CONTENT

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ OPSP/14	**Course name:** ABAP and Object and Dialogue Programming
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 ECTS credits: 5	
Recommended semester/trimester of the course: 2.	
Course level: II.	
Prerequisities: ÚINF/RASP/14 or ÚINF/RASP/16	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course: Screen, function codes, local and global classes, inheritance, polymorphism.	
Recommended literature:	
Course language:	
Notes:	
Course assessment Total number of assessed students: 28	

abs	n
64.29	35.71

Provides: RNDr. Štefan Pero, PhD.	
Date of last modification: 03.05.2015	
Approved: prof. RNDr. Katarína Cechlárová, DrSc.	

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 ECTS 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:

Notes:

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: 12.02.2020

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 57

A	B	C	D	E	FX
31.58	7.02	24.56	5.26	31.58	0.0

Provides: prof. RNDr. Danica Studenovská, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 160

A	B	C	D	E	FX
3.13	13.13	21.25	18.75	25.0	18.75

Provides: doc. RNDr. Ivan Žežula, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ BNK/10	**Course name:** Banking

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: 3

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

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To present the challenge of commercial banking. To teach students the basic knowledge and terms of commercial banking and the bank system in Slovakia. To familiarise them with the position, functions and role of the central bank, and with the position, functions and role of commercial banks.

Brief outline of the course:
Basic structure and philosophy of bank trading and of the bank as a unit. Bank reports. Basic principles of managing assets and liabilities. Bank loans and investments. The capital of bank. Payment connections.

Recommended literature:
1.Horvátová: Bankovníctvo, Súvaha 2000,
2. Ziegler, k. a kol. Finanční řízení bánk Bankvní institut Praha 1997
3. Prno, I. Bankovníctvo, IRIS, 2000
4. Makúch, J.a kol. Komerčné banky, Elita, 1994
5. Šenkýřová: Bankovníctví I,II.,
6. Gallo: Základy moderného bankovníctva.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 87

A	B	C	D	E	FX
37.93	41.38	17.24	2.3	1.15	0.0

Provides: Ing. Jozef Porvazník, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ KOA/10	**Course name:** Combinatorial algorithms

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 ECTS 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 an ability to understand the close tie between the theoretical and algorithmic aspects of discrete mathematics and to show how algorithms can be extacted from theorems. Ability in proving algorithm correctness.

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

Notes:

Course assessment
Total number of assessed students: 112

A	B	C	D	E	FX
35.71	21.43	22.32	9.82	9.82	0.89

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

Date of last modification: 13.02.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS credits: 4

Recommended semester/trimester of the course: 1., 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

Notes:

Course assessment
Total number of assessed students: 82

A	B	C	D	E	FX
21.95	25.61	28.05	19.51	4.88	0.0

Provides: prof. RNDr. Tomáš Madaras, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 04.09.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ VSM/10	**Course name:** Computational statistics and simulation methods

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 ECTS credits: 5

Recommended semester/trimester of the course: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Written tests. Final evaluation is given at the basis of partial examination, computing part, and oral exam.

Learning outcomes:
Getting to know modern software and computational and simulation methods in statistics.

Brief outline of the course:
• Types of statistical computations, popular mathematical software
• Some practical computational methods
o Computing distribution and quantile functions
o Matrix computations
• Random numbers generation
o Uniform distribution (linear reccurent generators, bit reccurent generators, nonlinear generators)
o General methods for other distributions
o Special methods for other distributions
• Applications of random numbers
o Simulations
o Approximate evaluation of an integral
o Bootstrap method
o Random processes and MCMC method
• Exploratory data analysis
o Principles of cluster analysis
o GUHA method

Recommended literature:
• Olehla, Věchet, Olehla: Řešení úloh matematické statistiky ve Fortranu, Nadas, 1982
• Olver et al.: NIST Handbook of mathematical functions, NIST and Cambridge University Press, 2010
• Deák: Random number generators and simulation, Akadémiai kiadó, 1990
• Fishman: Monte Carlo. Concepts, Algorithms, and Applications., Springer, 1996
• Backhaus, Erichson, Plinke, Weiber: Multivariate Analysemethoden, 7th ed., Springer, 1994
• Tan, Steinbach, Kumar: Introduction to Data Mining, Pearson Education Ltd., 2014

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 67

A	B	C	D	E	FX
16.42	19.4	23.88	17.91	19.4	2.99

Provides: doc. RNDr. Ivan Žežula, CSc., RNDr. Daniel Klein, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 139

A	B	C	D	E	FX
25.18	27.34	23.02	15.83	8.63	0.0

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS credits: 6

Recommended semester/trimester of the course: 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:

Notes:

Course assessment
Total number of assessed students: 701

A	B	C	D	E	FX
12.55	9.7	12.98	20.26	34.09	10.41

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS 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: Slovak	
Notes:	
Course assessment Total number of assessed students: 111	

abs	n
99.1	0.9

Provides: doc. RNDr. Roman Soták, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS 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: Slovak	
Notes:	
Course assessment Total number of assessed students: 107	

abs	n
99.07	0.93

Provides: prof. RNDr. Katarína Cechlárová, DrSc.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 46

A	B	C	D	E	FX
56.52	21.74	13.04	4.35	2.17	2.17

Provides:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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: 2 / 2 **Per study period:** 28 / 28
Course method: present

Number of ECTS 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

Notes:

Course assessment
Total number of assessed students: 52

A	B	C	D	E	FX
7.69	5.77	13.46	13.46	48.08	11.54

Provides: prof. RNDr. Jozef Doboš, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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. G. Owen, Game Theory, Academic Press (existuje ruský preklad).
3. A.R. Karlin, Y.Peres, Game theory alive, American Mathematical Society, 2017
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

Notes:

Course assessment
Total number of assessed students: 135

A	B	C	D	E	FX
17.78	24.44	20.74	20.74	15.56	0.74

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 07.04.2020
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

Course assessment
Total number of assessed students: 739

A	B	C	D	E	FX
60.89	13.8	12.58	8.66	3.38	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: 25.03.2020

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 12.02.2020

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 96

A	B	C	D	E	FX
40.63	17.71	17.71	11.46	8.33	4.17

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ POI/10	**Course name:** Insurance
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: 3	
Recommended semester/trimester of the course: 1., 3.	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes: To provide a grounding in commercial life, non-life and pension insurance. To apply the theoretical knowledge in practice.	
Brief outline of the course: Essential insurance terms and relations. The organization and structure of commercial insurance. Bases of life and non-life commercial insurance. The principles of selling and writting of insurance products. Forms and methods of reinsurance contracts. Economic factors of insurance company, analysis of costs. Solvency of insurance company and insurance reserve calculation. Methods of tariff determinations, forms of bonus and malus systems. Bases of continuous profit testing of the products, sources of profit. The bases of pension insurance. Characteristics of basic pension scheme. Pension insurance in Slovakia, description of particular pillars. Basic principles of health and sickness insurance in Slovakia.	
Recommended literature: 1. Chovan, P., Čejková, V.: Malá encyklopédia poistenia a poisťovníctva, Elita Bratislava, 1995 2. Chovan, P.: Základy poisťovníctva, SAP Bratislava, 1994 3. Komorník, J., Futej, D., Nováčková, D., Bahleda, M. : Základy poisťovníctva Európskej únie, Eurounion Bratislava 2001 4. Pidany, J., Kafková,E., Kyseľová, V.: Poisťovníctvo, Royal Unicorn Košice, 1999 5. Cipra T.: Pojistná matematika - teorie a praxe, Ekopress Praha, 1999 6. Cipra T.: Penzijní pojištění a jeho výpočetní aspekty, HZ Praha, 19967. Platná legislatíva pre komerčné a dôchodkové poistenie.	
Course language: Slovak	
Notes:	

Course assessment
Total number of assessed students: 49

A	B	C	D	E	FX
10.2	16.33	28.57	24.49	20.41	0.0

Provides: RNDr. Pavol Huraj

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 131

A	B	C	D	E	FX
22.9	22.14	22.9	16.79	11.45	3.82

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MSE/14	**Course name:** Mathematical methods in economics, finance and insurance
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS 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: The state examination is performed in a form of a debate with the emphasis on one topic of the following courses: ÚMV/MPA/19, ÚMV/NPR/19, ÚMV/APS/10, ÚMV/MMF/10 , ÚMV/ THR/10, ÚMV/MTE/10 . 1. Probability distributions of random vectors and their characteristics. 2. Types of convergence of random variables and limit theorems. 3. Markov chains and processes. 4. Modelling queueuing systems. 5. Measuring dependence of random variables and regression models. 6. Analysis of variance and covariance. 7. Time series analysis. 8. Portfolio theory, characteristics of portfolio and modelling financial markets. 9. Exchange economy with infinitely divisible goods, core and equilibrium. 10. Exchange economy with indivisible goods, algorithms. 11. Games of two players. 12. Cooperative games of n players.	
Recommended literature:	
Course language: Slovak	
Notes:	

Course assessment
Total number of assessed students: 21

A	B	C	D	E	FX
28.57	23.81	23.81	19.05	4.76	0.0

Provides:

Date of last modification: 07.04.2020

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MMF/10	**Course name:** Mathematical methods in finance

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 ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Written tests during the semester. Final evaluation is based on written tests and oral exam.

Learning outcomes:
To provide stochastic methods for investments, financial market analysis and financial forecasting.

Brief outline of the course:
Financial markets, institutions and instruments. Stochastic methods of valuation of financial products. Risk and return, analysis of portfolio of securities. Characteristics of portfolio, mean and variance, measures of dependencies. Admissible, efficient and optimal portfolio. Indiference curves, utility functions. Financial market models. Markowitz´s mean-variance model and its modifications, model of capital market line (CML). Sharpe´s model and its modifications. Capital assets pricing model (CAPM), security market line model (SML). Decomposition of total risk, market risk and specific risk. Diversification of portfolio. Measurement of performance. Investment and financial decisions. Financial derivatives, their classification and pricing. Financial time series and their decomposition. Analytical and adaptive methods of smoothing. Financial forecasting. Hypothesis of randomness.

Recommended literature:
1. Skřivánková V.-Skřivánek J.: Kvantitatívne metódy finančných operácií, IURA Edition, Bratislava, 2006.
2. Elliott R.J.-Kopp P.E.: Mathematics of Financial Markets, Springer, New York, 2005.
3. Janssen at al.: Mathematical Finance, ISTE / Wiley, 2009.
4. Ross S.M.: Mathematical Finance, Cambridge University Press, 2011.
5. Sharpe W.F.- Alexander G.J.: Investments, Prentice-Hall, New Jersey,1994.
6. Shreve S.E.: Stochastic Calculus for Finance, Springer, 2004.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 87

A	B	C	D	E	FX
11.49	22.99	17.24	32.18	16.09	0.0

Provides: Mgr. Katarína Lučivjanská, PhD.

Date of last modification: 22.09.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 35

A	B	C	D	E	FX
22.86	14.29	25.71	8.57	17.14	11.43

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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 Solár, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 07.03.2018

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 53

A	B	C	D	E	FX
18.87	20.75	9.43	18.87	18.87	13.21

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ TRZ/15	**Course name:** Risk 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: 3

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Based on written tests and oral exam.

Learning outcomes:
To give theoretical knowledge in stochastic modelling and managing of insurance risk process and the elements of ruin theory.

Brief outline of the course:
The conception of risk in insurance. Classification of risks. Individual and collective risk models. Probability distributions of individual claims. Distribution of the total number of claims and of the of aggregated claim size. Compound distributions, their characteristics and moment generating functions. Mixed distributions (Pólya, Waring, Delaporte) and their use. Distribution of extremal claims (Fréchet, Weibull, Gumbel, Pareto). The ruin problem. The risk process as special random process. Cramér- Lundberg model and its modification. Ruin probability approximations. Bayes ´s methods in risk theory and the princip of credibility. Risk management using reinsurance and bonus-malus systems.

Recommended literature:
1. Buhlmann H.: Mathematical Methods in Risk Theory, Springer, Berlin, 1996
2. Daykin at al.: Practical risk theory for actuarial. Chapman and Hall, 1994
3. Embrechts at l.: Modelling extremal events for insurance and finance. Springer, 1997
4. Horáková a kol.: Teória rizika v poistení. Wolters Kluwer, Bratislava, 2015
5. Mikosch T.: Non-Life Insurance Mathematics, Springer, Berlin, 2009.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 16

A	B	C	D	E	FX
12.5	25.0	25.0	18.75	12.5	6.25

Provides: doc. RNDr. Valéria Skřivánková, CSc.
Date of last modification: 21.02.2018
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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:
Course type: Practice
Recommended course-load (hours):
Per week: Per study period: 36s
Course method: present

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Conditions for course completion:
Attendance

Learning outcomes:
Learning outcomes:
Students will be provided an overview of possibilities how to spend leisure time in seaside conditions actively and their skills in work and communication with clients will be improved. Students will acquire practical experience in organising the cultural and art-oriented events, with the aim to improve the stay and to create positive experiences for visitors.

Brief outline of the course:
Brief outline of the course:
1. Basics of seaside aerobics
2. Morning exercises
3. Pilates and its application in seaside conditions
4. Exercises for the spine
5. Yoga basics
6. Sport as a part of leisure time
7. Application of projects of productive spending of leisure time for different age and social groups (children, young people, elderly)
8. Application of seaside cultural and art-oriented activities in leisure time

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 42

abs	n
11.9	88.1

Provides: Mgr. Alena Buková, PhD., Mgr. Agata Horbacz, PhD.
Date of last modification: 15.03.2019
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ OPS1/15	**Course name:** Security of computer networks

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 ECTS credits: 5

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:

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
35.29	17.65	11.76	17.65	11.76	5.88

Provides: doc. Ing. Štefánia Gallová, CSc., RNDr. Rastislav Krivoš-Belluš, PhD., doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ VKP/10	**Course name:** Selected topics in probability

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: II.

Prerequisities:

Conditions for course completion:
Written tests during the semester. Final evaluation isb ased on written tests and oral exam.

Learning outcomes:
Perspective of probability from the standpoint of measure theory. Understanding of most important results of probability theory.

Brief outline of the course:
• Probability and measure
o Set systems, random variables and measure
o Distribution functions and their properties
o Independence
o Radon-Nikodym derivative of measure
• Characteristics of random variables
o Moment characteristics
o Characteristic and genarating functions
o Quantile characteristics
o Conditional densities and conditional mean values
o Transformations of random variables, convolutions
• Important probability distributions
o Discrete distributions
o Absolute continuous distributions
• Convergence of sequences of random variables
o Types of convergence (a.s., Lp, P, D)
o Laws of large numbers
o Central limit theorems

Recommended literature:
• Loeve: Probability theory, Van Nostrand, 1960
• Rényi: Foundations of Probability, Holden-Day, 1970
• Athreya, Lahiri: Measure Theory and Probability Theory, Springer, 2006

Course language:

Slovak

Notes:

Course assessment
Total number of assessed students: 91

A	B	C	D	E	FX
14.29	13.19	15.38	14.29	32.97	9.89

Provides: doc. RNDr. Ivan Žežula, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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: **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: 2.	
Course level: II.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 126

abs	n	z
97.62	2.38	0.0

Provides: Mgr. Ondrej Kalina, PhD.
Date of last modification: 18.03.2019
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS credits: 2	
Recommended semester/trimester of the course: 1.	
Course level: I., I.II., II.	
Prerequisities:	
Conditions for course completion: Conditions for course completion: Min. 80% of active participation in classes.	
Learning outcomes: Learning outcomes: Increasing physical condition and performance within individual sports. Strengthening the relationship of students to the selected sports activity and its continual improvement.	
Brief outline of the course: Brief outline of the course: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, basketball, badminton, floorball, yoga, pilates, swimming, body-building, indoor football, self-defence and karate, table tennis, sports for unfit persons, streetball, tennis, and volleyball. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 12947

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.64	0.06	0.0	0.0	0.0	0.03	7.22	4.05

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

Date of last modification: 18.03.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS credits: 2	
Recommended semester/trimester of the course: 2.	
Course level: I., I.II., II.	
Prerequisities:	
Conditions for course completion: Conditions for course completion: Final assessment and active participation in classes - min. 75%.	
Learning outcomes: Learning outcomes: Increasing physical condition and performance within individual sports. Strengthening the relationship of students to the selected sports activity and its continual improvement.	
Brief outline of the course: Brief outline of the course: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, basketball, badminton, floorball, yoga, pilates, swimming, body-building, indoor football, self-defence and karate, table tennis, sports for unfit persons, streetball, tennis, and volleyball. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 11186

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.58	0.55	0.02	0.0	0.0	0.05	9.99	3.8

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

Date of last modification: 18.03.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

Course assessment
Total number of assessed students: 7741

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
90.03	0.04	0.01	0.0	0.0	0.03	4.04	5.85

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

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

Course assessment
Total number of assessed students: 5086

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.19	0.29	0.04	0.0	0.0	0.0	6.78	7.69

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

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ NPRa/10	**Course name:** Stochastic processes I

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 ECTS credits: 6

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

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

Learning outcomes:
Student should obtain the knowledge about modelling of stochastic processes and the ability to apply theoretical knowledge in practical problems solving.

Brief outline of the course:
Stochastic (random) processes, their distributions and characteristics. Trajectory of the process. Classification of processes -homogenous,ergodic and stacionary process. Markov chains with discrete time, classification of states of the process. Evaluation of transitions, optimal strategies, Howard´s algorithm. Markov chains with continuous time, intensity of transition. Kolmogorov´s differential equations, methods of solutions. Poisson process. Birth-and-death processes. General linear process. Applications to queuing theory. Kendall´s classification of queuing systems, opened and closed systems, systems with waiting. Applications to renewal theory and reliability. Markov chains in discrete renewal models. Renewal process with continuous time. Limit theorems of renewal theory.

Recommended literature:
1. Skřivánková V.: Náhodné procesy a ich aplikácie, UPJŠ, Košice, 2004 (in Slovak)
2. Beichelt F.: Applied Probability and Stochastic Processes, 2nd Ed., Chapman and Hall, 2016
3. Ross S. M.: Introduction to Probability Models, 10th ed., Academic Press, 2009
4. Janková, K. a kol. Markovove reťazce a ich aplikácie, epos, 2014 (in Slovak)
5. Prášková Z., Lachout P.: Základy náhodných procesu, MFF UK, Praha, 1998 (in Czech)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 84

A	B	C	D	E	FX
10.71	15.48	23.81	27.38	20.24	2.38

Provides: doc. RNDr. Valéria Skřivánková, CSc.

Date of last modification: 11.02.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ NPRb/10	**Course name:** Stochastic processes II

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 ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Test and individual project work.
Exam

Learning outcomes:
To obtain knowledge of the stationary stochastic processes analysis in time domain and spectral domain.
To study properties of random processes with discrete time (time series) and continuous time and their application in finance.

Brief outline of the course:
1. Stationary precess, linear process, causal and invertible process.
2. Time domain analysis (autocovariance and partial autocovariance function)
3. Frequency domain analysis (spectral density and distribution function, periodogram)
4. Prediction of time series
5. Random processes with continuous time (fundamental concepts)
6. Brownian motion, Itô's process, Itô's lemma and its application
7. The Black-Scholes formula

Recommended literature:
1. Brockwell P., Davis R.: Introduction to Time Series and Forecasting, 3rd ed., Springer, New York, 2016
2. Prášková Z.: Základy náhodných procesů II, Karolinum, Praha, 2004 (in Czech)
3. Tsay R.: Analysis of Financial Time Series, 3rd ed., Wiley Interscience, New Jersey, 2010
4. Shumway R., Stoffer D.: Time Series Analysis and Its Applications with R Examples, 4th ed., Springer, New York, 2017
5. Melicherčík I., Olšarová L., Úradníček V.: Kapitoly z finančnej matematiky, Epos, Bratislava, 2005 (in Slovak)
6. Oksendal B.K.: Stochastic Differential Equations, 6th ed., Springer, 2014

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 67

A	B	C	D	E	FX
28.36	29.85	14.93	13.43	11.94	1.49

Provides: RNDr. Martina Hančová, PhD.

Date of last modification: 11.02.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS credits: 3

Recommended semester/trimester of the course: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Due to Covid-19 adapted to carry out distance learning:
1. Preparation of own notes on the topics covered on the basis of provided study materials.
2. Seminar essay. Send the title of the selected topic to the lecturer no later than the end of the semester (May 15, 2020).
3. Oral exam within the curriculum of the course using electronic facilities (Skype/Hangouts)

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

Notes:

Course assessment
Total number of assessed students: 120

A	B	C	D	E	FX
31.67	30.0	14.17	13.33	10.83	0.0

Provides: doc. RNDr. Rudolf Gális, PhD.

Date of last modification: 28.03.2020
Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 94

A	B	C	D	E	FX
98.94	1.06	0.0	0.0	0.0	0.0

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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: **Course type:** Practice **Recommended course-load (hours):** **Per week: Per study period:** 36s **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion: Conditions for course completion: Attendance Final assessment: Raft control on the waterway (attended/not attended)	
Learning outcomes: Learning outcomes: Students have knowledge of rafts (canoe) and their control on waterway.	
Brief outline of the course: Brief outline of the course: 1. Assessment of difficulty of waterways 2. Safety rules for rafting 3. Setting up a crew 4. Practical skills training using an empty canoe 5. Canoe lifting and carrying 6. Putting the canoe in the water without a shore contact 7. Getting in the canoe 8. Exiting the canoe 9. Taking the canoe out of the water 10. Steering a) The pry stroke (on fast waterways) b) The draw stroke 11. Capsizing 12. Commands	
Recommended literature:	
Course language:	
Notes:	

Course assessment Total number of assessed students: 151	
abs	n
45.03	54.97
Provides: Mgr. Peter Bakalár, PhD.	
Date of last modification: 18.03.2019	
Approved: prof. RNDr. Katarína Cechlárová, DrSc.	

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: **Course type:** Practice **Recommended course-load (hours):** **Per week: Per study period:** 36s **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course:	
Course level: I., II.	
Prerequisities:	
Conditions for course completion: Conditions for course completion: Attendance Final assessment: continuous fulfilment of all tasks within the course	
Learning outcomes: Learning outcomes: Students will be familiarized with principles of safe stay and movement in extreme natural conditions as they will obtain theoretical knowledge and practical skills to solve the extraordinary and demanding situations connected with survival and minimization of damage to health. The course develops team work and students will learn how to manage and face the situations that require overcoming of obstacles.	
Brief outline of the course: Brief outline of the course: Lectures: 1. Principles of behaviour and safety for movement and stay in unknown mountains 2. Preparation and leadership of tour 3. Objective and subjective danger in mountains 4. Principles of hygiene and prevention of damage to health in extreme conditions Exercises: 1. Movement in terrain, orientation and navigation in terrain (compasses, GPS) 2. Preparation of improvised overnight stay 3. Water treatment and food preparation.	
Recommended literature:	
Course language:	
Notes:	

Course assessment Total number of assessed students: 392	
abs	n
44.39	55.61
Provides: Mgr. Marek Valanský, MUDr. Peter Dombrovský	
Date of last modification: 15.03.2019	
Approved: prof. RNDr. Katarína Cechlárová, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ DIS/10	**Course name:** Taxes and information systems

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 ECTS credits: 5

Recommended semester/trimester of the course: 4.

Course level: II.

Prerequisities:

Conditions for course completion:
Projects

Learning outcomes:
To obtain basic informations on Information system development. To learn tax system in Slovak Republic.

Brief outline of the course:
Information system, subsystem, information system development life cycle. Visual modeling, overview of modeling techniques. Structured methodologies. Algorithms in taxes.
The system of tax laws. Electronic Signature - mathematical foundations. Electronic Banking. Information technology in tax administration and banking.

Recommended literature:
Booch G., Jacobson I., Rumbaugh J.: The Unified Modeling Language user Guide, Addison-Wesley Pub. Co. 1998, ISBN 0-20157168-4

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 155

A	B	C	D	E	FX
54.19	17.42	15.48	7.74	5.16	0.0

Provides: doc. RNDr. Roman Soták, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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:

Notes:

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: 18.03.2019

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

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 ECTS 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

Notes:

Course assessment
Total number of assessed students: 50

A	B	C	D	E	FX
26.0	14.0	10.0	16.0	22.0	12.0

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Katarína Cechlárová, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ZKLS//13	**Course name:** Winter Ski Training Course
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 36 **Per study period:** 504 **Course method:** present	
Number of ECTS 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:	
Notes:	

Course assessment
Total number of assessed students: 97

abs	n
32.99	67.01

Provides: doc. PhDr. Ivan Šulc, CSc., Mgr. Marek Valanský
Date of last modification: 03.05.2015
Approved: prof. RNDr. Katarína Cechlárová, DrSc.