CONTENT

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/AOS1/15	**Course name:** Administration of OS

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., 3.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To be able to install Linux based system, divide disks, to know how to install, configure and manage several network deamons.

Brief outline of the course:
1. Introduction to network services
2. SSH
3. Routing and NAT
4. Introduction to Firewall
5. Advanced firewall settings
6. DHCP server
7. Web server (apache, php, mysql)
8. Monitoring Server (SNMP, MRTG)
9. Samba Server
10. Mail server (smtp, imap, postfix)
11. Proxy server
12. Windows server
13. Windows Server II.
14. Introduction to Virtualization (Hyper-V OpenVZ)

Recommended literature:
1. Linux Documentation Project, 4 updated edition. Brno: Computer Press (2008).
2. Stanek, W.: Windows Server 2012 Inside Out. Microsoft Press (2013)
3. Shah, S. Soyinka, W. Administration Linux. Grade (2007)
4. Nemeth, E., et al.: Linux. Brno: Computer Press (2008)

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 28

A	B	C	D	E	FX
57.14	21.43	14.29	0.0	7.14	0.0

Provides: RNDr. JUDr. Pavol Sokol, PhD., RNDr. Tomáš Bajtoš

Date of last modification: 10.02.2021

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ ADA/19	**Course name:** Applications of data 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: 5

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: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides: doc. Mgr. Michal Gallay, PhD., doc. Ing. Norbert Kopčo, PhD.

Date of last modification: 27.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ ATG/13	**Course name:** Applied graph 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 ECTS credits: 5

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

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

Learning outcomes:
To provide an overview of graph theory applications in computer science and other natural / social sciences.

Brief outline of the course:
The graph models of real-world problems. The elements of complex network analysis. Planarity testing, visualization and colouring algorithms and heuristics. Polynomial instances of NP-complete graph problems. Basics of probability method in graph theory.

Recommended literature:
U. Brandes, T. Erlebach: Network analysis. Methodological Foundations, Springer, 2005.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
11.76	41.18	17.65	11.76	17.65	0.0

Provides: prof. RNDr. Tomáš Madaras, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/APA1/15	**Course name:** Approximation algorithms

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: 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To learn basic conceptions of randomized algorithms and to classify the algorithms due to their error probability.

Brief outline of the course:
Basic notions of Probability Theory. Basic randomized computing models and its characterisations. Las Vegas algorithms. One sided error Monte Carlo algorithms. Two sided bounded error Monte Carlo algorithms. Two sided unbounded error Monte Carlo algorithms. Classes of randomized algorithms with polynomial time complexity and relationships between them. Optimisation problem, approximation algorithm, relative error, approximation ratio. Special optimisation problems and approximation solutions. Classification of optimisation problems based upon their approximations. FPTAS. PTAS. TSP problem and its relaxations. Unapproximability.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 158

A	B	C	D	E	FX
29.11	15.82	19.62	15.82	18.99	0.63

Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Ondrej Krídlo, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PSDU/16	**Course name:** Case studies in data mining

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: 4

Recommended semester/trimester of the course: 1.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Solution of practical problems in the data mining area. Orientation in basic terms of data mining. Knowledge of data mining methods.

Brief outline of the course:
Case study analysis using data mining methods in different application areas. Application of methods for automated analysis of large data volumes and extraction of knowledge from these data. Solving practical tasks using appropriate software tools. Testing Data Mining Algorithms.

Recommended literature:
[1] Zhao, Y., Cen, Y.: Data Mining Applications with R. Elsevier Inc. 2014.
[2] Han, J. and Kamber, M.: Data Mining Concepts and Techniques. 3rd Edition, Morgan Kaufmann, Burlington, 2011.
[3] Witten, I.E., Frank, E.: Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, 2005.

Course language:

Notes:

Course assessment
Total number of assessed students: 15

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

Provides: doc. RNDr. Csaba Török, CSc., RNDr. Juraj Šebej, PhD., RNDr. Erik Bruoth, PhD.

Date of last modification: 26.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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 ECTS 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:	
Notes:	

Course assessment
Total number of assessed students: 136

A	B	C	D	E	FX
25.0	35.29	13.97	12.5	6.62	6.62

Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Zuzana Bednárová, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ KMU1/15	**Course name:** Coding and multimedial data transition

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: 1.

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: 18

A	B	C	D	E	FX
33.33	5.56	22.22	22.22	16.67	0.0

Provides: doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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: 85

A	B	C	D	E	FX
38.82	27.06	21.18	8.24	3.53	1.18

Provides: doc. RNDr. Jaroslav Ivančo, CSc., RNDr. Mária Maceková, PhD.

Date of last modification: 13.02.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VKN/15	**Course name:** Computational and cognitive neuroscience
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: project, exam	
Learning outcomes: Advanced topics in study of the central nervous system and cognitive processes in human, with focus on computational concepts important in the study of cognitive and neural sciences. Prerequisite: Intro to Neurosicence	
Brief outline of the course: Selected topics in cognitive science (following up on Intro to Neuroscience). Overview of the methods of theoretical study in cognitive and neural science, including connectionistic, statistical and system-theory principles in modeling of cognitive processes and neural circuits. Selected models of the human visual and auditory systems, learning, thinking, attention, development and plasticity.	
Recommended literature: HERTZ, J., KROGH, A. and PALMER R. G.: Introduction to the theory of neural computation. Addison-Wesley 1991 KANDEL, E. R., SCHWARTZ, J. H. and JESSELL, T.M.: Principles of Neural Science. McGraw-Hill, 2000 DAYAN, P. and ABBOTT, L. F.: Theoretical Neuroscience – Computa-tional and Mathematical Modeling of Neural Systems. MIT Press, 2001	
Course language: Slovak or English	
Notes: Content prerequisites: basics of neurobiology, cognitive psychology, linear algebra and differential equations, programing, or instructor's consent	

Course assessment
Total number of assessed students: 8

A	B	C	D	E	FX
50.0	12.5	25.0	12.5	0.0	0.0

Provides: doc. Ing. Norbert Kopčo, PhD.

Date of last modification: 10.02.2021

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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 ECTS credits: 4

Recommended semester/trimester of the course: 1.

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:
1. J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2007.
2. M. Sipser: Introduction to the Theory of Computation, Thomson, 2nd edition, 2006.
3. L.A.Hemaspaandra, M.Ogihara: Complexity theory companion, EATCS series, texts in computer science, Springer-Verlag, 2002.
4. S. Arora, B. Barak: Computational Complexity: A Modern Approach, Cambridge Univ. Pess, 2009. 5. G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.
6. D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994.
7. 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:
Slovak or english

Notes:
Content prerequisities:
Basic notions from the theory of automata and formal languages.

Basic skills in programming and design of algorithms (in any programming language).
Basics knowledge in mathematical logic, set theory, and graph theory.

Course assessment
Total number of assessed students: 334

A	B	C	D	E	FX
57.78	15.57	11.68	7.19	7.49	0.3

Provides: prof. RNDr. Viliam Geffert, DrSc.

Date of last modification: 22.02.2021

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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: 47

A	B	C	D	E	FX
17.02	21.28	25.53	8.51	23.4	4.26

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

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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.

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: 75

A	B	C	D	E	FX
22.67	26.67	22.67	16.0	12.0	0.0

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ SDM/19	**Course name:** Data Management Seminar 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: 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: 0	
abs	n
0.0	0.0
Provides: RNDr. Martina Hančová, PhD.	
Date of last modification:	
Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SDMb/19	**Course name:** Data Management Seminar 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: 3.

Course level: II.

Prerequisities:

Conditions for course completion:
Active presentation of own and already known and published results related to diploma thesis in the middle and end of semester.

Learning outcomes:
To become familiar with selected current knowledge from the area of data analysis, machine learning and artificial intelligence. Developing skills such as understanding and interpreting scientific text.

Brief outline of the course:
The seminar is aimed to individual and group work with students whose diploma thesis are related to various aspects of data management.

Recommended literature:
1. Ian Goodfellow and Yoshua Bengio and Aaron Courville, Deep Learning, (November 18, 2016) [available online https://www.deeplearningbook.org]
2. Current articles from scientific journals, contributions at the scientific and professional conferences related to the topic of diploma thesis.

Course language:
English

Notes:

Course assessment
Total number of assessed students: 0

abs	n
0.0	0.0

Provides: prof. RNDr. Gabriel Semanišin, PhD., Mgr. Alexander Szabari, PhD.

Date of last modification: 21.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ DPO/15	**Course name:** Doctoral 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:

Notes:

Course assessment
Total number of assessed students: 42

A	B	C	D	E	FX
54.76	16.67	21.43	7.14	0.0	0.0

Provides:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ ZNA1/15	**Course name:** Foundations of knowledge systems

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: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
The goal is to teach students some advanced applications of logic into computer science, especially in database and knowledge systems.

Brief outline of the course:
Logic formulas, semantic, models and logical inference. Herbrand model, construction and usability. SLD-resolution and query, SLD trees. Logic and databases, relational databases, deductive databases. Logic and expert systems. Basic notions of Lattice Theory and Formal Concept Analysis (FCA). Basic notions of Fuzzy logic and Fuzzy extension of FCA. Optimal table decomposition, factorisation. Intercontextual structures, bonds.

Recommended literature:
Shawn Hedman. A first course in logic: An introduction to model theory, proof theory, computability and complexity. Oxford university press, ISBN 0–19–852980–5, 2006.
Shan-Hwei Nienhuys-Cheng, Ronald de Wolf. Foundations of Inductive Logic Programming. Springer-Verlag, ISBN 3-540-62927-0, 1997.
Kristian Kersting. An Inductive Logic Programming Approach to Statistical Relational Learning, IOS Press, ISBN 1-58603-674-2, 2006.
Nilsson U., Maluszynski J.: Logic, Programming and Prolog, John Wiley & Sons Ltd. 1995.
Bělohlávek R.: Fuzzy Relational Systems: Foundations and Principles. Kluwer, Academic/ Plenum Publishers, New York, 2002.
Ganter B., Wille R.: Formal Concept Analysis: Mathematical Foundations, Springer Berlin, 1999.

Course language:

Notes:

Course assessment
Total number of assessed students: 65

A	B	C	D	E	FX
49.23	4.62	21.54	9.23	9.23	6.15

Provides: prof. RNDr. Stanislav Krajči, PhD., RNDr. Ondrej Krídlo, PhD.
Date of last modification: 03.05.2015
Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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.

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: 76

A	B	C	D	E	FX
15.79	22.37	23.68	19.74	17.11	1.32

Provides: prof. RNDr. Katarína Cechlárová, DrSc.

Date of last modification: 07.04.2020
Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/IMUI/19	**Course name:** Information management and artificial intelligence methods
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: (ÚINF/ZNA1/15 and leboÚINF/ZNA1/21),ÚINF/NEU1/15,ÚINF/STU1/16,ÚMV/VSM/10,ÚMV/NPR/19	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment

Total number of assessed students: 0

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Provides:
Date of last modification: 29.03.2019
Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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: 41

A	B	C	D	E	FX
58.54	4.88	12.2	4.88	19.51	0.0

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ LTM/10	**Course name:** Logic and set theory

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: I., II.

Prerequisities: ÚMV/MANb/19 and leboÚMV/FRPb/19

Conditions for course completion:
Exam

Learning outcomes:
To obtain a basic knowledge on the mathematical notion of an infinity. Analysis of the notion of a proof.

Brief outline of the course:
Set as a mathematical formularization of an infinity. Properties of the set of reals. Mathematical induction. Relations and mappings.
Finite and countable sets. Cardinality of continuum. Elementary cardinal arithmetics.
Sentential calculus, an axiomatization. Completness Theorem. Methods of proofs. Language of predicate calculus, examples. Axiomatizations of predicate calculus and the notion of a proof. Methods of proofs in predicate calculus.

Recommended literature:
E. Mendelson, Introduction to Mathematical Logic, van Nostrand 1964.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 226

A	B	C	D	E	FX
10.62	18.14	20.35	15.93	32.74	2.21

Provides: doc. RNDr. Jaroslav Ivančo, CSc., RNDr. Jaroslav Šupina, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ STU1/16	**Course name:** Machine learning

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: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:
If necessary, teaching, mid-term and final evaluation will be by distance form (skype).

Course assessment
Total number of assessed students: 35

A	B	C	D	E	FX
28.57	14.29	31.43	14.29	11.43	0.0

Provides: RNDr. Ľubomír Antoni, PhD., doc. RNDr. Gabriela Andrejková, CSc.

Date of last modification: 30.03.2020

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ MPA/19	**Course name:** Markov's processes and their applications

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 in queuing theory. Kendall´s classification of queuing systems, opened and closed systems, systems with waiting. Applications in 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: 59

A	B	C	D	E	FX
18.64	13.56	20.34	25.42	18.64	3.39

Provides: RNDr. Martina Hančová, PhD., RNDr. Andrej Gajdoš, PhD.

Date of last modification: 18.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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: 21

A	B	C	D	E	FX
19.05	14.29	28.57	14.29	9.52	14.29

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ MPJ1/15	**Course name:** Modern programming languages

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: 2., 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Mastering the basics of standard and experimental programming models and techniques.

Brief outline of the course:
Object oriented programming, Generic programming – parametric polymorphism. Vector programming – operator overloading, indexer. Event programming (event handling) – delegates. Attribute programming. Parallel and multithread programming – processes, threadpool. Functional and declarative programming – lambda expressions, LINQ. Graphics primitives.

Recommended literature:
1. Andrew Troelsen, Pro C# 5.0 and the .NET 4.5 Platform, 2012, APRESS
2. Joseph Albahari, Ben Albahari, C# 5.0 in a Nutshell: The Definitive Reference, 2012, O'REILLY
3. Daniel Solis, Illustrated C# 2012, 2012, APRESS

Course language:

Notes:
If necessary, teaching, mid-term and final evaluation will be by distance form.

Course assessment
Total number of assessed students: 142

A	B	C	D	E	FX
16.2	19.01	24.65	21.13	17.61	1.41

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 30.03.2020

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ MWT1/19	**Course name:** Modern web technologies

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: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Active attendance at seminars, defense of final group project.
The final project is partially created on seminars.

Learning outcomes:
Ability to design and create dynamic scalable SPA - SIngle Page Application using Angular and Spring Boot.

Brief outline of the course:
- Selected part of Javascript and Typescript, High order functions, composition of pure functions, Angular - components, services, Observable, router, localStorage, form validation, comunication in component hierarchy, modules, hierarchical routing, routing guards, RXJS, material components library, NGXS storage and its extensions, reactive forms, custom validators, asynchronous validators, pagination, filtering and sorting of local and remote data in tables, Websockets.

Recommended literature:
1. web page of framework Angular: https://angular.io/
2. web page of Angular Material: https://material.angular.io/
3. web page of storage NGXS: https://www.ngxs.io/
4. web page of library RXJS: https://rxjs-dev.firebaseapp.com/guide/overview
5: Craig Walls: Spring in action. Fifth edition. ISBN: 978-1-61729-494-5. Hanning 2019

Course language:
slovak or english

Notes:

Course assessment
Total number of assessed students: 12

A	B	C	D	E	FX
75.0	0.0	8.33	8.33	8.33	0.0

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 16.01.2020

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/VRS/14	**Course name:** Multidimensional statistical methods

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:
Given at the basis of partial examination and working out an individual project.

Learning outcomes:
To learn to use the most widely used multivariate methods of data processing practically.

Brief outline of the course:
Multivariate data, multivariate normal distribution. Different dependence measures. Contingency tables, odds and risk ratios. Logistic regression. Classification trees, cluster analysis, principal component analysis, multidimensional scaling, factor analysis, linear discriminant analysis.

Recommended literature:
1. Wolfgang Karl Härdle, Léopold Simar. Heidelberg: Applied multivariate statistical analysis, Springer, 2012
2. Wolfgang Härdle, Zdeněk Hlávka: Multivariate statistics: Exercises and solutions. New York: Springer, 2007
3. Ho, R.: Handbook of univariate and multivariate data analysis and interpretation in SPSS, Chapman & Hall/CRC, 2006
4. Garson, D.: PA 765 Statnotes: An Online Textbook (elektronická učebnica, http://www2.chass.ncsu.edu/garson/pa765/statnote.htm), North Carolina State University, 1998

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 14

abs	n
92.86	7.14

Provides: RNDr. Daniel Klein, PhD.

Date of last modification: 26.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ NEU1/15	**Course name:** Neural networks

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: 3.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To understand and to know using basic paradigms of neural networks.

Brief outline of the course:
Feed-forward and recurrent neural networks, back propagation algorithm to adaptation of neural networks, a capability of neural networks to be an universal approximator. Hopfield neural networks and solving optimization problems. Kohonen neural networks. Neural networks in connections to computational models. Theoretical problems of neural networks.

Recommended literature:
J. Hertz, A.Krogh, R.G. Palmer: Introduction to the theory of neural computation, Addison Wesley, 1991.
V. Kvasnička a kol.: Úvod do teórie neurónových sietí, IRIS, Bratislava, 1997.
J. Šíma, R. Neruda: Teoretické otázky neurónových sítí. Matfyzpress,MFF UK, Praha, 1996.

Course language:

Notes:
For ERASMUS students:
It is necessary to know a model of artificial neurons, its computation and its setting, layered neural networks and backpropagation training algorithm.

Course assessment
Total number of assessed students: 228

A	B	C	D	E	FX
19.3	14.04	23.68	20.18	17.98	4.82

Provides: RNDr. Ľubomír Antoni, PhD., doc. RNDr. Gabriela Andrejková, CSc.

Date of last modification: 17.12.2020

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PDB1/15	**Course name:** Organization and data processing

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: 1.

Course level: II.

Prerequisities:

Conditions for course completion:
final test

Learning outcomes:
To understand the principles of database management systems. To be able to use the knowledge when solving optimization problems over big data and managing parallel and distributed databases.

Brief outline of the course:
Data representation, disk and file organization, tree-based indexing methods B+tree, R-tree, Hash-based indexing methods, external sorting, enumeration of relational operators, query optimization, transaction management, parallel and distributed databases, parallel and distributed relational operations, database security and data consistency, recovery management, profiling, data reduction

Recommended literature:
1. R. RAMAKRISHNAN, J. GEHRKE: Database Management Systems, McGraw Hill Higher Education, 2003
2. A. SILBERSCHATZ, H. F. KORTH, S. SUDARSHAN: Database system concepts, McGraw Hill Higher Education, 2006

Course language:

Notes:

Course assessment
Total number of assessed students: 111

A	B	C	D	E	FX
28.83	21.62	15.32	11.71	21.62	0.9

Provides: doc. RNDr. Csaba Török, CSc., RNDr. Peter Gurský, PhD.

Date of last modification: 05.02.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PDS1/18	**Course name:** Parallel and distributed systems

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: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
to introduce the fundamentals of parallel and distributed programming

Brief outline of the course:
current parallel and distributed architectures, basic issues in parallel and distributed applications development, data structures and programming methodologies

Recommended literature:
1. Kenneth A. Berman and Jerome L. Paul: Algorithms: Sequential, Parallel, and Distributed, Thomson, 2005, ISBN 0-534-42057-5
2. Gregory R. Andrews: Foundations of Multithreaded, Parallel, and Distributed Programming, Addison-Wesley, 2000, ISBN 0-201-35752-6
3. Joseph JáJá: An Introduction to Parallel Algorithms, Addison-Wesley, 1992, ISBN 0-201-54856-9
4. Gerard Tel: Introduction to Distributed Algorithms, Cambridge University Press, 1994, ISBN 0-521-47069-2

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 64

A	B	C	D	E	FX
23.44	7.81	17.19	14.06	23.44	14.06

Provides: doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 10.02.2021

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PDSI1/15	**Course name:** Pro-seminar to diploma thesis in informatics

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: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To inform students about areas of informatics they are suitable to work in diploma theses. In the end of semester students have to prepared themes of diploma theses, goals and recommended study literature.

Brief outline of the course:
The seminar is oriented to problems prospective to preparations of Diploma theses.

Recommended literature:
MEŠKO, D., KATUŠČÁK, D. Akademická príručka. 1. vyd. Vydavateľstvo Osveta : Martin, 2004. 316 s. ISBN 80-8063-150-6
ISO 690: 1987 Documentation - Bibliographic references. Content, form and structure.
ISO 2145: 1978 Documentation - Numbering of divisions and subdivisions in written documents.
Eco, U.: Jak napsat diplomovou práci, z taliančiny Come si fa una tesi di laures, Milano, 1977, Olomouc, Votobiax.
Odborná a vedecká literatúra týkajúca sa diplomovej práce podľa odporúčania vedúceho diplomovej práce.

Course language:

Notes:

Course assessment
Total number of assessed students: 72

abs	n
97.22	2.78

Provides: doc. RNDr. Ľubomír Šnajder, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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: 27

A	B	C	D	E	FX
22.22	25.93	11.11	14.81	18.52	7.41

Provides: prof. RNDr. Mirko Horňák, CSc.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ BPD1/15	**Course name:** Security of computer systems and data

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: 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: 36

A	B	C	D	E	FX
22.22	22.22	16.67	16.67	22.22	0.0

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Rastislav Krivoš-Belluš, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SGV1/16	**Course name:** Seminar on computer graphics and vision

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: 3

Recommended semester/trimester of the course: 2.

Course level: II.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:
Seminar is connecte to the lecture UGR Introduction to computer graphics. In seminar form students presents actual theoretical and implementation problems. Main goal in interest is oriented to quick algorithms of computer graphics, geometric modelling and realistic drawing of scenes.
Knowledge from the lecture UGR and good programmers experience are supposed.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 45

A	B	C	D	E	FX
68.89	17.78	11.11	2.22	0.0	0.0

Provides: RNDr. Rastislav Krivoš-Belluš, PhD., doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 02.03.2016

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SDI1a/15	**Course name:** Seminar to diploma theses in informatics

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: ÚINF/PDSI1/15

Conditions for course completion:

Learning outcomes:
Monitoring and public presentation of work done so fare on thesis preparation

Brief outline of the course:
Every thesis has a compulsory theoretical part and may also contain a software part. To gain recognition, the following is necessary: a detailed compilation of studied literature (a minimum of thirty pages) and at least twenty pages of text containing the candidate's own views of the problem area, possible research goals, own results are welcome (if the thesis is purely theoretical, this will be judged more strictly). For the SW part: a tested implementation (must conform to user requirements, help and user friendly user interface not necessary at this stage) and access to source texts.
For both parts there will be an oral presentation and discussion.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 169

abs	n
94.67	5.33

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Ondrej Krídlo, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SDI1b/15	**Course name:** Seminar to diploma theses in informatics

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: ÚINF/SDI1a/15

Conditions for course completion:

Learning outcomes:
Monitoring and public presentation of work done so fare on thesis preparation

Brief outline of the course:
Every thesis has a compulsory theoretical part and may also contain a software part. To gain recognition, the following is necessary: a detailed compilation of studied literature (a minimum of thirty pages) and at least twenty pages of text containing the candidate's own views of the problem area, possible research goals, own results are welcome (if the thesis is purely theoretical, this will be judged more strictly). For the SW part: a tested implementation (must conform to user requirements, help and user friendly user interface not necessary at this stage) and access to source texts.
For both parts there will be an oral presentation and discussion.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 160

abs	n
99.38	0.63

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Ondrej Krídlo, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SDI1c/15	**Course name:** Seminar to diploma theses in informatics

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: ÚINF/SDI1b/15

Conditions for course completion:

Learning outcomes:
Monitoring and public presentation of work done so fare on thesis preparation

Brief outline of the course:
Every thesis has a compulsory theoretical part and may also contain a software part. To gain recognition, the following is necessary: a detailed compilation of studied literature (a minimum of thirty pages) and at least twenty pages of text containing the candidate's own views of the problem area, possible research goals, own results are welcome (if the thesis is purely theoretical, this will be judged more strictly). For the SW part: a tested implementation (must conform to user requirements, help and user friendly user interface not necessary at this stage) and access to source texts.
For both parts there will be an oral presentation and discussion.

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 135

abs	n
100.0	0.0

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Ondrej Krídlo, PhD.

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚMV/ NPR/19	**Course name:** Stochastic processes

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: 55

A	B	C	D	E	FX
32.73	29.09	16.36	12.73	7.27	1.82

Provides: prof. RNDr. Ivan Žežula, CSc., RNDr. Martina Hančová, PhD.

Date of last modification: 11.03.2019

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SVK1/15	**Course name:** Student 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:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 171

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

Provides:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.

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:

Date of last modification: 03.05.2015

Approved: prof. RNDr. Tomáš Madaras, PhD., prof. RNDr. Gabriel Semanišin, PhD.