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: Mgr. Simona Dobiašová, PhD., Mgr. Aneta Barnes

Last change: 13.01.2025

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-012/15	Department Seminar (1)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 12

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-013/15	Department Seminar (2)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 15

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-014/15	Department Seminar (3)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 16

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-015/15	Department Seminar (4)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 9

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-016/15	Department Seminar (5)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-017/15	Department Seminar (6)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 9

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-018/15	Department Seminar (7)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 3

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-019/15	Department Seminar (8)

Educational activities:
Type of activities:
Number of hours:
per week: **per level/semester:**
Form of the course: on-site 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: 3

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-801/10	Direct Pedagogical Activity (1)

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

Number of credits: 5

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
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: 27

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 25.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-802/10	Direct Pedagogical Activity (2)

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

Number of credits: 5

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
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 computer exercises or laboratory practices.

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 19

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 25.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FFP-950/15	**Course title:** 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 and the goals of the dissertation. In the second part, an oral exam in Plasma Physics and Electric Discharges and their applications.	
State exam syllabus:	
Languages necessary to complete the course: english	
Last change: 01.02.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FFP-990/15	**Course title:** Dissertation Thesis Defense
Number of credits: 30	
Educational level: III.	
Learning outcomes: Defense of the disertation thesis.	
Class syllabus: Defense of the dissertation before the commission appointed by the dean.	
State exam syllabus:	
Recommended literature: Current articles on the issue	
Languages necessary to complete the course: english	
Last change: 25.01.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-703/10	Domestic Research Project Co-Investigator

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

Number of credits: 10

Recommended semester: 4.

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: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FFP-001/00	Experimental Vademecum

Educational activities:
Type of activities: lecture
Number of hours:
per week: 4 **per level/semester:** 52
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Evaluation during semester: homeworks
Exam: oral exam
Approximate evaluation grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
After completing the course, the student will have the basics of construction of experimental apparatus. They will be acquainted with the properties of commonly used materials and with the possibilities of their machining, they will expand their knowledge of vacuum technology, they will gain an overview of the practical use of optical and electronic components.

Class syllabus:
Design of experimental equipment - production processes, materials and their properties, joining materials, blueprints.
Vacuum technology - materials, measurement of pressure and flow of gases, vacuum generation, valves, couplings, electricity and electronics in vacuum, differential pumping, construction of metal vacuum apparatus.
Optical systems - optical components, materials, sources, lasers.
Electronics - basic circuits, passive and active components, amplifiers, voltage and current sources, AD/DA converters, signal and noise, grounding.
Temperature measurement and control.

Recommended literature:
J.H. Moore, C.C. Davis, M.A. Coplan, S.C. Greer: Building Scientific Apparatus: A Practical Guide to Design and Construction, 4th ed., Cambridge University Press, Cambridge, 2009.
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: 13	
ABS	NEABS
100,0	0,0
Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Juraj Országh, PhD.	
Last change: 02.02.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-021/22	Fundamentals of Legal Relations and Protection of Intellectual Property in the Process of Scientific Research

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

Number of credits: 5

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: continuous evaluation consists of assessment of seminar activities, solving practical tasks, etc.
Indicative assessment scale: A 91%, B 81%, C 73%, D 66%, E 61%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student acquires theoretical as well as practical knowledge with regard to the legal protection of intellectual property in the process of scientific research. The course focuses on the presentation of strategic ways of intellectual property protection: from contractual methods of protection (non-disclosure agreements / NDAs), through protection possible by means of trade secrets, as well as registered methods of protection (e.g. trademarks, utility models, designs and patents). The course also focuses on copyright protection of the results of scientific research and its consequences for publishing activities. The student acquires knowledge with regard to personal and property rights of intellectual property to the results of scientific research, focusing on the fact whether the person created the subject of intellectual property as a student, employee or entrepreneur. Subsequently, the course focuses on the possibilities of commercializing the results of research activities (i) making the results of research activities available to the public (especially if the free publication of research results is a condition for project financing), (ii) licensing, both protected and unprotected intellectual property (know-how) to another natural or legal person, (iii) sale or transfer of property rights to the result of scientific research to another person, (iv) establishment of a company or other legal entity as a tool for commercialization of research activities (spin-off or start-up company). The course also focuses on specific aspects of research activities funded by projects (national and European schemes), ownership conditions and the use of such intellectual property.

Class syllabus:
- The emergence of intellectual property in the process of scientific research
- Settlement of personal and property rights to the result of scientific research activities (student, employee, entrepreneur)

- Obligation to report the creation of intellectual property to the employer and exercise / non-exercise of employer's property rights
- Method of intellectual property protection (contractual protection, trade secret, intellectual property protection, copyright protection)
- Registered / unregistered intellectual property protection
- Copyright protection of the results of scientific research and its consequences for publishing activities
- Commercialization of the results of scientific research
- Making the results of scientific research available to the public
- Specific aspects of research activities funded by projects (national and European schemes), conditions of ownership and use of the resulting intellectual property
- Sale or transfer of intellectual property rights
- Licensing of research results and establishment of a company or other legal entity as a tool for commercialization of research activities (spin-off and start-up companies)

Recommended literature:
Van der Kooij, P. A. C. E. – Visser, D. J. G. EU IP Law: a short introduction to European intellectual property law, 1st edition, deLex B.V., 2015.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 11

ABS	NEABS
100,0	0,0

Lecturers: JUDr. Barbora Grambličková, PhD., LL.M.

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-002/15	High Temperature Plasma

Educational activities:
Type of activities: lecture
Number of hours:
per week: 4 **per level/semester:** 52
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Exam: oral
Approximate evaluation grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
The student will learn about the physics of high-temperature plasma, based on these knowledges student will be able to understand physical principles of confinement of fully ionized, high temperature (> 100 MK) plasma for the realization of controlled thermonuclear fusion.

Class syllabus:
Thermonuclear fusion between heavy isotopes of Hydrogen and its economic importance. Physical conditions for the realization of nuclear fusion - Lawson's criterion. Motion of single, charged particle in the electric and magnetic fields. Magnetohydrodynamic equations for strongly ionized plasmas. Generalized Ohm's law, magnetic pressure and freezing of the magnetic field lines in the plasma. Diffusion of magnetic field lines into the plasma. Electrical conductivity of plasma in a magnetic field. Equilibrium and dynamic pinch effect and it‘s instabilities. Principles of high-temperature plasma‘s confinement in the magnetic field. Additional heating of high-temperature plasma and reactor operating regimes. Concepts of ITER and DEMO. Diagnostic methods of high-temperature plasma.

Recommended literature:
Fundamentals of plasma physics / J. A. Bittencourt. New York : Springer, 2004
Jeffrey Freidberg: Plasma physics and fusion energy, Cambridge University Press, 2007

Languages necessary to complete the course:
english

Notes:

Past grade distribution Total number of evaluated students: 6	
ABS	NEABS
100,0	0,0
Lecturers: doc. Dr. Miklós Berta, PhD., doc. RNDr. Peter Papp, PhD.	
Last change: 02.02.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-101/15	Individual Study of Science and Research Resources (1)

Educational activities:
Type of activities: independent work
Number of hours:
per week: 10 **per level/semester:** 130
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Approximate grade scale A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The aim is to teach the doctoral student to study professional literature independently and to critically assess its content

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

Recommended literature:
Current scientific papers related to studied topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 17

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD., doc. RNDr. Juraj Országh, PhD., doc. RNDr. Peter Papp, PhD., doc. RNDr. Matej Klas, PhD.

Last change: 27.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-104/15	Individual Study of Science and Research Resources (2)

Educational activities:
Type of activities: independent work
Number of hours:
per week: 10 **per level/semester:** 130
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The aim is to teach the doctoral student to study scientific literature independently and to critically assess its content.

Class syllabus:
The doctoral student studies the scientific literature related to the topic of the dissertation.

Recommended literature:
Current papers related to dissertation topic.

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 17

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Anna Zahoranová, PhD., doc. RNDr. Juraj Országh, PhD., doc. RNDr. Peter Papp, PhD., doc. RNDr. Matej Klas, PhD.

Last change: 27.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-105/24	Individual Study of Science and Research Resources (3)

Educational activities:
Type of activities: independent work
Number of hours:
per week: 10 **per level/semester:** 130
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 3.

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: 6

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Juraj Országh, PhD., doc. RNDr. Peter Papp, PhD., doc. RNDr. Matej Klas, PhD., doc. RNDr. Anna Zahoranová, PhD.

Last change:

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FFP-106/24	**Course title:** Individual Study of Science and Research Resources (4)
Educational activities: **Type of activities:** independent work **Number of hours:** **per week:** 10 **per level/semester:** 130 **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester: 4.	
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: 0	

ABS	NEABS
0,0	0,0

Lecturers:
Last change:
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-702/10	International Research Project Co-Investigator

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

Number of credits: 15

Recommended semester: 6.

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: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-009/22	Low-Temperature Plasma Modification of Surfaces

Educational activities:
Type of activities: lecture / laboratory practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Evaluation during semester: individual work
Approximate grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The result of the training will be preparation and presentation of conference proceeding.

Class syllabus:
Theory: Capacitively coupled HF discharge - homogeneous model (plasma admittance, boundary layer admittance, time change of potential in the boundary layer, electron temperature in plasma, plasma concentration, total dissipated power in HF discharge); bias voltage calculation; calculation of electronic parameters for the adapter unit.
Experiment: Plasma modification of selected material, measurement of electrical parameters of RF discharge, end-point detection using OES. Modified surface analysis using SEM, EDX, WDX, XPS and FTIR.
Output: Processing of measured data and their discussion, preparation and presentation of poster or oral presentation.

Recommended literature:
M. A. Lieberman, and A.J. Lichtenberg, Principles of Plasma Discharges and Materials Processing, John Wiley & Sons, Inc., New Jersey, 2005

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 9

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Miroslav Zahoran, CSc., doc. RNDr. Veronika Medvecká, PhD., doc. RNDr. Anna Zahoranová, PhD.
Last change: 27.01.2022
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-006/22	Mass and Ion Mobility Spectrometry

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

Number of credits: 10

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Evaluation during semester: homeworks
Exam: oral
Approximate evaluation grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 20/80

Learning outcomes:
The student will acquire knowledge in the field of theory, physical foundations of mass spectrometry (MS) and ion mobility spectrometry (IMS). The student will learn to use MS in plasma diagnostics and MS and IMS in atmospheric discharge diagnostics. They will get acquainted with the current state of the art and in the use and evaluation of measured results and will also gain practical experience in experimental facilities.

Class syllabus:
Physical principles of different types of mass spectrometers. Basic types of mass spectrometers (static and dynamic). Ion detection methods. Formation and types of ions in plasma. Extraction of ions from plasma. Use of mass spectrometry for diagnostics of plasma parameters, for measuring precipitation cross-sections, ionization cross-sections (total and partial), cross-sections for electron capture on molecules also depending on electron temperature and neutral gas temperature. Specifics of mass spectrometry, trends in MS, sampling methods. Principles of IMS operation, types of IMS spectrometers, use of IMS, combinations of IMS with other techniques.

Recommended literature:
Accelerator mass spectrometry : Ultrasensitive analysis for global science / Claudio Tuniz ... [et al.]. Boca Raton, Fla. : CRC Press, 1998
Mass spectrometry : Principles and applications / Edmond de Hoffmann, Vincent Stroobant. Chichester : John Wiley, 2007
Mass spectrometry and ion-molecule reactions / P. F. Knewstubb. Cambridge : Cambridge University Press, 1969

Languages necessary to complete the course:
english

Notes:	
Past grade distribution Total number of evaluated students: 8	
ABS	NEABS
100,0	0,0
Lecturers: prof. Dr. Štefan Matejčík, DrSc., RNDr. Ladislav Moravský, PhD.	
Last change: 27.01.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-406/24	Mobility of PhD Student

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

Number of credits: 10

Recommended semester:

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: 1

ABS	NEABS
100,0	0,0

Lecturers:

Last change:

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-011/22	Modern Plasma Technologies

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

Number of credits: 10

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: independent study of current journal literature, student presentations on a selected topic related to the topic of PhD
Final evaluation: final colloquium
Approximate grade scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Extension of knowledge in the field of plasma generation at low and high pressures and its use in modern plasma technologies.

Class syllabus:
Specifics of plasma generation at low, medium and high pressures. Equilibrium and nonequilibrium plasma. Basic types of plasma sources and reactor configurations.
Low pressure plasma generation - capacitive and inductively coupled rf discharge, ECR and helicone discharge; physical models for etching, deposition and plasma implantation.
Atmospheric pressure plasma generation - arc plasma torch, corona discharge, plasma jet, plasma pen, microwave torch, dielectric barrier discharges, their various types and configurations.
Applications: cleaning, surface activation and modification, coating, etc.

Recommended literature:
Principles of plasma physics for engineers and scientists/Umran Inan, Marek Golkowski, Cambridge University Press, 2011
M. A. Lieberman, and A.J. Lichtenberg, Principles of Plasma Discharges and Materials Processing, John Wiley & Sons, Inc., New Jersey, 2005.
R. d´Agostino et al: Advanced Plasma Technology, Wiley-VCH Verlag, Weinheim 2008
R. Hippler, S. Pfau, M. Schmidt, K. H. Schoenbach, Low Temperature Plasma Physics, Wiley-VCH Verlag Berlin, 2001,
A. Bogaerts, E. Neyts, R. Gijbels, J. van der Mullen: Gas discharge plasmas and their applications, Review, Spectrochimica Acta Part B 57 (2002), 609 – 658

Roth J. R.: Industrial Plasma Engineering, Vol. 2: Applications to nonthermal plasma processing, Institute of Physics Publishing, Bristol and Philadelphia, 2001
U. Kogelschatz: Dielectric-barrier discharges: their history, discharge physics, and industrial applications, Plasma Chemistry and Plasma Processing 23, No. 1 (2003), pp. 1-46
- electronic texts of lecturers, current articles

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Anna Zahoranová, PhD., doc. RNDr. Miroslav Zahoran, CSc., doc. RNDr. Matej Klas, PhD.

Last change: 27.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-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

Number of credits: 20

Recommended semester: 8.

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 proproject proposal, determination of the project objectives, work progress and budget planning of the scientific project.

Recommended literature:

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-020/22	On the Project Application and Management

Educational activities:
Type of activities: lecture
Number of hours:
per week: 1 **per level/semester:** 13
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:

Learning outcomes:
After completing the course, the student will have an overview of the possibilities and methods of financing scientific research in the Slovak Republic and the EU. The student will be acquainted with various grant schemes - domestic and foreign, will gain experience in the preparation of the project proposal, the creation of the budget and the team of researchers, the creation of the project solution schedule as well as the preparation of interim and final reports.

Class syllabus:
- possibilities of research financing: overview of grant agencies in the Slovak Republic, EU, international cooperation
- types of scientific research projects: domestic, bilateral, international, European
- focus of research projects: basic research, applied, development, mobility projects, individual projects, consortia, ..
- preparation of the project proposal: scientific intention, methods of solution, team of researchers, budget, solution schedule
- project outputs: publications, conference papers, citations, patents, dissemination of results, deliverables, milestones, ...
- preparation of project reports: interim, final and financial reports

Recommended literature:

Languages necessary to complete the course:
english

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers: prof. Dr. Štefan Matejčík, DrSc., doc. RNDr. Juraj Országh, PhD., doc. RNDr. Peter Papp, PhD.
Last change: 25.01.2022
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-004/22	Optical Plasma Diagnostics

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

Number of credits: 10

Recommended semester: 4.

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:
Upon completion, the student will master the methods of optical diagnostics of plasma, will be able to determine the characteristic plasma temperatures and concentrations of particles and radicals on the basis of experimental measurements.

Class syllabus:
Absolute and relative methods for determining the concentration of particles in the plasma, the characteristic temperatures of the population of states, determining the reaction constants of the formation and extinction of radicals and excited particles. Classical optical emission and ascending spectroscopy in the near IR, visible, UV and vacuum UV range.
Time-resolved spectroscopy in a wide range of spectra, laser methods of plasma diagnostics.

Recommended literature:
Laser spectroscopy : Basic concepts and instrumentation / Wolfgang Demtröder. Berlin : Springer, 1981
Molekulová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1987
Laserová spektroskopia / Zuzana Chorvátová. Bratislava : Univerzita Komenského, 1992
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: 0	
ABS	NEABS
0,0	0,0
Lecturers: prof. RNDr. Pavel Veis, CSc.	
Last change: 25.02.2022	
Approved by: prof. Dr. Štefan Matejčík, DrSc.	

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KEF/3-FFP-405/24	**Course title:** Organization of Scientific and Pedagogical Events
Educational activities: **Type of activities:** **Number of hours:** **per week:** **per level/semester:** **Form of the course:** on-site learning	
Number of credits: 10	
Recommended semester:	
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: 0	

ABS	NEABS
0,0	0,0

Lecturers:
Last change:
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-403/10	Presentation at Domestic Conference

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

Number of credits: 10

Recommended semester: 8.

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: 10

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

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

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

Number of credits: 20

Recommended semester: 8.

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: 33

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

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: 33

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Zdenko Machala, DrSc.
Last change: 14.04.2022
Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-304/22	Publication in Domestic Peer-Reviewed Journal or Peer-Reviewed Proceedings

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

Number of credits: 15

Recommended semester: 8.

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, proofs and communication with the editor of the journal.

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: 25.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-303/15	Publication in International Peer-Reviewed Journal or Peer-Reviewed Proceedings

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

Number of credits: 20

Recommended semester: 8.

Educational level: III.

Prerequisites:

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

Learning outcomes:
By publishing the work in a international 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 manuscript, submitting the manuscript to the editorial office, incorporation of comments from the reviewers, proofs and communication with the editor of the journal.

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-302/22	Publication in Journal Registered in Current Contents

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

Number of credits: 35

Recommended semester: 8.

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 experience in preparing scientific results for publication.

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

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-301/22	Publication in Journal Registered in Web of Science or SCOPUS

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

Number of credits: 30

Recommended semester: 8.

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.
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 manuscript, submission the article to the editorial office, incorporation of comments from the review process, proofs and communication with the editor of the journal.

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: 02.02.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-307/22	Publication in Non-peer-reviewed Proceedings

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

Number of credits: 5

Recommended semester: 8.

Educational level: III.

Prerequisites:

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

Learning outcomes:
By publishing work in a non-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 manuscript.

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-171/20	Slovak Language for Foreign Students (1)

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

Number of credits: 2

Recommended semester: 1.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.

Class syllabus:
The sylabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).

Recommended literature:
Krížom- Krážom Slovenčina 1, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 155

A	ABS	B	C	D	E	FX	NEABS
40,65	21,29	7,1	4,52	0,65	1,29	21,29	3,23

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-172/20	Slovak Language for Foreign Students (2)

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

Number of credits: 2

Recommended semester: 2.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.

Class syllabus:
The sylabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1) and this course is a follow up course to the Slovak language course 1.

Recommended literature:
Krížom- Krážom Slovenčina 1, additional material to further support the covered topics

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 87

A	ABS	B	C	D	E	FX	NEABS
63,22	18,39	1,15	1,15	0,0	0,0	9,2	6,9

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-271/20	Slovak Language for Foreign Students (3)

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

Number of credits: 2

Recommended semester: 3.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.

Class syllabus:
The sylabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 2.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 32

A	ABS	B	C	D	E	FX	NEABS
59,38	3,13	18,75	3,13	3,13	0,0	12,5	0,0

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-272/20	Slovak Language for Foreign Students (4)

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

Number of credits: 2

Recommended semester: 4.

Educational level: I., I.II., II., III.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.

Class syllabus:
The sylabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 3.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 25

A	ABS	B	C	D	E	FX	NEABS
84,0	0,0	4,0	4,0	0,0	0,0	8,0	0,0

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KEF/3-FFP-804/15	Supervision of Student Scientific Conference Contribution

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

Number of credits: 10

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:

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:
Current journal literature in the field of issues.

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: 26.01.2022

Approved by: prof. Dr. Štefan Matejčík, DrSc.