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.KAFZM/3-FAA-025/23	An Introduction to Extrasolar Planets and Brown Dwarfs

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 assessement
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Detailed knowledge of populations of exoplanets and brown dwarfs.

Class syllabus:
Extrasolar planets. Basic terms and effects: albedo, temperature of the planet, habitable zone, greenhouse effect, Rayleigh scattering, Kepler laws, tides, transfer of the angular momentum, Roche limit, Roche potential, Hill sphere, Jacobi constant, Tisserand invariant, Kozai mechanism, reflection effect. Methods of the detection of exoplanets: radial velocities, planetary transits, timing, microlensing, imaging, astrometry, planet induced stellar variability, Rossiter-McLaughlin effect. Interior, formation and evolution: formation ang migration, degenerate gas, diffusion approximation and radiative gradient, konvection, equations of the internal structure radii. Atmospheres: konvection, HE, RE, day-night heat transfer, LTE, LCE, chemistry of low temperatures, dust, clouds, rain-out, optical properties, transits and transit radius spectrum, stratosheres, phase lightcurves, bifurcation and grey atmosphere
Brown dwarfs: spectral classification (M,L,T,Y), formation, young brown dwarfs, magnetosheric accretion, Interior and evolution, atmospheres.

Recommended literature:
Cassen, P., Guillot, T., Quirrenbach, A., 2006, Extrasolar Planets: Saas Fee Advanced Course 31 Swiss Society for Astrophysics and Astronomy
Perryman, M. 2011, The exoplanet handbook, Cambridge Univ. Press
Seager, S., 2010, Exoplanets, Univ. of Arizona Press
B.W. Carroll, D.A. Ostlie, 1996, 2006, Introduction to modern astrophysics, 1st, 2nd issue
N.I. Reid, S.L. Hawley, 2005, New light on dark stars: red dwarfs, low mas stars, brown dwarfs, Springer

Languages necessary to complete the course:
English

Notes:
The subject is taught in English

Past grade distribution
Total number of evaluated students: 1

ABS	NEABS
100,0	0,0

Lecturers: RNDr. Ján Budaj, DrSc.

Last change: 09.06.2023

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-005/00	Analytical and Numerical Methods in Celestial Mechanics

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: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: individual work
Exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:

Class syllabus:
Motivation – Newton's equation of motion and orbital elements in celestial mechanics. Gravitational attraction between bodies of finite dimensions. Perturbation equations of celestial mechanics – derivation from Newton's equation of motion. Simple application to motion of the Moon. Nongravitational effects. The effect of electromagnetic radiation on motion of particles: types of osculating orbital elements, detail analytical calculation of orbital evolution up to the second order of perturbation theory, secular evolution of orbital elements, orbital resonances with planets. Influence of the solar (stellar) wind. Oort's cloud of comets and gravitational perturbations of the Galaxy – secular evolution of cometary orbits. Comparison between analytical and numerical solutions.

Recommended literature:
Brouwer D., Clemence G. M.: 1961, Methods of Celestial Mechanics, Academic Press, New York.
Murray C. D., Dermott S. F.: 1999, Solar System Dynamics, Cambridge Univ. Press
Hockney R. W., Eastwood J. W.: 1992, Computer Simulation Using Particles, J. W. Arrowsmith Ltd, Bristol
Press W. H., Flannery B. P., Teukolsky S. A., Vetterling W. T.: Numerical Recipes, Cambridge Univ. Press

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 8	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Jozef Klačka, PhD., RNDr. Luboš Neslušan, CSc.	
Last change: 21.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-021/22	Astronomical Observations (1)

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

Number of credits: 5

Recommended semester: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: practical exercise, exercise reports
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of scientific observation skills and habits, practical use of instrumentation, processing of own acquired data.

Class syllabus:
Preparation and implementation of observations in the field of interplanetary matter and space debris. Familiarization with instrumentation and its operation. Acquisition of observation data, its processing, analysis, archiving and discussion of the obtained results.
- astrometry and photometry of asteroids and comets
- acquisition and processing of all-sky meteor observations
- spectroscopy of meteors
- space debris: photometry and reflectance spectroscopy

Recommended literature:
Selected papers and manuals on the issue.
Asteroids II, 1989, eds. R. P. Binzel, T. Gehrels, M. S. Matthews
MaxIm DL User Guide – CCD camera manual
P. Martinez, A. Klotz: A practical Guide to CCD Astronomy, Cambridge, 1998
Thomas Eversberg, Klaus Vollmann: Spectroscopic Instrumentation, Springer, 2015

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution Total number of evaluated students: 12	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Leonard Kornoš, PhD., Mgr. Adrián Galád, PhD., Mgr. Jiří Šilha, PhD., Mgr. Marek Husárik, PhD.	
Last change: 21.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-022/22	Astronomical Observations (2)

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

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: practical exercise, exercise reports
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of scientific observation skills and habits, practical use of instrumentation, processing of own acquired data.

Class syllabus:
Preparation and implementation of observations in the field of interplanetary matter and space debris. Familiarization with instrumentation and its operation. Acquisition of observation data, its processing, analysis, archiving and discussion of the obtained results.
- astrometry and photometry of asteroids and comets
- acquisition and processing of all-sky meteor observations
- spectroscopy of meteors
- space debris: photometry and reflectance spectroscopy

Recommended literature:
Vybrané články a manuály. Asteroids II, 1989, eds. R. P. Binzel, T. Gehrels, M. S. Matthews
MaxIm DL User Guide – CCD camera manual
P. Martinez, A. Klotz: A practical Guide to CCD Astronomy, Cambridge, 1998
Thomas Eversberg, Klaus Vollmann: Spectroscopic Instrumentation, Springer, 2015

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 7

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Leonard Kornoš, PhD., Mgr. Adrián Galád, PhD., Mgr. Jiří Šilha, PhD., RNDr. Richard Komžík, CSc.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-023/22	Astronomical Observations (3)

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

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: practical exercise, exercise reports
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of scientific observation skills and habits, practical use of instrumentation, processing of own acquired data.

Class syllabus:
Preparation and implementation of observations in the field of interplanetary matter, space debris and stellar astrnomy. Acquisition of observation data, its processing, analysis, archiving and discussion of the obtained results.
- spectroscopy of meteors
- space debris: photometry and reflectance spectroscopy
- stellar photometry and spectroscopy

Recommended literature:
Asteroids II, 1989, eds. R. P. Binzel, T. Gehrels, M. S. Matthews
MaxIm DL User Guide – CCD camera manual
P. Martinez, A. Klotz: A practical Guide to CCD Astronomy, Cambridge, 1998
Thomas Eversberg, Klaus Vollmann: Spectroscopic Instrumentation, Springer, 2015
Stewe Howell, Handbook of CCD astronomy, Cambridge University Press, 2012 (ISBN 9780511807909)
Immo Appenzeller, Introduction to Astronomical Spectroscopy, Cambridge University Press, 2012 (ISBN 9781139059503)

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution Total number of evaluated students: 5	
ABS	NEABS
100,0	0,0
Lecturers: Mgr. Adrián Galád, PhD., doc. RNDr. Leonard Kornoš, PhD., Mgr. Jiří Šilha, PhD., RNDr. Ján Rybák, CSc.	
Last change: 21.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-024/22	Astronomical Observations (4)

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

Number of credits: 5

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: practical exercise, exercise reports
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Acquisition of scientific observation skills and habits, practical use of instrumentation, processing of own acquired data.

Class syllabus:
Preparation and implementation of observations in the field of interplanetary matter, space debris and stellar astrnomy. Acquisition of observation data, its processing, analysis, archiving and discussion of the obtained results.
- spectroscopy of meteors
- space debris: photometry and reflectance spectroscopy
- stellar photometry and spectroscopy

Recommended literature:
Asteroids II, 1989, eds. R. P. Binzel, T. Gehrels, M. S. Matthews
MaxIm DL User Guide – CCD camera manual
P. Martinez, A. Klotz: A practical Guide to CCD Astronomy, Cambridge, 1998
Thomas Eversberg, Klaus Vollmann: Spectroscopic Instrumentation, Springer, 2015
Stewe Howell, Handbook of CCD astronomy, Cambridge University Press, 2012 (ISBN 9780511807909)
Immo Appenzeller, Introduction to Astronomical Spectroscopy, Cambridge University Press, 2012 (ISBN 9781139059503)

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution Total number of evaluated students: 3	
ABS	NEABS
100,0	0,0
Lecturers: Mgr. Adrián Galád, PhD., doc. RNDr. Leonard Kornoš, PhD., Mgr. Jiří Šilha, PhD., RNDr. Theodor Pribulla, CSc.	
Last change: 21.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-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:

Educational level: III.

Prerequisites:

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

Learning outcomes:
The student will gain experience in leading the preparation of the final thesis.

Class syllabus:
Proposal of the topic of the final thesis. Consultations provided to the student. Preparation of work report.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-501/10	Completion of PhD Research Project Stage

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:
Getting relevant results
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Report on the completion of the research phase.

Class syllabus:
Presentation of the results of professional and scientific work of the doctoral student within the project in the form of a report.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

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. RNDr. Juraj Tóth, PhD.

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. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-806/10	Creation of Teaching Texts and Aids

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

Number of credits: 6

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
The student will master the methodology of creating a teaching aid or textbook.

Class syllabus:
Consultations with the leader of the author's team. Assistance to the leader of the author's team with the elaboration of the teaching text or the preparation of the teaching aid.

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:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-809/10	Diploma Thesis Guidance

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:

Educational level: III.

Prerequisites:

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

Learning outcomes:
The student will gain experience in leading the preparation of the final thesis.

Class syllabus:
Consultations provided to the student

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FAA-990/15	**Course title:** Dissertation Thesis Admission
Number of credits: 30	
Educational level: III.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-301/10	Foreign Periodical Cited in Current Contents

Educational activities:
Type of activities: independent work
Number of hours:
per week: 20 **per level/semester:** 260
Form of the course: on-site learning

Number of credits: 35

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
A publication in foreign periodical cited in current contents

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FAA-303/10	**Course title:** Foreign Periodical not Cited in Current Contents

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: 20

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
A publication in home periodical not cited in current contents

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-804/10	Guidance of the Students´ Research Project

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

Number of credits: 7

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
The student will gain experience in leading the preparation of work for a student scientific conference.

Class syllabus:
Proposal of the topic of the Student Scientific Conference. Consultations provided to the student. Elaboration of a report on the work.

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-302/10	Home Journal Cited in Current Contents

Educational activities:
Type of activities: independent work
Number of hours:
per week: 15 **per level/semester:** 195
Form of the course: on-site learning

Number of credits: 30

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
A publication in home periodical cited in current contents

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

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: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FAA-304/10	**Course title:** Home Journal not Cited in Current Contents
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: 15	
Recommended semester:	
Educational level: III.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: A publication in home periodical not cited in current contents	
Class syllabus: Preparation of a research paper.	
Recommended literature: Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.	
Languages necessary to complete the course: Slovak / English	
Notes:	
Past grade distribution Total number of evaluated students: 0	

ABS	NEABS
0,0	0,0

Lecturers:
Last change: 17.02.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-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

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 practical experience with the design, preparation and solution of a home scientific project.

Class syllabus:
Getting acquainted with the preparation of a scientific project. Participation in project solutions. Assistance in preparing the final report for the project.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 10

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-101/10	Individual Study of Science and Research Resources

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:
Continuous assessment, individual work
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The graduate will gain an overview of the topic of the dissertation and its the current state. They will learn methods of carrying out research and study information sources.

Class syllabus:
Study of current research literature advised by the supervisor. A creation of the schedule of the literature study and its evaluation by the supervisor.
Selection of literature.
Supervised studying of the scientific literature, presenting gained knowledge to the supervisor.
Overviewing the literature.

Recommended literature:
Selection of the literature by own choice and following advice of the supervisor. The used literature will be referred in the bibliography list.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 22

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-102/10	Individual Study of Science and Research Resources

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:
Continuous assessment, individual work
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The graduate will gain an overview of the topic of the dissertation and its the current state. They will learn methods of carrying out research and study information sources.

Class syllabus:
Study of current research literature advised by the supervisor. A creation of the schedule of the literature study and its evaluation by the supervisor.
Selection of literature.
Supervised studying of the scientific literature, presenting gained knowledge to the supervisor.
Overviewing the literature.

Recommended literature:
Selection of the literature by own choice and following advice of the supervisor. The used literature will be referred in the bibliography list.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 18

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-103/10	Individual Study of Science and Research Resources

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:
Continuous assessment, individual work
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The graduate will gain an overview of the topic of the dissertation and its the current state. They will learn methods of carrying out research and study information sources.

Class syllabus:
Study of current research literature advised by the supervisor. A creation of the schedule of the literature study and its evaluation by the supervisor.
Selection of literature.
Supervised studying of the scientific literature, presenting gained knowledge to the supervisor.
Overviewing the literature.

Recommended literature:
Selection of the literature by own choice and following advice of the supervisor. The used literature will be referred in the bibliography list.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 17

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-104/10	Individual Study of Science and Research Resources

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:
Continuous assessment, individual work
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The graduate will gain an overview of the topic of the dissertation and its the current state. They will learn methods of carrying out research and study information sources.

Class syllabus:
Štúdium odbornej literatúry vybranej podľa doporučenia školiteľa. Stanovenie plánu kontrolovaného čítania školiteľom doktoranda
Výber literatúry
Kontrolované čítanie, referovanie o získaných poznatkoch školiteľovi
Rešeršná činnosť

Recommended literature:
Selection of the literature by own choice and following advice of the supervisor. The used literature will be referred in the bibliography list.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 15

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-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

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 practical experience with the design, preparation and solution of an international scientific project.

Class syllabus:
Getting acquainted with the preparation of a scientific project. Participation in project solutions. Communication with foreign partners. Participation in international working meetings. Assistance in preparing the final report for the project.

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-307/10	Non-reviewed Foreign Papers Volume

Educational activities:
Type of activities: independent work
Number of hours:
per week: 5 **per level/semester:** 65
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:
A publication in foreign non-reviewed proceedings

Class syllabus:

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-308/10	Non-reviewed Home Papers Volume

Educational activities:
Type of activities: independent work
Number of hours:
per week: 5 **per level/semester:** 65
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:
A publication in home non-reviewed foreign proceedings

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJFB/3-FAA-006/00	Nuclear Astronomy and Astrophysics

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:
Continuous assessment: individual work
Exam

Learning outcomes:
The application of nuclear physical knowledge in the field of astronomy and astrophysics.

Class syllabus:
Basics theory of nucleosynthesis, primordial, antropogenic and cosmogenic nuclides. Principles of nuclear radiometric methods, dating, catastrophic events and their investigation by nuclear methods. Position of the Earth in the Solar system. Isotpos and their applications in Solar system formation chronometry. Space, chemical elemnts in it and their abundances in various objects of Solar system.
Note
The selection of the given topics will be made by the supervisor according to the focus of the dissertation.

Recommended literature:
Ringwood, A. E.: Origin of the Earth and Moon. Springer-Verlag, 1979.
Cox, P. A.: The Elements on the Earth.
Dalrymple, G. B.: The Age of the Earth.
Press, F., Siever, R.: Earth. W. H. Freeman and Company, 1978.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: prof. RNDr. Jozef Masarik, DrSc.

Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-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:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
The doctoral student will gain practical experience with the preparation of a scientific project, its solution, and writing a final report.

Class syllabus:
Preparation of a scientific project within the UK Grants program. Project solution. Preparation of the final report on the project. Closing the project.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
91,67	8,33

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-805/10	Participation in a Conference Organising Committee

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:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
The student will gain practical experience in organizing scientific events and communicating with conference participants.

Class syllabus:
Participation in activities related to the organization of the conference.

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

STATE EXAM DESCRIPTION

Academic year: 2026/2027	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAFZM/3-FAA-950/15	**Course title:** Passing Dissertation Examination
Number of credits: 20	
Educational level: III.	
State exam syllabus:	
Last change: 02.06.2015	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-009/00	Planetary Cosmogony

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: preparation and presentation of a paper.
Final examination: oral exam.
Approximate scale of final grades: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
The graduate of the course will deepen theoretical knowledge of models of the origin and development of planetary systems and will have an overview in the most recent publications in the field of planetary science.

Class syllabus:
Historical models of the formation of the Solar System. Nucleogenesis of chemical elements and their cosmic abundances. Gravitational collapse and the Jeans criterion. Solar System formation, standard model, chemical condensation equilibrium theory of dust formation. Turbulence in protoplanetary disks, collisional growth of planetesimals. Protoplanetary disk structure. Massive disk model - gaseous planets, planet migration. Chronology of the formation of Solar System bodies. Other planetary systems, circumstellar dust disks, the cycle of matter in interstellar clouds.

Recommended literature:
Sun Kwok: The Origin and Evolution of Planetary Nebulae. Cambridge University Press, 2000
G. A. Gurzadyan: The Physics and Dynamics of Planetary Nebulae. Springer, 1997
W. Benz et al.: From dust to terrestrial planets. Proceedings of an ISSI Workshop, Bern, Kluwer Ac. Publishers, 1999
E.H. Levy, J.I. Lunine: Protostars and Planets III. The Univ. of Arizona Press, Tuscon, 1999
V. Mannings, A.P. Boss, S.S. Pressell (Ed.): Protostars and Planets IV. The Univ. of Arizona Press, Tuscon, 2000

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution Total number of evaluated students: 0	
ABS	NEABS
0,0	0,0
Lecturers: prof. RNDr. Juraj Tóth, PhD., doc. RNDr. Pavol Matlovič, PhD., Mgr. Marian Jakubík, PhD.	
Last change: 20.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-001/00	Population of the Small Bodies of the Solar System (1)

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: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment, exam

Learning outcomes:
The student will gain the latest knowledge from the research of the population of meteoroids and interplanetary dust.

Class syllabus:
Meteoroid population – components; interaction of meteoroids with the atmosphere and meteor physics; observational methods – photographic, radio, TV, meteor spectra; micrometeoroids, interplanetary dust; zodiacal light; meteoroid population – structure; sporadic meteors, activity variations, sources; selection effects; meteoroid streams - activity, structure, origin and evolution; meteor complexes, associations of potential parent bodies; influx of meteor matter on the Earth; interaction of large meteoroids with the atmosphere, falls of meteorites' accompanying effects, classification of meteorites – structure, chemical composition, mineralogy; meteor crates, ages of meteorites, origin of meteorites and their parent bodies.
Note: The supervisor will make a selection of the given topics according to the focus of the dissertation.

Recommended literature:
Murrad E., Williams I.P.: 2002, Meteors in the Earth's Atmosphere. Cambridge, London
McDonnell J.A.M.: 1978, Cosmic Dust. John Wiley & Sons, New York, Toronto
McKinley D.W.R.: 1961, Meteor science and engineering. McGraw-Hill Comp., New York
Heide F., Wlotzka F.: 1995, Meteorites. Springer, Berlin, Heidelberg, New York
McSween H.Y.: 1999, Meteorites and their parent bodies. Cambridge Univ. Press, Cambridge.
Buchwald, F.: 1975, Handbook od iron meteorites, Vol. 1-3, Univ. of California Press, Berkeley
Current monographs and papers.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 13

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Leonard Kornoš, PhD., prof. RNDr. Juraj Tóth, PhD., Mgr. Dušan Tomko, PhD.

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-002/00	Population of the Small Bodies of the Solar System (2)

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:
Continuous assessment: semestral work.
Final examination: oral exam.
Approximate scale of final grades: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Detailed knowledge of populations of asteroids, comets and ice bodies of the Edgeworth-Kuiper belt. Extension of knowledge from II. degree.

Class syllabus:
Distribution of asteroids in the Solar System, commensurabilities, asteroid families, asteroids on special orbits. Asteroid structure, taxonomic types and their incidence depending on heliocentric distance, near-Earth asteroids, Trojans and centaurs. Comets at large heliocentric distances, new comets in the Oort´s sense, Oort cloud. Ice objects of the Edgeworth-Kuiper belt, Pluto and Charon. Origin and evolution of individual populations of interplanetary matter and their interrelationships.

Recommended literature:
Michel, P., Demeo, F.E., Bottke, W.F.: Asteroids IV, Tucson, University of Arizona Press, 2015.
Festou, M.C., Keller, H.U., Weaver, H.A.: Comets II, Tucson, University of Arizona Press, 2004.
Fernández. J.A., Lazzaro, D., Prialnik, D., Schulz, R.: Icy Bodies of the Solar System, Cambridge University Press, 2010.

Languages necessary to complete the course:
Slovak / English

Notes:
Jazyk, ktorého znalosť je potrebná na absolvovanie predmetu: anglický

Past grade distribution Total number of evaluated students: 12	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Leonard Kornoš, PhD., doc. RNDr. Pavol Matlovič, PhD., Mgr. Marian Jakubík, PhD.	
Last change: 20.06.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-404/10	Presentation at a Department Seminar

Educational activities:
Type of activities: independent work
Number of hours:
per week: 5 **per level/semester:** 65
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:
Presentation of the research results at the seminar

Class syllabus:
Preparation of the results and the seminar contribution.

Recommended literature:
selected articles

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 3

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-403/10	Presentation at a Home Conference

Educational activities:
Type of activities: independent work
Number of hours:
per week: 7 **per level/semester:** 91
Form of the course: on-site learning

Number of credits: 10

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
Presentation of the research results at the conference.

Class syllabus:
Preparation of the results and the conference contribution.

Recommended literature:
selected articles

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 6

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-402/10	Presentation at a Home Conference with International Participation

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: 15

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
Presentation of the research results at the conference.

Class syllabus:
Preparation of the results and the conference contribution.

Recommended literature:
slected articles

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 4

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

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

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: 20

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
Presentation of the research results at an international conference.

Class syllabus:
Preparation of the results and the conference contribution.

Recommended literature:
selected articles

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 21

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

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. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-704/10	Quotation 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

Number of credits: 4

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
Citation. By obtaining a registered response to their work, the student demonstrates the relevance of their own research.

Class syllabus:
Citation of the doctoral student's contribution in a publication without self-citation

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-707/10	Quotation in a Home Scientific Journal

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

Number of credits: 2

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
Citation. By obtaining a registered response to their work, the student demonstrates the relevance of their own research.

Class syllabus:
Citation of the doctoral student's contribution in a publication without self-citation

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-705/10	Quotation in a Monograph

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:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
Citation. By obtaining a registered response to their work, the student demonstrates the relevance of their own research.

Class syllabus:
Citation of the doctoral student's contribution in a publication without self-citation

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-706/10	Quotation in a Scientific Journal Abroad

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:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
Citation. By obtaining a registered response to their work, the student demonstrates the relevance of their own research.

Class syllabus:
Citation of the doctoral student's contribution in a publication without self-citation

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: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-305/10	Reviewed Foreign Papers Volume

Educational activities:
Type of activities: independent work
Number of hours:
per week: 15 **per level/semester:** 195
Form of the course: on-site learning

Number of credits: 30

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
A publication in foreign peer-reviewed proceedings

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 2

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-306/10	Reviewed Home Papers Volume

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: 15

Recommended semester:

Educational level: III.

Prerequisites:

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

Learning outcomes:
A publication in home peer-reviewed proceedings

Class syllabus:
Preparation of a research paper.

Recommended literature:
Study of current local and international research literature focusing on the topic of the dissertation advised by the supervisor and/or by a principal investigator of the research project and/or by the study programme guarantor.

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-511/15	Science Thesis (1)

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: 5., 6..

Educational level: III.

Prerequisites:

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

Learning outcomes:
The PhD. student will gain and expand the ability to work individually as well as in team during conducting his/her research activities connected to the PhD. project, writing research papers.

Class syllabus:
Individual research of the PhD. student represents a crucial part of the PhD. studies.
Individual approach to solving open scientific problems. Original and individual results under supervision of the supervisor.

Recommended literature:
Relevant scientific papers

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 15

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-512/15	Science Thesis (2)

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: 5., 6..

Educational level: III.

Prerequisites:

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

Learning outcomes:
The PhD. student will gain and expand the ability to work individually as well as in team during conducting his/her research activities connected to the PhD. project, writing research papers.

Class syllabus:
Individual research of the PhD. student represents a crucial part of the PhD. studies.
Individual approach to solving open scientific problems. Original and individual results under supervision of the supervisor.

Recommended literature:
Relevant scientific papers

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 13

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-513/15	Science Thesis (3)

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: 7., 8..

Educational level: III.

Prerequisites:

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

Learning outcomes:
The PhD. student will gain and expand the ability to work individually as well as in team during conducting his/her research activities connected to the PhD. project, writing research papers.

Class syllabus:
Individual research of the PhD. student represents a crucial part of the PhD. studies.
Individual approach to solving open scientific problems. Original and individual results under supervision of the supervisor.

Recommended literature:
Relevant scientific papers

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 10

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-514/15	Science Thesis (4)

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: 7., 8..

Educational level: III.

Prerequisites:

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

Learning outcomes:
The PhD. student will gain and expand the ability to work individually as well as in team during conducting his/her research activities connected to the PhD. project, writing research papers.

Class syllabus:
Individual research of the PhD. student represents a crucial part of the PhD. studies.
Individual approach to solving open scientific problems. Original and individual results under supervision of the supervisor.

Recommended literature:
Relevant scientific papers

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 10

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-003/22	Selected Topics of Solar Physics (1)

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: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment, individual work
Exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
A deeper understanding of the processes in the physics of the Sun.

Class syllabus:
The course is realized in the form of lectures in which deeper information about existing knowledge and the most current findings from the field of Solar physics will be conveyed. The contents of the lectures are the following topics: basic definitions and assumptions, basic physical facts about the Sun, internal structure of the Sun, energy production, the problem of solar neutrinos, energy transfer by radiation and convection, helioseismology, solar atmosphere, photospheric radiation and photospheric structures, chromosphere, transition region and corona, optically thin radiation, solar flares, coronal mass ejections, magnetic fields in the solar atmosphere, measurements of the magnetic field strength, Stokes parameters, basic MHD equations, solar dynamics, differential rotation and its description, Standard model of the Sun, solar activity and its cycle, solar wind, solar-earth relations, space weather. The supervisor will make a choice of the given topics according to the focus of the dissertation.

Recommended literature:
Zirin, H.: Astrophysics of the Sun, Cambridge Univ. Press, Cambridge, 1988
Priest, E. R.: Solar Magnetohydrodynamics, D. Reidel Publishing Company, 1982
M. Stix: The Sun, An Introduction, Springer, 2nd edition, 2002.

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: Mgr. Peter Gömöry, PhD., doc. RNDr. Leonard Kornoš, PhD.	
Last change: 17.02.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-033/22	Selected Topics of Solar Physics (2)

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:
Continuous assessment, individual work
Exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Detailed knowledge of the physical properties of the lower layers of the solar atmosphere and the active phenomena taking place in these layers, on basics technical and observational research possibilities of the transition layer and corona of the Sun by space-born instrumentation and on unique knowledge, which are acquired about the Sun and its atmosphere exclusively by this way.

Class syllabus:
Solar photosphere, physical parameters, observation methods, radiation transfer in the photosphere - LTE, solar granulation, solar chromosphere, physical parameters, observation methods. Radiation transfer in the chromosphere - NLTE, active phenomena in the chromosphere – chromospheric network, spicules, models of the solar photosphere and chromosphere.
Knowledge on the transition region and corona of the Sun: historical development and current status, observational possibilities of the ground-based and space-born observations. Instrumental approaches and the methods of the space-born observations of the transition region and corona of the Sun. Physics of the coronal emission lines. Models of the transition region and solar corona. Spaceborn instrumentation – past, actual and planned instruments: UV spectrometers, UV telescopes and filters, coronagraphs. Interpretation possibilities of the transition tegion and solar corona observations.

Recommended literature:
Bellot Rubio, L., Orozco Suárez, D. Quiet Sun magnetic fields: an observational view. Living Rev Sol Phys 16, 1 (2019). https://doi.org/10.1007/s41116-018-0017-1
Mats Carlsson, Bart De Pontieu, Viggo H. Hansteen, New View of the Solar Chromosphere Annual Review of Astronomy and Astrophysics 2019 57:1, 189-226
M. Stix: The Sun, An Introduction, Springer, 2nd edition, 2002.
E. R. Priest: Magnetohydrodynamics of the Sun, Cambridge University Press, 2014.

The Solar Transition Region. Cambridge Astrophysics Series, by Mariska, John T., Edition: 1 Publisher: Cambridge Cambridge University Press 1992
Ultraviolet and X-ray Spectroscopy of the Solar Atmosphere, by Phillips, Kenneth J.H, Feldman, U., Landi, E., Edition: 1 Publisher: Cambridge Cambridge University Press 2008
Physics of the Solar Corona, by Aschwanden, Markus J., Edition: 1,2, Publisher: Chichester Praxis Publishing 2004, 2006

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 0

ABS	NEABS
0,0	0,0

Lecturers: Mgr. Peter Gömöry, PhD., doc. RNDr. Leonard Kornoš, PhD.

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-004/22	Selected Topics of Stellar Physics (1)

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: 1.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment, individual work
exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Extending knowledge of stellar physics.

Class syllabus:
Internal structure depending on evolution; rotation; energy transport, convection; fundamental stellar parameters, HRD; radiative transfer in continuum and spectral line; atmosphere models, opacity, atomic databases, synthetic spectra; spectrum analysis; magnetic field, Stokes parametersm, spectropolarimetry; atmospheric chemical composition, CP stars; pulsation, oscillation, asteroseismology; double stars, interacting binaries, cataclismtic stars; observational methods, photometry, photometric systems, spectrophotometry, spectroscopy.

Recommended literature:
V.C. Reddish: 1978, Stellar Formation. Pergamon Press, Oxford
L.H. Aller and D.B. McLaughlin: 1965, Stellar Structure.Univ. of Chicago Press, Illinois
D. Gray: 1976, Observation and Analysis of Stellar Atmospheres.Willey-Interscience Publ., New York
The A-star puzzle, J. Zverko, J. Žižňovský, S. J. Adelman, W. W. Weiss (eds.), 2005, Proc. IAUS 224, Cambridge University Presss, Cambridge
T. Padhanabhan, Theoretical Astrophysics Vol. 1-2, 2001, CUP, Cambridge
D.Prialnik, An introduction to the theory of stellar structure and evolution, 2000, CUP, Cambridge
Current papers, monographs.

Languages necessary to complete the course:

Notes:

Past grade distribution Total number of evaluated students: 3	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Jozef Klačka, PhD., RNDr. Augustín Skopal, DrSc.	
Last change: 17.02.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-034/22	Selected Topics of Stellar Physics (2)

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:
Continuous assessment, individual work
Exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Deeper understanding of the basic types of mass transfer in close binaries and on single and binary stars of late spectral types. Creation of accretion disks. Outbursts.

Class syllabus:
Mass transfer from the donor in the binary by filling in the Roche-lobe, its subsequent transfer onto the accretor, the formation of the accretion disk and the energy release. Energy distribution in the spectrum of an accretion disk for a simplified case of an optically thick disk that radiates locally as a black body. Comparison of the theoretical model with observations. Mass transfer in binaries with very long orbital periods via the stellar wind from the donor star. An example for symbiotic stars. Possibilities of determining the mass-loss rate. Accretion from the wind by a compact component in a binary star. Outbursts of classic novae and symbiotic stars.
Stars of late spectral types are stellar objects with a surface temperature lower than the surface temperature of the Sun. Their spectral types are usually K, M, C, and S, respectively. Often, G-type stars are also included in this group. Late-type stars can be either low-mass if they are on the main sequence, or more massive than the Sun, if they are giants or super giants.
The supervisor will make a choice of the given topics according to the focus of the dissertation.

Recommended literature:
C.W.H. de Loore and C. Doom, Structure and evolution of single and binary stars. Kluwer Academic Publisher (1992). (ISBN 0-7923-1768-8).
Ulrich Kolb, Extreme Environment Astrophysics, The open University, 2010 (ISBN 9780521187855)

Languages necessary to complete the course:
Slovak / English

Notes:	
Past grade distribution Total number of evaluated students: 2	
ABS	NEABS
100,0	0,0
Lecturers: doc. RNDr. Jozef Klačka, PhD., RNDr. Augustín Skopal, DrSc.	
Last change: 17.02.2022	
Approved by: prof. RNDr. Juraj Tóth, PhD.	

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-007/00	Seminar on Astronomy and Astrophysics (1)

Educational activities:
Type of activities: seminar
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: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals.

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 21

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-008/00	Seminar on Astronomy and Astrophysics (2)

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

Number of credits: 5

Recommended semester: 2.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 17

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-011/00	Seminar on Astronomy and Astrophysics (3)

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

Number of credits: 5

Recommended semester: 3.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 17

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-012/00	Seminar on Astronomy and Astrophysics (4)

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

Number of credits: 5

Recommended semester: 4.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 15

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-013/00	Seminar on Astronomy and Astrophysics (5)

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

Number of credits: 5

Recommended semester: 5.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals.

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 18

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-014/00	Seminar on Astronomy and Astrophysics (6)

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

Number of credits: 5

Recommended semester: 6.

Educational level: III.

Prerequisites:

Course requirements:
Continuous assessment: presentation and discussion participation
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers.
The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU
Astronomical periodicals and journals

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 15

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 21.06.2022
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-018/22	Seminar on Astronomy and Astrophysics (7)

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

Number of credits: 5

Recommended semester: 7.

Educational level: III.

Prerequisites:

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

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers. The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU Astronomical periodicals and journals.

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 12

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 10.05.2023
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-019/22	Seminar on Astronomy and Astrophysics (8)

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

Number of credits: 5

Recommended semester: 8.

Educational level: III.

Prerequisites:

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

Learning outcomes:
Students will gain experiences with the preparation and oral presentation of their scientific work and with active participation in the discussion. Students will deepen their knowledge of the research fields covered at the seminar presentations.

Class syllabus:
Student's own scientific work, preparation of background materials and presentation of partial results of the disertation thesis. Active participation in the discussion. Presentation of current results of research programs by the staff of the Division of Astronomy and Astrophysics and invited speakers. The current astronomical news, discoveries and information from the meetings organized by the International Astronomical Union, with a focus to the research fields of astronomy in Slovakia: the interplanetary matter research, solar physics and stellar astronomy.

Recommended literature:
Proceedings from the symposia and meetings organized by the IAU Astronomical periodicals and journals.

Languages necessary to complete the course:
English

Notes:
Language necessary to complete the course: English

Past grade distribution
Total number of evaluated students: 7

ABS	NEABS
100,0	0,0

Lecturers: prof. RNDr. Juraj Tóth, PhD., RNDr. Roman Nagy, PhD., Mgr. Natalia Shagatova, PhD.
Last change: 10.05.2023
Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-035/22	Spectroscopy in Astronomy

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: individual work / home assignment.
Final examination: oral exam
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
Deepen basic knowledge on the energy states of atoms and molecules, their spectral characteristics, quantum-chemical description of rotational and vibrational motions, basic types of molecular spectroscopy, selection rules, their origin. To provide an overview of methods and applications of spectroscopic research in astronomy.

Class syllabus:
Hartree-Fock theory of atom and molecule. Atomic and molecular orbitals. Energy levels of atoms and molecules. Born - Oppenheimer approximation. Rotational and vibrational states of diatomic molecules. Rotational levels of polyatomic molecules. Vibration of polyatomic molecules. Electron states and electron spectra. atoms and molecules Symmetry of transitions, selection rules. Spinorbital coupling. Summary of quantum mechanical theory of rotational moment. Spectroscopic methods in astronomy, modeling of synthetic spectra and fitting methods. Emission, absorption and reflectance spectroscopy in stellar, galactic and interplanetary astronomy.

Recommended literature:
Molecular quantum mechanics / Peter Atkins, Ronald Friedman. Oxford : Oxford University Press, 2005
Exploring Chemistry with Electronic Structure Methods / James B. Foresman, AEleen Frisch. Gaussian, Inc, 1993, 1995-96, 2015
Tennyson J., 2005, Astronomical Spectroscopy: An Introduction To The Atomic And Molecular Physics Of Astronomical Spectra, Imperial College Press, ISBN 9781860945137
Appenzeller I., 2013, Introduction to Astronomical Spectroscopy, Cambridge University Press, ISBN 9781107601796
selected papers

Languages necessary to complete the course:

Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 7

ABS	NEABS
100,0	0,0

Lecturers: doc. RNDr. Pavol Matlovič, PhD., prof. Ing. Pavel Mach, CSc., RNDr. Theodor Pribulla, CSc.

Last change: 20.06.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-807/10	Study Stay Abroad

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:

Educational level: III.

Prerequisites:

Course requirements:
100/0

Learning outcomes:
The student will gain valuable experience with teaching and research in a foreign institution.

Class syllabus:
Completion of a study stay abroad.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 8

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 19.01.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-801/10	Supervising and Demonstrating Work

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: 5

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Regular student's weekly teaching.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The PhD student will gain teaching and pedagogical skills by leading practicals and exercises.

Class syllabus:
Regular student's weekly teaching.
Consultations with the lecturer.
Evaluation of tests and assignments.
Providing assistance to the lecturer during final examinations.

Recommended literature:

Languages necessary to complete the course:
Slovak / English

Notes:

Past grade distribution
Total number of evaluated students: 33

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.

COURSE DESCRIPTION

Academic year: 2026/2027

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KAFZM/3-FAA-802/10	Supervising and Demonstrating Work

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: 5

Recommended semester:

Educational level: III.

Prerequisites:

Course requirements:
Regular student's weekly teaching.
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The PhD student will gain teaching and pedagogical skills by leading practicals and exercises.

Class syllabus:
Regular student's weekly teaching.
Consultations with the lecturer.
Evaluation of tests and assignments.
Providing assistance to the lecturer during final examinations.

Recommended literature:

Languages necessary to complete the course:
SLovak / English

Notes:

Past grade distribution
Total number of evaluated students: 19

ABS	NEABS
100,0	0,0

Lecturers:

Last change: 17.02.2022

Approved by: prof. RNDr. Juraj Tóth, PhD.