**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** KFaDF/ AFS/05 | **Course name:** Ancient Philosophy and Present Times |
|---|---|

**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 credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 31

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 80.65 | 6.45 | 6.45 | 0.0 | 6.45 | 0.0 |

**Provides:** Doc. PhDr. Peter Nezník, CSc.

**Date of last modification:** 24.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ ALA/10 | **Course name:** Applied linear algebra |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 2 / 1 **Per study period:** 28 / 14
**Course method:** present

**Number of credits:** 5

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
According to tests and to the exam.

**Learning outcomes:**
To obtain basic knowledge on linear algebra; to be able to apply the theory in concrete excercises.

**Brief outline of the course:**
Matrices over Euclidean rings, canonical forms. Polynomial matrices. Similar matrices. Jordan normal form. Functions of matrices, sequences, series. Inversion of singular matrices, pseudoinverse matrices and their application.

**Recommended literature:**
H.E.Rose: Linear Algebra, A Pure Mathematical Approach, Birkhäuser Verlag, 2002.
D.Serre: Matrices, Theory and applications, Springer Verlag, 2002.
http://www.cs.ut.ee/~toomas_l/linalg/

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 52

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 32.69 | 5.77 | 25.0 | 5.77 | 30.77 | 0.0 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ APS/10 | **Course name:** Applied statistics |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 2 **Per study period:** 42 / 28
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Given at the basis of statistical processing of real data. Final evaluation is given at the basis of partial examination, computing part, and oral part of the exam.

**Learning outcomes:**
Learning most frequently applied statistical methods.

**Brief outline of the course:**
• Matrices and linear spaces, g-inversions, projections
• Important distributions
o Normal distribution and related distributions
o Hotelling's test
• General linear model
o Probability foundations of regression and correlation
o Model with full rank
o Model with incomplete rank
o Submodels testing
• Regression analysis
o Basic models
o Assesing the quality of a model
• Analysis of variance
o One-way ANOVA, multiple comparison procedures, problem of heteroskedasticity
o Balanced factorial models (two-way ANOVA with/without interactions, three-way ANOVA, BIB design, Latin squares)
o Hierarchical models
• Analysis of covariance
• Statistical software for linear modeling

**Recommended literature:**
• Rao: Linear statistical inference and its applications, Wiley, 1973
• Seber: Linear regression analysis, Wiley, 1977
• Searle: Linear models, Wiley, 1997
• Sen, Srivastava: Regression analysis (Theory, Methods, and Applications), Springer, 1990

• Christensen: Plane answers to complex questions (The Theory of Linear Models), Springer, 1987

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 158

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 3.16 | 12.66 | 21.52 | 18.35 | 25.32 | 18.99 |

**Provides:** doc. RNDr. Ivan Žežula, CSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ DBS/15 | **Course name:** Database systems for Mathematicians |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 2 **Per study period:** 42 / 28
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Acquired basic concepts and techniques of relational database theory and corresponding software.

**Brief outline of the course:**
Data models. Languages for defining and manipulating data (DDL, DML). Tables, attributes and integrity constraints. Queries: select, where, group by, aggregate and system functions. Nested queries and several tables: join, union, primary, foreign key. Relational algebra. Database modelling. Functional dependency and normalization.

**Recommended literature:**
- S. Krajčí: Databázové systémy, UPJŠ, 2005 2. J.
- Date C.J., Database Design and Relational Theory, O'Reilly, 2012
- Atkinson, P., Vierra, R., BEGINNING MICROSOFT SQL SERVER 2012 PROGRAMMING, John Wiley - Wrox, 2012
- Itzik Ben-Gan, Microsoft SQL Server, 2012 T-SQL Fundamentals, O'Reilly, 2012
- L. Davidson, J.M. Moss, Pro SQL Server 2012 Relational database Design and Implementation, APRESS, 2012

**Course language:**

**Course assessment**
Total number of assessed students: 694

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 12.54 | 9.51 | 12.68 | 20.32 | 34.44 | 10.52 |

**Provides:** doc. RNDr. Csaba Török, CSc.

**Date of last modification:** 07.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** KFaDF/ DF2p/03 | **Course name:** History of Philosophy 2 (General Introduction) |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 2 / 1 **Per study period:** 28 / 14
**Course method:** present

**Number of credits:** 4

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 734

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 60.63 | 13.9 | 12.67 | 8.72 | 3.41 | 0.68 |

**Provides:** doc. PhDr. Pavol Tholt, PhD., mim. prof., Doc. PhDr. Peter Nezník, CSc., PhDr. Katarína Mayerová, PhD., doc. Mgr. Róbert Stojka, PhD.

**Date of last modification:** 24.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ DPO/14 | **Course name:** Diploma thesis and its defence |
|---|---|

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

**Number of credits:** 20

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 38

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 50.0 | 23.68 | 15.79 | 5.26 | 2.63 | 2.63 |

**Provides:**

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ DPP1a/14 | **Course name:** Diploma Project 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 credits:** 1 | |
| **Recommended semester/trimester of the course:** 2. | |
| **Course level:** II. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:**<br>Slovak | |
| **Course assessment**<br>Total number of assessed students: 103 | |

| abs | n |
|---|---|
| 99.03 | 0.97 |

| |
|---|
| **Provides:** doc. RNDr. Roman Soták, PhD. |
| **Date of last modification:** 22.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚMV/ DPP1b/14 | **Course name:** Diploma Project 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 credits:** 1 | |
| **Recommended semester/trimester of the course:** 3. | |
| **Course level:** II. | |
| **Prerequisities:** ÚMV/DPP1a/14 | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:**<br>Slovak | |
| **Course assessment**<br>Total number of assessed students: 98 | |

| abs | n |
|---|---|
| 98.98 | 1.02 |

| |
|---|
| **Provides:** prof. RNDr. Katarína Cechlárová, DrSc. |
| **Date of last modification:** 22.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ FAN/10 | **Course name:** Functional analysis |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 1 **Per study period:** 42 / 14
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
exam

**Learning outcomes:**
Understanding of the basic rigorous ideas of Applied Functional Analysis.

**Brief outline of the course:**
Linear spaces. Algebraic base and dimension. Linear operators and functionals. Algebraic dual spaces. Linear topological space. Locally convex space. Normed space. L(p) spaces. Dual spaces of L(p) spaces. Hilbert space. Applications of Baire category theorem. Open mapping theorem. Closed graph theorem. Hahn-Banach theorem. Spectrum of linear compact operator.

**Recommended literature:**
A. M. Bruckner, J. B. Bruckner, B. S. Thomson: Real Analysis, Prentice Hall, 1997.

**Course language:**
Slovak or English

**Course assessment**
Total number of assessed students: 49

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 8.16 | 6.12 | 14.29 | 12.24 | 46.94 | 12.24 |

**Provides:** prof. RNDr. Jozef Doboš, CSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ GZB/10 | **Course name:** Geometric transformations |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 2 / 1 **Per study period:** 28 / 14
**Course method:** present

**Number of credits:** 5

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Exam realized by a test.

**Learning outcomes:**
To obtain a deeper knowledge on projective spaces and transformation groups.

**Brief outline of the course:**
Projective spaces, Projective transformations, collineations. Fixed elements of a collineation. A clasification of collineations.

**Recommended literature:**
S. V. Duzhin, B. D. Chebotarevsky: Transformation Groups for Beginers, AMS 2004

**Course language:**
Slovak

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

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 37.04 | 29.63 | 22.22 | 7.41 | 3.7 | 0.0 |

**Provides:** doc. RNDr. Jaroslav Ivančo, CSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** KFaDF/IH2/03 | **Course name:** Idea Humanitas 2 (General Introduction) |
|---|---|

**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 credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 8

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 87.5 | 12.5 | 0.0 | 0.0 | 0.0 | 0.0 |

**Provides:** Doc. PhDr. Peter Nezník, CSc.

**Date of last modification:** 24.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** KFaDF/ KDF/05 | **Course name:** Chapters from History of Philosophy of 19th and 20th Centuries (General Introduction) |

**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 credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 10

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 50.0 | 20.0 | 10.0 | 0.0 | 10.0 | 10.0 |

**Provides:** doc. PhDr. Pavol Tholt, PhD., mim. prof.

**Date of last modification:** 24.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ KDZ/10 | **Course name:** Combinatorial designs |
|---|---|

**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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Based on results of oral exam.

**Learning outcomes:**
To present the basics of theory of combinatorial designs and their applications in sciences.

**Brief outline of the course:**
2-designs, balanced designs. Symmetric designs, Hadamard matrices, finite projective planes. Steiner systems.

**Recommended literature:**
I. Anderson, I. Honkala: A short course in combinatorial designs, http://www.utu.fi/~honkala/cover.html
D.R. Stinson: Combinatorial Designs: Constructions and Analysis, Springer 2004
W.D. Wallis: Combinatorial designs, Marcel Dekker 1988

**Course language:**
Slovak or English

**Course assessment**
Total number of assessed students: 73

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 19.18 | 24.66 | 30.14 | 20.55 | 5.48 | 0.0 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** KPPaPZ/KK/07 | **Course name:** Communication and Cooperation |

**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 credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 281

| abs | n | z |
|---|---|---|
| 98.22 | 1.78 | 0.0 |

**Provides:** Mgr. Ondrej Kalina, PhD., Mgr. Lucia Hricová, PhD.

**Date of last modification:** 16.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

**Course ID:** ÚINF/ KKV1/15

**Course name:** Classical and quantum computations

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 1 **Per study period:** 42 / 14
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Written work
Writen and oral examination

**Learning outcomes:**
To provide information on quantum computer and quantum computations. To compare classical and quantum models and methods.

**Brief outline of the course:**
The basics of classical theory of computation: Turing machines, Boolean circuits, parallel algorithms, probabilistic computation, NP-complete problems, and the idea of complexity of an algorithm. Introduction of general quantum formalism (pure states, density matrices, and superoperators), universal gate sets and approximation theorems. Grover's algorithm, Shor's factoring algorithm, and the Abelian hidden subgroup problem. Parallel quantum computation, a quantum analogue of NP-completeness, and quantum error-correcting codes.

**Recommended literature:**
1. BERMAN,G.P., DOOLEN,G.D., MAINIERI, R., TSIFRINOVIC, V.I. Introduction to Quantum Computers. World Scientific, 2003.
2. GRUSKA, J. Quantum Computing. McGraw-Hill, 1999.
3. JOHNSON, G. A Shortcut Through Time: The Path to the Quantum Computer, Knopf 2003.
4. KITAEV, A.Y., SHEN, A.H., VYALYI, M.N. Classical and Quantum Computation. American Mathematical Society, 2002.
5. NIELSEN, M.A., CHUANG, I.L. Quantum Computation and Quantum Information. Cambridge University Press, 2000.
6. HIRVENSALO, M., Quantum Computing, Springer 2004

**Course language:**

**Course assessment**
Total number of assessed students: 104

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 23.08 | 35.58 | 14.42 | 14.42 | 8.65 | 3.85 |

| |
|---|
| **Provides:** doc. RNDr. Gabriel Semanišin, PhD., RNDr. Zuzana Bednárová, PhD. |
| **Date of last modification:** 07.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ KOO/10 | **Course name:** Combinatorial optimization |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 1 **Per study period:** 42 / 14
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Evaluation is based on working out the seminar work and on passing the oral examination.

**Learning outcomes:**
Mastered basic knowledge of methods of modelling and controlling, and an ability to apply them on typical problems using methods of discrete mathematics.

**Brief outline of the course:**
Introduction to graphs.
Introduction to algorithms and complexity. Sorting algorithms. Search algorithms. Greedy algorithms. NP-completeness.
Trees and rooted trees. Generating all spanning trees of a graph. Minimum spanning tree problem.
Distance in graphs. Shortest path problem and its analogues. The most reliable path. The largest capacity path. The path with the largest expected capacity.
Location centres and medians.
Networks: An introduction to networks, the max-flow min-cut theorem. Related problems.
Matchings: Maximum matchings in bipartite graphs. Maximum matchings in general graphs. Transportation and assignment problems.
Eulerian graphs and Chinese postman's problem.
Hamiltonian graphs. Travelling salesman problem.

**Recommended literature:**
1. G. Chartrand, O.R. Vellermann: Applied and Algorithmic Graph Theory, McGraw-Hill, Inc. New York 1993.
2. N. Christofides: Graph Theory - An Algorithmic Approach, Academic Press, New York 1975 (Russian translation from 1978).
3. D. Jungnickel: Graphs, Networks, and Algorithms, Springer-Verlag Berlin 2005.
4. J. Plesník: Grafové algoritmy, Veda Bratislava 1983.
5. M. N. S. Swamy, K. Thulasiraman: Graphs, networks, and algorithms. John Wiley and Sons, New York 1981.

**Course language:**
Slovak

**Course assessment**

Total number of assessed students: 24

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 62.5 | 29.17 | 4.17 | 4.17 | 0.0 | 0.0 |

**Provides:** Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc., RNDr. Juraj Valiska

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚTVŠ/ KP/12 | **Course name:** Survival Course |
| **Course type, scope and the method:**<br>**Course type:** Practice<br>**Recommended course-load (hours):**<br>**Per week: Per study period:** 36s<br>**Course method:** present | |
| **Number of credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** I., II. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Course assessment**<br>Total number of assessed students: 329 | |

| abs | n |
|---|---|
| 47.11 | 52.89 |

| | |
|---|---|
| **Provides:** MUDr. Peter Dombrovský, Mgr. Marek Valanský | |
| **Date of last modification:** 23.02.2017 | |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. | |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚTVŠ/ LKSp/13 | **Course name:** Summer Course-Rafting of TISA River |
| **Course type, scope and the method:**<br>**Course type:** Practice<br>**Recommended course-load (hours):**<br>**Per week: Per study period:** 36s<br>**Course method:** present | |
| **Number of credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** I., II. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Course assessment**<br>Total number of assessed students: 126 | |
| abs | n |
| 45.24 | 54.76 |
| **Provides:** Mgr. Peter Bakalár, PhD. | |
| **Date of last modification:** 23.02.2017 | |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. | |

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

**Course ID:** ÚBEV/MOB2/10 | **Course name:** Molecular Biology

**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 credits:** 3

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Familiarize students with the structure, properties and functions of information macromolecules and their work, focusing primarily on the molecular mechanisms of regulation of DNA replication, gene expression and cell cycle.

**Brief outline of the course:**
Structure and properties of information macromolecules. Molecular structure of chromatin and mitotic and meiotic chromosomes. Dynamics of chromosomes. Replication of chromosomal and extrachromosomal DNA. Repair of DNA damage. Genome of prokaryotic and eukaryotic cells. The human genome. Mobile genetic elements. Transcription and posttranscriptional modifications and editing. Translation and posttranslational modifications. Specific protein degradation. DNA-protein interactions. Regulation of the expression of prokaryotic and eukaryotic genes. Control of the cell cycle.

**Recommended literature:**
E. Mišúrová:Molekulárna biológia. Učebné texty, PF UPJŠ Košice, 1999
E. Mišúrová, P. Solár: Molekulová biológia. Učebné texty, PF UPJŠ, 2007
S.Rosypal:Úvod do molekulární biologie. Grafex Blansko, Brno,1999
Alberts, D.Bray, J. Lewis a kol.: Molecular Biology of the Cell, Academic Press, London, 1994
D.P. Clark: Molecular Biology, Elsevier Academic Press, London, 2005

**Course language:**

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

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Provides:** doc. RNDr. Peter Pristaš, CSc.

**Date of last modification:** 24.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ MSM/14 | **Course name:** Mathematical modelling |
|---|---|

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

**Number of credits:** 4

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Acquiring the required number of credits in the structure defined by the study plan.

**Learning outcomes:**
Evaluation of student‘s competences with respect to the profile of the graduate.

**Brief outline of the course:**

**Recommended literature:**

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 10

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 30.0 | 30.0 | 20.0 | 20.0 | 0.0 | 0.0 |

**Provides:**

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ MTE/10 | **Course name:** Mathematical economics |
|---|---|

**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 credits:** 5

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Two written exams in solving problems. Final evaluation is based on written exams and theoretical oral exam.

**Learning outcomes:**
To learn basic notions and methods of the modern mathematical economics.

**Brief outline of the course:**
The notion of exchange economy. Edgeworth box. Preferences and utility functions. Optimality in exchange economies. Existence of core. Walrasian equilibrium. Optimality and decentralization. Production economies.
Basic knowledge of convex analysis and topology is recommended. Basic knowledge in microeconomics is also invited.

**Recommended literature:**
1. C.D. Aliprantis, D.J. Brown, O. Burkinshaw: Existence and optimality of competitive equilibria, Springer 1989
2. W. Hildenbrand, A.P. Kirman: Equilibrium analysis, North Holland,
3. A. Takayama: Mathematical economics, Cambridge University Press, 1985

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 130

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 23.08 | 22.31 | 23.08 | 16.92 | 10.77 | 3.85 |

**Provides:** prof. RNDr. Katarína Cechlárová, DrSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ POT/10 | **Course name:** Polyhedral 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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

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

**Learning outcomes:**
Mastered basic knowledge from theory of convex polyhedra and polyhedral maps.

**Brief outline of the course:**
Classification of surfaces.
Combinatorial and geometric properties of three-dimensional convex polyhedra.
Graphs of polyhedra.
Polyhedral maps. Euler's theorem,
Steinitz' theorem.
Light subgraphs.
Face- and vertex- vectors. Eberhard's theorem.
Groups of symmetries of polyhedra.
Applications in optimization and chemistry.

**Recommended literature:**
1. B. Grunbaum: Convex polytopes (2nd edition), Springer New York, 2003.
2. S. Jendrol': Light subgraphs of graphs embedded in the plane - a survey, Discrete Math. 313(2013), 406-421.
3. E. Jucovič: Konvexné mnohosteny, Veda Bratislava 1981.
4. G. Ringel, Map color theorem, Springer-Verlag 1974.
2. G.M. Ziegler: Lectures on Polytopes, Springer-Verlag, New York, 1996

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 15

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 86.67 | 0.0 | 0.0 | 13.33 | 0.0 | 0.0 |

**Provides:** Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc.

| |
|---|
| **Date of last modification:** 22.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** Dek. PF UPJŠ/PPZ/13 | **Course name:** Personality Development and Key Competences for Success on a Labour Market |
|---|---|

**Course type, scope and the method:**
**Course type:** Practice
**Recommended course-load (hours):**
**Per week: Per study period:** 14s
**Course method:** present

**Number of credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 39

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Provides:** RNDr. Peter Stefányi, PhD.

**Date of last modification:** 13.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** KPPaPZ/PPZMg/12 | **Course name:** Psychology and Health Psychology (Master´s Study) |

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 1 / 2 **Per study period:** 14 / 28
**Course method:** present

**Number of credits:** 4

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 226

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 19.47 | 25.22 | 25.66 | 13.27 | 15.93 | 0.44 |

**Provides:** PhDr. Anna Janovská, PhD., Mgr. Lucia Hricová, PhD.

**Date of last modification:** 16.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ PSTb/10 | **Course name:** Probability and statistics II |
|---|---|

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

**Number of credits:** 5

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**
To obtain at least 50% in two written tests during the semester. Total evaluation based on written tests and oral exam.

**Learning outcomes:**
Student should obtain the knowledge about basic statistical methods and the ability to apply theoretical knowledge in practical problems solving.

**Brief outline of the course:**
Random vectors, their distributions and characteristics. Joint and marginal distributions. Correlation and regression, properties of correlation coefficient. Random sample, sampling distributions and characteristics. Some important statistics and their distributions. Point estimators and their properties. Maximum likelihood method. Interval estimates, confidence interval construction.Testing of statistical hypothesis, critical region, level of significance. Methods for searching optimal critical regions. Some important parametric and nonparametric tests.

**Recommended literature:**

1. Skřivánková V.: Pravdepodobnosť v príkladoch, UPJŠ, Košice, 2006 (in Slovak)
2. Skřivánková V.-Hančová M.: Štatistika v príkladoch, UPJŠ, Košice, 2005 (in Slovak)
3. CASELLA, G., BERGER, R., Statistical Inference, 2nd ed., Duxbury Press, 2002
4. DeGroot, M. H., Schervish, M. J.: Probability and Statistics, 4th ed., Pearson, Boston, 2012
5. Utts, J.M., Heckard, R.F.: Mind od Statistics, 5th ed., Thomson Brooks/Cole, 2014
6. Anděl J.: Základy matematické statistiky, MatfyzPress, Praha, 2011 (in Czech)


**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 170

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 20.0 | 20.59 | 18.24 | 24.12 | 11.18 | 5.88 |

**Provides:** RNDr. Martina Hančová, PhD.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚFV/SEV/10 | **Course name:** Structure and Evolution of the Universe |
|---|---|

**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 credits:** 3

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**
Test within the curriculum presented during the course; seminar essay.
Oral exam with preparation; 3 questions within the curriculum presented during the course.

**Learning outcomes:**
Become acquainted with basic knowledge about the structure and evolution of the universe.

**Brief outline of the course:**
The stars, their basic properties, structure and evolution. Structure and distribution of matter in the universe. Cosmological theories, formation, evolution and future of the universe.

**Recommended literature:**
1. Carroll, B. W., Ostlie, D. A., An Introduction to Modern Astrophysics, Addison-Wesley Publishing Company, Reading, Massachusetts, 1996;
2. Contopoulos, D. Kotsakis, Cosmology, the structure and evolution of the Universe, Springer, 1984;
3. Narlikar, J.V.,An Introduction to Cosmology, Cambridge University Press, Cambridge, 2002;
4. Pasachoff, J.M., Filippenko, A., The Cosmos: Astronomy in the New Millennium, Cambridge University Press, 2013;

**Course language:**
Slovak, English

**Course assessment**
Total number of assessed students: 115

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 29.57 | 31.3 | 13.91 | 13.91 | 11.3 | 0.0 |

**Provides:** doc. RNDr. Rudolf Gális, PhD.

**Date of last modification:** 21.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

**Course ID:** ÚMV/ SHM/10 | **Course name:** Seminar on history of mathematics

**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 credits:** 2

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**
Homework, presentation on the chosen topic during the seminar.
More than 91 points - evaluation of A.
81-90 points - evaluation of B.
71-80 points - rating C.
61-70 points - evaluation of D.
51-60 points - evaluation of E.
Less than 50 points - FX evaluation.

**Learning outcomes:**
Students get an overview of the history of the development of certain mathematical disciplines and selected terms and about parallel between phylogenesis and ontogenesis of mathematical thinking.

**Brief outline of the course:**
Mathematics in Early Civilizations. Greek Mathematics. Mathematics in the Near and Far East (Arabia, China, India). Medieval European Mathematics. The Renaissance of Mathematics. The Beginning of Modern Mathematics.

**Recommended literature:**
Burton, D. M.: The History of Mathematics: An Introduction. McGraw−Hill, 2007.
Devlin, K.: Jazyk matematiky. Dokořán, 2002 (in czech)
Kolman, A.: Dejiny matematiky ve starověku. Academia, Praha, 1968 (in slovak)
Juškevič, A. P.: Dejiny matematiky ve středověku. Academia, Praha 1977 (in slovak)
Znám,Š. a kol.: Pohľad do dejín matematiky. Alfa, Bratislava, 1986 (in slovak)
Konforovič, A.G.: Významné matematické úlohy, SPN Praha, 1989 (in slovak)

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 138

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 79.71 | 7.25 | 7.25 | 2.9 | 2.9 | 0.0 |

| |
|---|
| **Provides:** RNDr. Ingrid Semanišinová, PhD. |
| **Date of last modification:** 22.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** KPPaPZ/SPVKE/07 | **Course name:** Social-Psychological Training of Coping with Critical Life Situations |
| **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 credits:** 2 | |
| **Recommended semester/trimester of the course:** 2. | |
| **Course level:** II. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Course assessment**<br>Total number of assessed students: 126 | |

| abs | n | z |
|---|---|---|
| 97.62 | 2.38 | 0.0 |

| |
|---|
| **Provides:** Mgr. Ondrej Kalina, PhD. |
| **Date of last modification:** 16.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ SVK/10 | **Course name:** Students scientific conference |
|---|---|

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

**Number of credits:** 4

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

**Course level:** I., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Individual scientific work of students. Publishing of obtained results in a written form and as a public presentation.

**Brief outline of the course:**

**Recommended literature:**
With respect to the research problematics (article in journals, books).

**Course language:**
Slovak or English

**Course assessment**
Total number of assessed students: 79

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 98.73 | 1.27 | 0.0 | 0.0 | 0.0 | 0.0 |

**Provides:**

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TGF/10 | **Course name:** Graph 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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

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

**Learning outcomes:**
Basic knowledge concerning methods how new discoveries in matematics. Deeper knowledge on selected topics in graph theory.

**Brief outline of the course:**
Embeddings graphs into surfaces.
Global properties of embedded graphs: Oblique graphs (Voigt and Walther´s theorem), Platonic and Archimedean solids.
Introduction into the theory of light graphs: Kotzig´s theorem, Borodin´s theorem, Fabrici and Jendroľ´s theorem, light paths.
Introduction into colourings of embedded graphs: The four colour theorem, rainbow colourings, parity colourings, and non-repetitive colourings.
Words and colourings.

**Recommended literature:**
1. J. Barat, J. Czap: Facial nonrepetitive verxex coloring of plane graphs, J. Graph Theory, DOI:10.1002/jgt21695.
2. J. A. Bondy, U.S R. Murty: Graph Theory, Springer 2008.
3. J. Czap, S. Jendrol', F. Kardoš, R. Soták: Facial parity edge colouring of plane pseudographs, Discrete Math. 312(2012), 2735-2740.
4. J. Czap, S. Jendroľ, M. Voigt: Parity vertex colouring of plane graphs, Discrete Math. 311(2011), 512-520.
5. G. Chartrand, L. Lesniak, P. Zhang: Graphs and digraphs, CRC Press, Boca Raton 2011.
6. F. Havet, S. Jendroľ, R. Soták, E. Škrabuľáková, Facial non-repetitive edge-coloring of plane graphs, J. Graph Theory 66(2011), 38-48.
7. S. Jendroľ, H.-J. Voss: Light subgraphs of graphs embedded in the plane - A Survey, Discrete Math. 313(2013), 406-421.

**Course language:**
Slovak

**Course assessment**

Total number of assessed students: 56

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 51.79 | 14.29 | 16.07 | 10.71 | 7.14 | 0.0 |

**Provides:** Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

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

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 2 / 1 **Per study period:** 28 / 14
**Course method:** present

**Number of credits:** 5

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

**Course level:** II.

**Prerequisities:**

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

**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. Sylow 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

**Course assessment**
Total number of assessed students: 40

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 37.5 | 25.0 | 22.5 | 7.5 | 7.5 | 0.0 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

# COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ THO/10 | **Course name:** Queueing 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 credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A (60 points at maximum) and one from the group B (40 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.

**Learning outcomes:**
A student gets acquainted with analysis of input requests streams and with functioning of simple queuing systems.

**Brief outline of the course:**
Queuing system. Stationary, ordinary and Markov (memoryless) input requests stream. Basic types of input requests streams. Auxiliary lemmas. Properties of a memoryless input requests stream. Service analysis in a simple queuing system. Markov's theorem.

**Recommended literature:**
B.V. Gnedenko and I.N. Kovalenko, Introduction to Queueing Theory, Second Edition, Birkhauser Boston, Cambridge MA, 1989

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 50

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 20.0 | 22.0 | 8.0 | 18.0 | 20.0 | 12.0 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ THR/10 | **Course name:** Game theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 1 **Per study period:** 42 / 14
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Two written exams dring the semester. The final assessment is based on the written tests and oral examination.

**Learning outcomes:**
To learn the basic methods of game theory. We also require that students will be able to model situations from everyday life as simple games.

**Brief outline of the course:**
Examples of games. Extensive form of a game, value of the game. Von Neumann Morgenstern theory of utility. Matrix games and their solution. Bimatrix games.Theory of negotiations. n-person games: core, Shapley value. Economic applications of game theory.
The students should have basic knowledge in probability theory and linear programming (including duality theory and simplex method).

**Recommended literature:**
1. K. Binmore, Fun and games, D.C. Heath, 1992
2. M. Chobot, F. Turnovec, V. Ulašin, Teória hier a rozhodovania, Alfa, Bratislava, 1991.
3. G. Owen, Game Theory, Academic Press (existuje ruský preklad).
4. L.C. Thomas, Games, Theory and Applications, Wiley, New York.
5. H.S. Bierman, L.Fernandez, Game Theory with Economic Applications, Addison-Wesley, 1998.

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 129

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 17.05 | 23.26 | 20.93 | 21.71 | 16.28 | 0.78 |

**Provides:** prof. RNDr. Katarína Cechlárová, DrSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TIN/10 | **Course name:** Information 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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A and one from the group B (both for 50 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.

**Learning outcomes:**
A student gets acquainted with a mathematical attempt to solve some problems of computer science.

**Brief outline of the course:**
A quantitative characteristic of an information. Entropy of a random variable. Mutual information. Inequalities involving mutual information and entropy, respectively. Typical sequence, typical set. Data compression.

**Recommended literature:**
T. M. Cover, J. A. Thomas, Elements of Information Theory, Wiley, 1991 (2nd ed. 2006)
T. K. Moon, Information Theory (free online course materials), available at the address http://digitalcommons.usu.edu/ocw_ece/3/

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 93

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 39.78 | 18.28 | 18.28 | 11.83 | 7.53 | 4.3 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

# COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TKO/10 | **Course name:** Theory of codes |
|---|---|

**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 credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A and one from the group B (both for 50 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.

**Learning outcomes:**
A student gets acquainted with basic principles and theoretical bases of text coding and possibilities of their application.

**Brief outline of the course:**
Monoids. Basic notions of theory of codes. Examples of codes. Important classes of codes. Maximal codes. Submonoids generated by codes. Stable submonoids. Group codes. Free hull of a set of words. Test for recognising codes. Measure of a code. Bernoulli distribution. Dyck code. Complete sets in monoids. Thin codes. Composition of codes. Indecomposable codes.

**Recommended literature:**
J. Berstel and D. Perrin, Theory of Codes, Academic Press, 1985

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 47

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 25.53 | 12.77 | 10.64 | 17.02 | 21.28 | 12.77 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

# COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TMT/10 | **Course name:** Matroid 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 credits:** 5

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A (65 points at maximum) and one from the group B (35 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.

**Learning outcomes:**
A student gets acquainted with basic notions of matroid theory and possibilities of using matroids in various disciplines of discrete mathematics.

**Brief outline of the course:**
Independent sets and bases. Properties of rank function. Closure operator. Circuits. Duality in matroids. Hyperplanes.

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

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 34

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 23.53 | 14.71 | 26.47 | 8.82 | 17.65 | 8.82 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TOP/15 | **Course name:** Topology |
|---|---|

**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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Exam

**Learning outcomes:**
To acquaint the student with basic knowledge of point-set topology.

**Brief outline of the course:**
Basic notions and results of point-set topology. Connected and arcwise connected space. Compactness and compactification. Uniform space, basic properties. Metric and separable space. Dimension and its basic properties. The notion of a manifold and examples of manifolds. Homotopy, homotopy group.

**Recommended literature:**
R. Engelking, General Topology, Heldermann, Berlin, 1989.
J.L. Kelley, General Topology, Springer, 1955.
I.M. Singer and J.A. Thorpe, Lecture Notes on Elementary Topology and Geometry, Springer, 1967.

**Course language:**
Slovak or English

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

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 66.67 | 0.0 | 33.33 | 0.0 | 0.0 | 0.0 |

**Provides:** RNDr. Jaroslav Šupina, PhD.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ TSS/10 | **Course name:** Control theory |
|---|---|

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 3 / 1 **Per study period:** 42 / 14
**Course method:** present

**Number of credits:** 6

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
Based on two written tests during the semester and on the oral examination.

**Learning outcomes:**
To learn the basic notions of controllable systems.

**Brief outline of the course:**
Controllable systems. Pontrjagin maximum principle. Linear systems, bang-bang controls, singular controls.. Discrete systems, dynamic programming, Bellmann's optimality principle. Practical applications of theoretical results.

**Recommended literature:**
1. K. Macki, A. Strauss: Introduction to Optimal Control Theory, Springer, 1980.
2. G. Feichtinger, R.F. Hartl: Optimale Kontrolle okonomischer Prozesse, Berlin, 1986.

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 133

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 24.81 | 27.82 | 22.56 | 16.54 | 8.27 | 0.0 |

**Provides:** prof. RNDr. Katarína Cechlárová, DrSc.

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

# COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚTVŠ/ TVa/11 | **Course name:** Sports Activities I. |
|---|---|

**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 credits:** 2

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

**Course level:** I., I.II., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 10457

| abs | abs-A | abs-B | abs-C | abs-D | abs-E | n | neabs |
|---|---|---|---|---|---|---|---|
| 88.25 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 | 7.81 | 3.92 |

**Provides:** Mgr. Peter Bakalár, PhD., Mgr. Dana Dračková, PhD., Mgr. Agata Horbacz, PhD., Mgr. Dávid Kaško, Mgr. Zuzana Küchelová, PhD., PaedDr. Jana Potočníková, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Aurel Zelko, PhD., Mgr. Marcel Čurgali, doc. PhDr. Ivan Šulc, CSc.

**Date of last modification:** 23.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚTVŠ/ TVb/11 | **Course name:** Sports Activities II. |
|---|---|

**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 credits:** 2

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

**Course level:** I., I.II., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 9779

| abs | abs-A | abs-B | abs-C | abs-D | abs-E | n | neabs |
|---|---|---|---|---|---|---|---|
| 85.09 | 0.61 | 0.02 | 0.0 | 0.0 | 0.02 | 10.36 | 3.9 |

**Provides:** Mgr. Peter Bakalár, PhD., Mgr. Dana Dračková, PhD., Mgr. Agata Horbacz, PhD., Mgr. Dávid Kaško, Mgr. Zuzana Küchelová, PhD., PaedDr. Jana Potočníková, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Aurel Zelko, PhD., Mgr. Marcel Čurgali, doc. PhDr. Ivan Šulc, CSc.

**Date of last modification:** 23.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚTVŠ/ TVc/11 | **Course name:** Sports Activities III. |
|---|---|

**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 credits:** 2

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

**Course level:** I., I.II., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 6188

| abs | abs-A | abs-B | abs-C | abs-D | abs-E | n | neabs |
|---|---|---|---|---|---|---|---|
| 89.66 | 0.03 | 0.0 | 0.0 | 0.0 | 0.0 | 4.36 | 5.95 |

**Provides:** PaedDr. Jana Potočníková, PhD., Mgr. Marcel Čurgali, Mgr. Peter Bakalár, PhD., Mgr. Dana Dračková, PhD., Mgr. Agata Horbacz, PhD., Mgr. Dávid Kaško, Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Aurel Zelko, PhD., doc. PhDr. Ivan Šulc, CSc.

**Date of last modification:** 23.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚTVŠ/ TVd/11 | **Course name:** Sports Activities IV. |
|---|---|

**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 credits:** 2

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

**Course level:** I., I.II., II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 4644

| abs | abs-A | abs-B | abs-C | abs-D | abs-E | n | neabs |
|---|---|---|---|---|---|---|---|
| 85.66 | 0.32 | 0.04 | 0.0 | 0.0 | 0.0 | 6.61 | 7.36 |

**Provides:** Mgr. Marcel Čurgali, Mgr. Peter Bakalár, PhD., Mgr. Dana Dračková, PhD., Mgr. Agata Horbacz, PhD., Mgr. Dávid Kaško, Mgr. Zuzana Küchelová, PhD., PaedDr. Jana Potočníková, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Aurel Zelko, PhD., doc. PhDr. Ivan Šulc, CSc.

**Date of last modification:** 23.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

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

**Course type, scope and the method:**
**Course type:** Lecture / Practice
**Recommended course-load (hours):**
**Per week:** 2 / 1 **Per study period:** 28 / 14
**Course method:** present

**Number of credits:** 5

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

**Course level:** II.

**Prerequisities:**

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

**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:**
Ordered sets and lattices. Distributivity and modularity. Ideals and set-theoretical representation. Completeness and completions. 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

**Course assessment**
Total number of assessed students: 29

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 34.48 | 13.79 | 31.03 | 17.24 | 3.45 | 0.0 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

## COURSE INFORMATION LETTER

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

**Faculty:** Faculty of Science

| **Course ID:** ÚMV/ UAL/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 credits:** 5

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**
According to results of the exam (written+oral).

**Learning outcomes:**
To obtain basic knowledge from universal algebra and to be able to apply it in concrete situations.

**Brief outline of the course:**
Algebraic structures. Homomorphisms and congruences. Direct and subdirect products. Terms. Free algebras. Birkhoff theorems about varieties.

**Recommended literature:**
S.Burris, H.P.Sankappanavar: A Course in Universal Algebra. Springer-Verlag, 1981.
B. Jónsson: Topics in universal algebra, Springer-Verlag 1972.
G. Grätzer: Universal Algebra, 2nd edition, Springer Verlag, 1979.

**Course language:**
Slovak

**Course assessment**
Total number of assessed students: 34

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 29.41 | 29.41 | 23.53 | 5.88 | 5.88 | 5.88 |

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

**Date of last modification:** 22.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** KPPaPZ/UPR/03 | **Course name:** The Art of Aiding by Verbal Exchange |

**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 credits:** 2

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

**Course level:** II.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Course assessment**
Total number of assessed students: 49

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 85.71 | 4.08 | 2.04 | 2.04 | 2.04 | 4.08 |

**Provides:** Mgr. Ondrej Kalina, PhD.

**Date of last modification:** 16.02.2017

**Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc.

**COURSE INFORMATION LETTER**

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

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ VYZ1/15 | **Course name:** Computational complexity |
|---|---|

**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 credits:** 4

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

**Course level:** II.

**Prerequisities:**

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

**Learning outcomes:**
To give the students the theoretical background in computational complexity and theory of NP-completeness.

**Brief outline of the course:**
Deterministic and nondeterministic algorithms with polynomial time, NP-completeness. Deterministic simulation of a nondeterministic Turing machine. Satisfiability of Boolean formulae. Another NP-complete problems: satisfiability of a formula in a conjunctive normal form, 3-satisfiability, 3-colorability of a graph, 3-colorability of a planar graph, knapsack problem, balancing, ... Space bounded computations, classes L, NL, PSPACE. Deterministic simulation - Savitch theorem. Closure under complement.
Complete problems for classes NL, P, and PSPACE.

**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.
L.A.Hemaspaandra, M.Ogihara: Complexity theory companion, EATCS series, texts in computer science, Springer-Verlag, 2002.
S. Arora, B. Barak: Computational Complexity: A Modern Approach, Cambridge Univ. Pess, 2009.
G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.
D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994.
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.

**Course language:**

**Course assessment**
Total number of assessed students: 296

| A | B | C | D | E | FX |
|---|---|---|---|---|---|
| 57.77 | 14.86 | 11.15 | 7.77 | 8.11 | 0.34 |
| **Provides:** prof. RNDr. Viliam Geffert, DrSc. | | | | | |
| **Date of last modification:** 07.02.2017 | | | | | |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. | | | | | |

**COURSE INFORMATION LETTER**

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚTVŠ/ ÚTVŠ/CM/13 | **Course name:** Seaside Aerobic Exercise |
| **Course type, scope and the method:**<br>**Course type:** Practice<br>**Recommended course-load (hours):**<br>**Per week: Per study period:** 36s<br>**Course method:** present | |
| **Number of credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** I., II. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Course assessment**<br>Total number of assessed students: 15 | |

| abs | n |
|---|---|
| 26.67 | 73.33 |

| |
|---|
| **Provides:** Mgr. Alena Buková, PhD., Mgr. Agata Horbacz, PhD. |
| **Date of last modification:** 23.02.2017 |
| **Approved:** Guaranteeprof. RNDr. Danica Studenovská, CSc. |