# CONTENT

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dCDC/12 | **Course name:** Citation in a Slovak scientific journal |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 0 | |

| abs | n |
|---|---|
| 0.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dCMG/12 | **Course name:** Citation in a monograph |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 20 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 0 | |

| abs | n |
|---|---|
| 0.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dCZC/12 | **Course name:** Citation in an international scientific journal |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 10 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 0 | |
| abs | n |
| 0.0 | 0.0 |
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dSVP/14 | **Course name:** Co-researcher of an APVV or VEGA project |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 60 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dSVG/12 | **Course name:** Co-researcher of an internal grant |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 10 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 63 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dSMP/14 | **Course name:** Co-researcher of an international project |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 3 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 6 | |
| abs | n |
| 100.0 | 0.0 |
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dKOA/10 | **Course name:** Combinatorial algorithms |
| **Course type, scope and the method:**<br>**Course type:** Lecture<br>**Recommended course-load (hours):**<br>**Per week:** 3 **Per study period:** 42<br>**Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** 2., 4. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:**<br>Exam | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:**<br>Slovak and English | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 1 | |

| N | P |
|---|---|
| 0.0 | 100.0 |

| |
|---|
| **Provides:** RNDr. Mária Maceková, PhD. |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dKOM/10 | **Course name:** Combinatorics |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 3 **Per study period:** 42
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Oral exam

**Learning outcomes:**

**Brief outline of the course:**
Finite combinatorics. Generating functions. Incidence structures. Distributive latices. Basis of infinite combinatorics. Almost disjoint set systems. Independence set systems. Infinite trees, their propertiesand a question of their existence. Some cardinal characteristics of the set of real numbers.

**Recommended literature:**
1. M. Aigner: Combinatorial Theory, Springer-Verlag, Berlin, 1997
2. B. Balcar a P. Štěpánek, Teorie množin, Academia, Praha 2000
3. B. Bollobás, Combinatorics, Cambridge University Press, Cambridge 1986
4. T. Jech, Set Theory, Springr-Verlag, Berlin 2002
5. Journal literatura

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 0

| N | P |
|---|---|
| 0.0 | 0.0 |

**Provides:** prof. RNDr. Stanislav Jendroľ, DrSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ VYMD/15 | **Course name:** Computational complexity and models |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 2 **Per study period:** 28
**Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:** 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Written test combined with an oral examination.

**Learning outcomes:**
Providing en extended backgroung in the area of efficient computations, computational complexity of algorithms, and fundamental time and space complexity classes, hardest complete problems, and about reducibility among problems.

**Brief outline of the course:**
Basic computational models; relations among different models with respect to their computational complexity; deterministic and nondeterministic computations; basic complexity classes - L, NL, P, NP, PSPACE, NPSPACE; reducibilities of problems; complete languages in basic complexity classes; hierarchy and translation theorems for time and space; relativization; alternating computations and hierarchies.

**Recommended literature:**
J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2007.
M. Sipser: Introduction to the Theory of Computation, Thomson, 2nd edition, 2006.
S. Arora, B. Barak: Computational Complexity: A Modern Approach, Cambridge Univ. Pess, 2009.
C. Calude and J. Hromkovič: Complexity: A Language-Theoretic Point of View, in G. Rozenberg and A. Salomaa, Handbook of Formal Languages II, Springer, 1997.
G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.
Ch. H. Papadimitriou: Computational Complexity, Addison-Wesley, 1994.
D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994.

**Course language:**

**Notes:**

| **Course assessment**<br>Total number of assessed students: 26 | |
|---|---|
| N | P |
| 0.0 | 100.0 |
| **Provides:** prof. RNDr. Viliam Geffert, DrSc. | |
| **Date of last modification:** 03.05.2015 | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPOV/12 | **Course name:** Conference organising commiittee membership |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 4

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dDZS/14 | **Course name:** Dissertation examination |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 20 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:**<br>Acquiring the required number of credits in the structure defined by the study plan. | |
| **Learning outcomes:**<br>Evaluation of student‘s competences with respect to the profile of the graduate. | |
| **Brief outline of the course:**<br>The summary doctoral exam is organised as a discourse focusing on 3 courses serving as credit sources for a PhD student (the course is chosen by the supervisor of the student after consulting with the guarantee of the study programme). | |
| **Recommended literature:** | |
| **Course language:**<br>slovak | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 20 | |

| N | P |
|---|---|
| 0.0 | 100.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** CJP/ AJD1/07 | **Course name:** English Language for PhD Students 1 |
|---|---|

**Course type, scope and the method:**
**Course type:** Practice
**Recommended course-load (hours):**
**Per week:** 2 **Per study period:** 28
**Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:** 1.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Written assignments - professional CV, short academic biography (200-350 words).
distance mode of instruction using MS teams

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
Total number of assessed students: 649

| N | Ne | P | Pr | abs | neabs |
|---|---|---|---|---|---|
| 0.0 | 0.0 | 51.31 | 0.0 | 48.69 | 0.0 |

**Provides:** PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.

**Date of last modification:** 11.02.2021

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** CJP/ AJD2/07 | **Course name:** English Language for PhD Students 2 |
| **Course type, scope and the method:**<br>**Course type:** Practice<br>**Recommended course-load (hours):**<br>**Per week:** 2 **Per study period:** 28<br>**Course method:** present | |
| **Number of ECTS credits:** 3 | |
| **Recommended semester/trimester of the course:** 2. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:**<br>Distance mode of instruction. Online consultations.<br>Test, oral exam in accordance with the exam requirements (https://www.upjs.sk/filozoficka-fakulta/cjp/doktorandi-upjs/) | |
| **Learning outcomes:**<br>Development of students´language skills, improvement of students´linguistic competencies (selected aspects of English pronunciation, vocabulary and syntax), development of students´s pragmatic competence (selected aspects of functional grammar) with focus on English for academic and specific purposes. B2/C1 level of lanugage competence (according to CEFR.) | |
| **Brief outline of the course:**<br>Specific aspecs of academic and professional English with focus on vocabulary development (noun and verb collocations, phrasal verbs, prepositional phrases, word-formation, formal/informal language, etc.), selected aspects of English grammar (prepositions, grammar tenses, passive voice, etc.), selected functional grammar (expressing opinion, cause/effect, arguments, examples, etc.). Academic communication. Cross-language interference. | |
| **Recommended literature:**<br>Kolaříková, Z., Petruňová, H., Timková, R.: Angličtina v akademickom prostredí (cvičebnica). UPJŠ Košice, 2015<br>McCarthy, M., O´Dell, F.: Academic Vocabulary in Use. CUP, 2008<br>Štepánek, L., J. De Haff a kol.: Academic English-Akademická angličtina. Grada Publishing, a.s., 2011<br>Blašková, K.: Handbook of English for Postgraduate Students. Vyd. SPRINT Bratislava, 2007<br>Dušková, L. a kol.: Hovorová angličtina pre vedeckých a odborných pracovníkov. Veda. Bratislava, 1982<br>Armer, T.: Cambridge English for Scientists. CUP, 2011<br>Porter, D.: Check your vocabulary for Academic English. Macmillan Publishers Limited, 2008<br>Oxford Collocations Dictionary for students of English. OUP, 2002<br>lms.upjs.sk | |
| **Course language:** | |

B2/C1 level according to CEFR

**Notes:**

**Course assessment**
Total number of assessed students: 607

| N | Ne | P | Pr | abs | neabs |
|---|---|---|---|---|---|
| 0.33 | 0.0 | 92.59 | 1.32 | 5.77 | 0.0 |

**Provides:** PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.

**Date of last modification:** 10.02.2021

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dEKO/10 | **Course name:** Enumeration of combinatorial objects |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 2., 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination.

**Learning outcomes:**
Student gets acquainted with Pólya's enumeration theory and on special examples sees how to use it when determining the number of some mathematical objects.

**Brief outline of the course:**
Cycle index of a permutation group. Burnside's Lemma. Pólya's Enumeration Theorem. Enumeration of injective functions. Enumeration of trees. Enumeration of graphs of given order and size. Enumeration of oriented graphs. Generalisations of Pólya's Enumeration Theorem.

**Recommended literature:**
F. Harary, E. M. Palmer: Graphical Enumeration, Academic Press, 1973

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 1

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Mirko Horňák, CSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTGF/10 | **Course name:** Graph theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 3 **Per study period:** 42
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 1.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Oral examination

**Learning outcomes:**
Knowledge some of basic and also up-to-date knowledge about graph theory. Ability of a creative scietific work.

**Brief outline of the course:**
Planar graphs. Colourings of graphs and their generalizations. Structural properties of plane graphs. Introduction to the theory of light graphs. Colourings of plane graphs. Cyclic colourings. Parity colourings. Nonrepetitive colourings. Rainbow colourings. Ramsey theory for graphs. Applications of graph theory.

**Recommended literature:**
1. J. A. Bondy and U.S.R. Murty, Graph Theory, Springer-Verlag, 2008
2. J.Bang-Jensen and G. Gutin: Digraphs: Theory, Algorithms and Applications, Springer-Verlag London, 2001
3. R. Diestel: Graph Theory, Springer-Verlag, New York, 1997
4. Časopisecká literatúra

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 20

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Roman Soták, PhD., prof. RNDr. Mirko Horňák, CSc., prof. RNDr. Stanislav Jendroľ, DrSc., doc. RNDr. Jaroslav Ivančo, CSc., prof. RNDr. Tomáš Madaras, PhD.

**Date of last modification:** 03.05.2015

| |
|---|
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTGR/10 | **Course name:** Group theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
written and oral exam

**Learning outcomes:**
The students learn basic concepts and methods of group theory and their applications in various parts of mathematics.

**Brief outline of the course:**
Groups of symmetries, abstract groups. Subgroups, orders of elements, cyclic groups. Normal subgroups, factorization. Classification of finitely generated Abelian groups. Groups of permutations, cyclic index, Burnside´s lemma, Pólya´s theorem. Sylow´s subgroups, p-groups. Groups in linear algebra.

**Recommended literature:**
S. MacLane, G. Birkhoff: Algebra, Alfa Bratislava, 1973
L. Beran: Grupy a svazy, SNTL Praha, 1974
D.A.R. Wallace: Groups,rings and fields, Springer 1998
J. J. Rotman: Advanced Modern Algebra, Amer. Math. Soc., Providence 2010

**Course language:**
Slovak or English

**Notes:**

**Course assessment**
Total number of assessed students: 18

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Miroslav Ploščica, CSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dISLa/14 | **Course name:** Individual study of scientific literature I |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 12 | |
| **Recommended semester/trimester of the course:** 1., 2.. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:**<br>Slovak and English | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 20 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dISLb/14 | **Course name:** Individual study of scientific literature II |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 12 | |
| **Recommended semester/trimester of the course:** 3., 4.. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:**<br>Slovak and English | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 22 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTZV/10 | **Course name:** Lattice theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 2 **Per study period:** 28
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 2., 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Awarded according to written and oral exam.

**Learning outcomes:**
The students learn basic concepts and methods of Lattice theory and gain the ability to apply them in various parts of mathematics.

**Brief outline of the course:**
Distributive and modular lattices, Boolean algebras. Ideals, reprezentation of distibutive lattices and Boolean algebras. Completeness and completions. Algebraic properties of lattices, congruence relations. Formal concept analysis.

**Recommended literature:**
G.Grätzer: General Lattice Theory (2nd edition), Birkhäuser, 1998
B. A. Davey, H. A. Priestley: Introduction to lattices and order, Cambridge University Press 1990
M. Kolibiar: Algebra a príbuzné disciplíny, Alfa Bratislava, 1991

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 6

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Miroslav Ploščica, CSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTMT/10 | **Course name:** Matroid theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 1., 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination.

**Learning outcomes:**
A student gets acquainted with special parts of matroid theory and with possibilities how to use them in various disciplines of discrete mathematics.

**Brief outline of the course:**
Restriction, contraction, minor of a matroid. Connected matroids. Whitney's Theorem. Graph homeomorphisms versus matroid minors. Planar graphs and their duals. Representation of a matroid in a vector space. Binary matroids. Block designs versus matroids. Extremal problems in matroids. Greedy algorithm versus matroids.

**Recommended literature:**
D. J. A. Welsh: Matroid Theory, Academic Press, 1976.
J. G. Oxley, Matroid Theory, Oxford University Press, 2010.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 1

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Mirko Horňák, CSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dZMG/14 | **Course name:** Obtaining of a mobility grant |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 10 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 2 | |
| abs | n |
| 100.0 | 0.0 |
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dUAS/10 | **Course name:** Ordered algebraic structures |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 3 **Per study period:** 42
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 2., 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
examination

**Learning outcomes:**
To acquire fundamentals of theory of ordered algebraic structures connecting them with obtained knowledge of algebra, to distend and generalize; application on concrete exercises and mathematical problems.

**Brief outline of the course:**
Partially ordered, linearly ordered, lattice ordered groups. Convex subgroups, absolute value and orthogonality, order of factor classes. Archimedean ordered structures. Partially ordered and linearly ordered rings, fields, lattice ordered rings.

**Recommended literature:**
L.Fuchs: Partially ordered algebraic systems, Pergamon Press, 1963.
T.S.Blyth: Lattices and Ordered Algebraic Structures, Springer Verlag, London, 2005.
E.Harsheim: Ordered sets, Springer Verlag, 2005.
G.Grätzer: Universal algebra, Second Edition, Springer 2008.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 4

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Danica Studenovská, CSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** KPE/ PgVU/17 | **Course name:** Pedagogy for university teachers |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week: Per study period:** 28s
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
Total number of assessed students: 32

| abs | n | neabs |
|---|---|---|
| 100.0 | 0.0 | 0.0 |

**Provides:** PaedDr. Renáta Orosová, PhD.

**Date of last modification:** 12.02.2021

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ ODP/14 | **Course name:** PhD thesis defence |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 30 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 22

| N | P |
|---|---|
| 0.0 | 100.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dPLT/10 | **Course name:** Polyhedral theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Oral exam.

**Learning outcomes:**
Mastered basic knowledge and results of theory of convex polyhedra on up-to-date level..

**Brief outline of the course:**
Polyhedral maps on surfaces. Combinatorial structure of polyhedra. Polyhedral graphs. Euler's formula. Steinitz theorem for 3-dimensional polyhedra. Schlegel's diagrams. Gale's diagrams. Face and vertex structure of polyhedra. Moredimensional polyhedra.

**Recommended literature:**
1. W. Cook, P.D. Seymour: Polyhedral Combinatorics, American Society, 1990.
2. B. Grunbaum: Convex Polytopes, (2-nd edition), Springer-Verlag New York, 2003
3. E. Jucovič: Convex polytopes. Veda, Bratislava, 1981
4. G.M. Ziegler: Lectures on Polytopes, Springer-Verlag, New York, 1995
5. Journal references.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 4

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Stanislav Jendroľ, DrSc.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPDK/12 | **Course name:** Presentation of results at a local conference |

**Course type, scope and the method:**
**Course type:**
**Recommended course-load (hours):**
**Per week: Per study period:**
**Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
Total number of assessed students: 19

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:**

**Approved:** prof. RNDr. Mirko Horňák, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPDZ/12 | **Course name:** Presentation of results at a local conference with international participation |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 4 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 91 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| | |
|---|---|
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dVMK/14 | **Course name:** Presentation of results at an international conference |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 6 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 75 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPSM/12 | **Course name:** Presentation of results in a seminar |

**Course type, scope and the method:**
**Course type:**
**Recommended course-load (hours):**
**Per week: Per study period:**
**Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
Total number of assessed students: 145

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:**

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dPMK/10 | **Course name:** Probability method in combinatorics |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 1., 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
based on the oral examination

**Learning outcomes:**
Introduction to the randomness in graph theory and applications of the probabilistic method in graph theory and combinatorics

**Brief outline of the course:**
1. Probability Theory (probability space, event, probability, random variable, expectation, random graph)
2. Probabilistic Method - First Moment Principle (Ramsey numbers, hypergraph coloring, the Erdös-Ko-Rado theorem, pairs of sets)
3. Linearity of Expectation (Hamiltonian graphs, splitting graphs)
4. Alterations (Markov's inequality, independent sets, high girth and high chromatic number)
5. The Second Moment (Chebyshev's inequality, threshold functions, the clique number)
6. The Lovász Local Lemma (hypergraph coloring again, directed cycles)

**Recommended literature:**
1. N. Alon, J. Spencer: The Probabilistic Method, John Wiley, 1991
2. M. Molloy, B. Reed: Graph Colourings and the Probabilistic Method, Springer, 2002
3. J. Matoušek, J. Vondrák: The Probabilistic Method, Lecture Notes, 2002

**Course language:**
Slovak

**Notes:**

**Course assessment**
Total number of assessed students: 12

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** RNDr. Igor Fabrici, Dr.

**Date of last modification:** 03.05.2015

| |
|---|
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** KPPaPZ/PsVU/17 | **Course name:** Psychology for University Lecturers |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week: Per study period:** 28s
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Case study, micro-output, its analysis
Current modifications of the course for the semester 2020/2021 are listed in the electronic bulletin board of the course.

**Learning outcomes:**
Acquisition of psychological skills necessary for professional, competent performance of university teaching practice of doctoral students on the basis of acquisition and use of selected psychological knowledge from cognitive psychology, psychology of emotions and motivation, personality psychology, developmental, social, pedagogical psychology and health psychology. They will enable university teachers - doctoral students to understand the psychological interpretation of human development, upbringing and education. The acquired knowledge will enable better application in practice, are closely linked to practice and are based on current knowledge of the field.

**Brief outline of the course:**
University teacher and his work in the teaching process with a focus on:
teacher in relation to himself (cognitive, personality, social competencies and competencies in the use of methods), in relation to students and as part of the teacher-student relationship based on selected areas of cognitive psychology, psychology of emotions and motivation, developmental psychology, social psychology , educational psychology and health psychology with application to the university environment.

**Recommended literature:**
Alexitch, L. R. (2005). Applying social psychology to education. Social Psychology.–Ed.: Schneider F., Gruman J., Coutts L.–Sage Publications, Inc, 205-228.
Fry, H., Ketteridge, S., & Marshall, S. (2008). A handbook for teaching and learning in higher education: Enhancing academic practice. Routledge.
Mareš, J.: Pedagogická psychologie. Portál, 2013.
Kniha psychologie. Universum, 2014
Čáp, J., Mareš, J.: Psychologie pro učitele. Praha: Portál 2007.
Vágnerová, M.: Školní poradenská psychológie pro pedagogy. Praha: Karolínum 2005.

**Course language:**

**Notes:**

**Course assessment**
Total number of assessed students: 27

| abs | n | neabs |
|---|---|---|
| 100.0 | 0.0 | 0.0 |

**Provides:** Mgr. Marta Dobrowolska Kulanová, PhD., doc. PhDr. Beata Gajdošová, PhD., PhDr. Anna Janovská, PhD.

**Date of last modification:** 17.02.2021

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dVOP/12 | **Course name:** Reviewer report |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 1

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dCSC/12 | **Course name:** SCI or SCOPUS citation |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 20 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 13 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPRZ/12 | **Course name:** Scientific publication in peer-reviewed proceedings |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 27 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| | |
|---|---|
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPCR/12 | **Course name:** Scientific publication registered in the database Math. Reviews or Zentralblatt MATH |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 15 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 9

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dPCW/12 | **Course name:** Scientific publication registered in the database Web of Science or Scopus |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 20 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**

Total number of assessed students: 58

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dVTGa/10 | **Course name:** Selected topics in graph theory I |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 2 **Per study period:** 28
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 2.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Mastering some of the recent trends in graph theory.

**Brief outline of the course:**
Selected topics from up-to-date graph theory

**Recommended literature:**
Recent publications from international scientific journals.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 19

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Roman Soták, PhD., prof. RNDr. Mirko Horňák, CSc., prof. RNDr. Stanislav Jendroľ, DrSc., doc. RNDr. Jaroslav Ivančo, CSc., prof. RNDr. Tomáš Madaras, PhD.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dVTGb/10 | **Course name:** Selected topics in graph theory II |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 2 **Per study period:** 28
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Oral examination

**Learning outcomes:**
Knowledge about up-to-date trends in the graph theory.

**Brief outline of the course:**
Selected topics from up-to-date graph theory.

**Recommended literature:**
Recent literature from international scientific journals

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 25

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Roman Soták, PhD., prof. RNDr. Mirko Horňák, CSc., prof. RNDr. Stanislav Jendroľ, DrSc., prof. RNDr. Danica Studenovská, CSc., doc. RNDr. Jaroslav Ivančo, CSc., prof. RNDr. Tomáš Madaras, PhD.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** Dek. PF UPJŠ/JSD/14 | **Course name:** Spring School for PhD Students |
| **Course type, scope and the method:**<br>**Course type:** Lecture<br>**Recommended course-load (hours):**<br>**Per week: Per study period:** 4d<br>**Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 154

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** prof. RNDr. Katarína Cechlárová, DrSc. |
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dZSP/12 | **Course name:** Study stay abroad |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 4 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 12 | |
| abs | n |
| 100.0 | 0.0 |
| **Provides:** | |
| **Date of last modification:** | |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. | |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dVBP/12 | **Course name:** Supervising a bachelor thesis |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 6 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment**<br>Total number of assessed students: 7 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ dVPS/12 | **Course name:** Supervising a student's scientific work |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 6 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 3

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTPG/14 | **Course name:** Theory of planar graphs |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 1., 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
To obtain the knowledge on basic and advanced topics related to planar and plane graphs.

**Brief outline of the course:**
Basics of topology of the plane. Planar and plane graphs. Characterizations of planarity. Euler formula and its corollaries. Local structure of planar and plane graphs, the discharging method. Proper and generalized colourings of planar and plane graphs. Separators in planar graphs.

**Recommended literature:**
T. Nishizeki, N. Chiba: Planar graphs: Theory and Algorithms, Dover Publications, 2008
S. Jendroľ, H-J. Voss: Light subgraphs of graphs embedded in the plane - A survey, Discrete Mathematics Vol. 313, no. 4 (2013) 406-421.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 0

| N | P |
|---|---|
| 0.0 | 0.0 |

**Provides:** prof. RNDr. Tomáš Madaras, PhD.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dTTG/10 | **Course name:** Topological graph theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 4 **Per study period:** 56
**Course method:** present

**Number of ECTS credits:** 7

**Recommended semester/trimester of the course:** 1., 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Skúška

**Learning outcomes:**
Oboznámiť sa so základnými metódami a poznatkami Topologickej teórie grafov.

**Brief outline of the course:**
Planárne grafy. Plochy. Vnorenia. Napäťové grafy a pokrývajúce priestory. Rod grafov. Rody grúp. Farbenia grafov na plochách. Neodstraniteľné konfigurácie. Reprezentativita grafov na plochách. Stromová šírka grafov. Minory. Zakázané konfigurácie pre plochy.

**Recommended literature:**
1. G. Gross, T.W. Tucker: Topological Graph Theory, John Wiley and Sons, New York, 1987
2. B. Mohar, C., Thomassen: Graphs on Surfaces,The Johns Hopkins University Press, Baltimore, 2001
3. G. Ringel: Map Color Theorem, Springer-Verlag, Berlin, 1974
4. Journal articles

**Course language:**
Slovak or English

**Notes:**

**Course assessment**
Total number of assessed students: 17

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Roman Soták, PhD.

**Date of last modification:** 03.05.2015

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

**University:** P. J. Šafárik University in Košice

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ dUAL/10 | **Course name:** Universal algebra |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture
**Recommended course-load (hours):**
**Per week:** 3 **Per study period:** 42
**Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 1., 3.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Exam consisting of a written test and of a oral examination.

**Learning outcomes:**
To continue in obtaining a deeper knowledge in universal algebra and in its generalization; to be able to apply the knowledge in investigating concrete situations.

**Brief outline of the course:**
Relations, operations, algebraic structures. Congruences, homomorphism and isomorphism theorems. Application to abstract automata and other structures. Automorphism groups and endomorphism monoids of algebraic structures, abstract and concrete representation problem. Subalgebras. Direct and subdirest product. Direct and inverse limit of algebras. Terms. Free algebras. Birkhoff theorems about varieties. Structures and 1st order logic.

**Recommended literature:**
G. Grätzer: Universal Algebra, 2nd Edition, Springer Verlag, Berlin - New York, 2008.
S.Burris, H.P.Sankappanavar: A Course in Universal Algebra. Springer-Verlag, 1981;
online http://orion.math.iastate.edu/cliff/BurrisSanka.pdf.
V.P.Snaith: Groups, Rings and Galois Theory, Word Scientific Publ. Co.,New Jersey-London-Singapore, 2003.
M. Kolibiar a kol.: Algebra a príbuzné disciplíny, Bratislava, 1992.
B. Jónsson: Topics in Universal Algebra, Springer-Verlag, 1972.

**Course language:**
Slovak and English

**Notes:**

**Course assessment**
Total number of assessed students: 4

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Danica Studenovská, CSc.

| |
|---|
| **Date of last modification:** 03.05.2015 |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |

## COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ PDS/18 | **Course name:** Writing dissertation work |
| **Course type, scope and the method:**<br>**Course type:**<br>**Recommended course-load (hours):**<br>**Per week: Per study period:**<br>**Course method:** present | |
| **Number of ECTS credits:** 0 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 2

| N | P |
|---|---|
| 0.0 | 100.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** |
| **Approved:** prof. RNDr. Mirko Horňák, CSc. |