COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ AFJD/15	**Course name:** Formal languages and finite-state automata

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

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

Learning outcomes:
To obtain an overview in the efficient representation of regular languages and finite state automata, as well as about connection between automata and complexity theory.

Brief outline of the course:
Chomsky hierachy of languages and grammars. Finite state automata and its variants: deterministic, nondeterministic, alternating, probabilistic, quantum ... one-way, two-way, reversal bounded. Regular expressions and grammars. Unary regular languages and their properties. Connection between finite state automata and complexity theory. Pushdown automata, time and space complexity for recognition of context-free languages. Closure properties of contex-free, context-sensitive, and recursively enumerable languages.

Recommended literature:
Current journal publications on the topic, especially those related to the descriptional complexity of automata.
J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2001.
J. Shallit: A second course in formal languages and automata theory, Cambridge University press, 2009.
M. Sipser: Introduction to the theory of computation, Thomson Course Technology, 2006.
D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994.
J.van Leeuwen (ed.): Handbook of theoretical science, North-Holland, 1990.
G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.

Course language:

Course assessment
Total number of assessed students: 12

N	P
0.0	100.0

Provides: prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

Number of credits: 2

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 558

N	Ne	P	Pr	abs	neabs
0.0	0.0	56.99	0.0	43.01	0.0

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

Date of last modification: 06.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ AJD2/07	**Course name:** English Language for PhD Students 2

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

Number of credits: 3

Recommended semester/trimester of the course: 2.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 558

N	Ne	P	Pr	abs	neabs
0.0	0.0	92.29	1.43	6.27	0.0

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

Date of last modification: 06.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ CDC/15	**Course name:** Citation in local scientific journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 0	

abs	n
0.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ CM/15	**Course name:** Citation in monograph
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 0	
abs	n
0.0	0.0
Provides:	
Date of last modification: 20.02.2018	
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ CZC/15	**Course name:** Citation in international scientific journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	

Course assessment
Total number of assessed students: 6

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/DK/15	**Course name:** Local conference

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

Number of credits: 2

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 26

abs	n
100.0	0.0

Provides:

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ DKC/15	**Course name:** Local currented journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 1	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ DKZU/15	**Course name:** Local conference with international participation
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 4	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	

Course assessment

Total number of assessed students: 41

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ DNC/15	**Course name:** Local non-currented journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 4	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ DZS/15	**Course name:** Summary exam to dissertation thesis
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 27	

N	P
0.0	100.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

<table>
<tr><td colspan="2">University: P. J. Šafárik University in Košice</td></tr>
<tr><td colspan="2">Faculty: Faculty of Science</td></tr>
<tr><td>Course ID: ÚINF/ FKAD/15</td><td>Course name: Formal concept analysis</td></tr>
<tr><td colspan="2">Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 0 Per study period: 28 / 0
Course method: present</td></tr>
<tr><td colspan="2">Number of credits: 8</td></tr>
<tr><td colspan="2">Recommended semester/trimester of the course:</td></tr>
<tr><td colspan="2">Course level: III.</td></tr>
<tr><td colspan="2">Prerequisities:</td></tr>
<tr><td colspan="2">Conditions for course completion:</td></tr>
<tr><td colspan="2">Learning outcomes:</td></tr>
<tr><td colspan="2">Brief outline of the course:</td></tr>
<tr><td colspan="2">Recommended literature:</td></tr>
<tr><td colspan="2">Course language:</td></tr>
<tr><td colspan="2">Course assessment
Total number of assessed students: 0</td></tr>
<tr><td colspan="2"><table>
<tr><td>N</td><td>P</td></tr>
<tr><td>0.0</td><td>0.0</td></tr>
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<tr><td colspan="2">Provides: doc. RNDr. Stanislav Krajči, PhD.</td></tr>
<tr><td colspan="2">Date of last modification: 20.02.2018</td></tr>
<tr><td colspan="2">Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.</td></tr>
</table>

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ IG/15	**Course name:** Obtaining of internal grant
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	

Course assessment
Total number of assessed students: 26

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

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

Course assessment
Total number of assessed students: 121

abs	n
100.0	0.0

Provides: prof. RNDr. Katarína Cechlárová, DrSc.
Date of last modification: 19.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ KRYD/15	**Course name:** Cryptology

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:
Witten and oral exam.

Learning outcomes:
To learn theoretical background and standard methods of computer algebra and know how they can be used in cryptographic systems and cryptoanalytic methods. To know current trends of research in this area of computer science.

Brief outline of the course:
Special parts of computational algebra - rings of polynoms, cyclic groups, factorization of big numbers, arithmetic of eliptic curves. Actual problems of symmetric and nonsymmetric cryptography and cryptoanalysis.

Recommended literature:
1. ROSEN, K. H.: Elementary Number Theory and Its Applications, Addison Wesley, 2000
2. STINSON, D. R. : Cryptography. Theory and Practie, CRC Press, 2002
3. MEZENES, A.,. van Oorschot, P., Vanstone, S.: Handbook of Applied Cryptography, CRC Press, 1996
4. BLAKE, I. F., Seroussi, G., Smart, N.P.: Elliptic Curves in Cryptography, CUP 1999

Course language:

Course assessment
Total number of assessed students: 6

N	P
0.0	100.0

Provides: prof. RNDr. Gabriel Semanišin, PhD., doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ KVAD/15	**Course name:** Quantum algorithms

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 0 **Per study period:** 28 / 0
Course method: present

Number of credits: 8

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:
oral exam

Learning outcomes:
To learn how quantum algorithms can be used for solving hard problems, in coding theory and in cryptology.

Brief outline of the course:
Quantum information. Principles and power of quantum computing. Fast factorisation. Qunatum search algorithm anf ther application for NP-hard problems. The class BQNP - an analogy of the class NP. Quantum coding. Quantum kryptography.

Recommended literature:
1. GRUSKA, J. Quantum Computing. McGraw-Hill, 1999.
2. HIRVENSALO, M. Quantum Computing, Springer, 2004.
3. KITAEV, A.Y., SHEN, A.H., VYVALYI, M.N. Classical and Quantum Computation. American Mathematical Society, 2002.
4. NIELSEN, M.A., CHUANG, I.L. Quantum Computation and Quantum Information. Cambridge University Press, 2000.
5. STEEB, W. H., HARDY, Y. Problems And Solutions in Quantum Computing And Quantum Information. World Scientific Publishing Company, 2006.

Course language:

Course assessment
Total number of assessed students: 0

N	P
0.0	0.0

Provides: prof. RNDr. Gabriel Semanišin, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ LOGD/15	**Course name:** Logic

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To understand basic notions of predicate logic (logic language, term, formula, axioms, proof, provability, truth, model, syntax and semantics, soundness, completeness) and to check student's ability to formalize concisely.

Brief outline of the course:
Predicate logic – logic language, syntax and semantics, term, formula.
Axioms, proof, provability.
Interpretation, truth, model.
Correctness of the predicate logic.
Boolean algebras.
Syntactic model, completeness of predicate logic.
Inductive structures in general.
Aplications of logic in database systems.

Recommended literature:
1. GOLDSTERN, M., JUDAH H.: The Incompleteness Phenomenon, A New Course in Mathematical Logic, A K Peters, Wellesley, Massachusetts, 1995
2. ABITEBOUL, S. HULL, R., VIANU, V.: Foundations of databases, Addison-Wesley Publishing Co, 1995

Course language:

Course assessment
Total number of assessed students: 7

N	P
0.0	100.0

Provides: doc. RNDr. Stanislav Krajči, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ MBPD/15	**Course name:** Modelling and analysis of security protocols

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:
Written and oral exam.

Learning outcomes:
To learn essential properties of the used cryptographic authentication and certification schemes and standard methods of attacks to them. To understand the theoretical background of a design of formal models and know how it is possible to utilise them in practise. To know the actual problems concerning the analysis of the security of cryptographic protocols.

Brief outline of the course:
Authentication and certification schemes, key distribution and maintenance. Formal description of cryptographic protocols and methods for their analysis. Algebraic and logic methods for attack modelling, utilisation of dynamic logical systems. Datalog for automatic security verification.

Recommended literature:
1. RYAN, P. Y. A., SCHNEIDER, S.A.: Modelling and Analysis of Security Protocols, Addison Wesley, 2001
2. HUTH, M., RYAN, M.: Logic in Computer Science - Modelling and Reasoning about Systems, CUP, 1999
3. MENEZES, A., van OORSCHOT, P., VANSTONE, S.: Handbook of Applied Cryptography, CRC Press, 1996

Course language:

Course assessment
Total number of assessed students: 4

N	P
0.0	100.0

Provides: prof. RNDr. Gabriel Semanišin, PhD., doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ MK/15	**Course name:** International conference
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 66	

abs	n
96.97	3.03

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ MNID/15	**Course name:** Models of imperfect information

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To give the students basic techniques in systems processing imperfect information to be able read and write scientific papers in the area.

Brief outline of the course:
Belief and probability, Dempster-Shaferova belief. Necessity and possibility. Uncertainty in artificial intelligence.
Fuzzy sets, constructions of fuzzy sets from statistic data.
Uncertainty in artificial intelligence, Markov and Bayesian networks, belief updating, belief revision.

Recommended literature:
1. PEARL J.: Probabilistic Reasoning in Intelligent Systems: Networks of Plausible Inference, Morgan – Kaufmann, San Francisco, CA, 1988
2. JENSEN, F. V.: An Introduction to Bayesian networks, UCL Press, 1996
3. DUBOIS, D., Prade, H.: Possibility Theory. Plenum Press, N.York, 1988
4. PARIS, J. B.: The uncertain Reasoners Companion. Cambridge University Press, 1994

Course language:

Course assessment
Total number of assessed students: 2

N	P
0.0	100.0

Provides: doc. RNDr. Stanislav Krajči, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/MUID/15	**Course name:** Methods of computational learning and artificial intelligence

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To learn a design of algorithmic models to solve increasingly complex problems.
To understand methods used to solve problems in the following two areas:
1. Learning from experimental data - examples, samples, measurements, records, and observations.
2. Expert systems - types, analysis, construction.

Brief outline of the course:
To construct the adaptive mechanisms to be enable or facilitate intelligent behaviour in complex and changing environments.
Learning and soft computing - real using, motivation, basic knowledge. Mathematical methods for soft computing. Vector machines, neural networks, fuzzy logic systems.

Recommended literature:
1. KECMAN, V.: Learning and Soft Computing, MIT Press, 2001
2. BALDI, P., BRUNAK, S.: Bioinformatics, MIT Press, 2001
3. ENGELBRECHT, A. P. Computational Intelligence. John Willey & Sons, Ltd, 2005
4. de CASTRO, L. N.: Fundamentals of natural computing. Chapman & Hall/CRC, 2006
5. SMOLENSKY, P., LEGENDRE, G.: The harmonic mind. Vol. 1: Cognitive architectures. MIT Press, 2006

Course language:

Course assessment
Total number of assessed students: 10

N	P
0.0	100.0

Provides: doc. RNDr. Gabriela Andrejková, CSc.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ NEK1/15	**Course name:** Neurocognition

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:
project, exam

Learning outcomes:
Skills in quantitative analysis and modeling of neural data.

Brief outline of the course:

Recommended literature:
Gazzaniga M. (ed.): The New Cognitive Neurosciences. 2nd ed. MIT Press. 1999
Dayan P and LF Abbott: Theoretical Neuroscience - Computational and Mathematical Modeling of Neural Systems. MIT Press, 2001
Stillings et al.: Cognitive Science: An Introduction, 2nd ed., MIT Press, 1995
Hertz J, Krogh A and Palmer RG: Introduction to the theory of neural computation. Addison-Wesley 1991
Duda, Hart, and Stork (2001). Pattern Classification, 2nd Edition, New York: Wiley Interscience.

Course language:
English

Course assessment
Total number of assessed students: 3

N	P
0.0	100.0

Provides: doc. Ing. Norbert Kopčo, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ NEM/15	**Course name:** Installing of new experimental methods
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 1	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ NZ/15	**Course name:** International or local not-reviewed proceedings
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 4	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 20	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ODZP/15	**Course name:** Defence of diploma thesis
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 30	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 11	

N	P
9.09	90.91

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PAHD/15	**Course name:** Probabilistic and approximate 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 credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

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

Learning outcomes:
Providing en extended backgroung in the area of probabilistic and approximation algorithms, with respect to their classification, efficiency, and probability of error.

Brief outline of the course:
Basic probabilistic computational models, Las Vegas algorithms, Monte Carlo algorithms. Probabilistic classes with polynomial time. Foiling the adversary, Hashing, Fingerprinting.

Recommended literature:
1. HROMKOVIČ, J.: Design and analysis of ranodmized algorithms. Springer-Verlag, 2005. ISBN 3-540-23949-9.
2. MOTWANI, R. and RAGHAVAN, P.: Randomized Algorithms. Cambridge University Press 1995. ISBN 0-521-47465-5
3. MITZEMANCHER, M. and UPFAL, E.: Probability and Computing: Randomized Algorithms and Probabilistic Analysis. Cambridge University Press 2005. ISBN 0-521-83540 2
4. HROMKOVIČ, J.: Communication Protocols - An Exemplary Study of the Power of Randomness. In: Handbook on Randomized Computing, P.Pardalos, S.Rajasekaran, J.Reif, J.Rolim, Eds., Kluwer Publ., 2001.

Course language:

Course assessment
Total number of assessed students: 5

N	P
0.0	100.0

Provides: prof. RNDr. Viliam Geffert, DrSc., prof. RNDr. Gabriel Semanišin, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PDS/18	**Course name:** Writing Dissertation Work
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 0	

N	P
0.0	0.0

Provides:
Date of last modification: 17.04.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PGOD/15	**Course name:** Computer graphics and image 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 credits: 8

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To introduce the basic elements of the visual system, internal and external representations of an image, the image pre-processing methods and applications for surface visual inspection.

Brief outline of the course:
Introduction to computer vision. Collecting and storing images. Capturing and digitizing. Representation of the image - the image space. Color models. Multispectral images. Properties of digital images. Local operations. Global operations. Active contours. Segmentation. Texture, variety of symptoms. 3D reconstruction and visualization. Chaos and fractals.

Recommended literature:
1. ŠONKA, P., HLAVÁČ, V., BOYLE: Image processing, Analysis and Machine Vision, 2nd edition, International Thomson Publishing Inc., 1999.
2. TURCEZAN, M., JAIN, A.K.: Texture analysis. The handbook of pattern recognition and computer vision. World Scientific Pub. Co., 1998.

Course language:

Course assessment
Total number of assessed students: 9

N	P
0.0	100.0

Provides: doc. RNDr. Csaba Török, CSc., doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ POVK/15	**Course name:** Membership in a conference organizing committee
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 20	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PPC/15	**Course name:** Direct pedagogical activities
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 3	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 158	

abs	n
98.73	1.27

Provides: doc. RNDr. Gabriela Andrejková, CSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PVS/15	**Course name:** Patents, inventions, and software

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

Number of credits: 2

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 1

abs	n
100.0	0.0

Provides:

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPE/ PgVU/17	**Course name:** Pedagogy for university teachers
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week: Per study period:** 28s **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	

Course assessment

Total number of assessed students: 12

abs	n	neabs
100.0	0.0	0.0

Provides: PaedDr. Renáta Orosová, PhD.
Date of last modification: 05.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: KPPaPZ/PsVU/17	**Course name:** Psychology for University Lecturers
Course type, scope and the method: **Course type:** Lecture **Recommended course-load (hours):** **Per week: Per study period:** 28s **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	

Course assessment

Total number of assessed students: 12

abs	n	neabs
100.0	0.0	0.0

Provides: Mgr. Marta Dobrowolska Kulanová, PhD., doc. PhDr. Beata Gajdošová, PhD.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ RZ/15	**Course name:** Rewieved international or local proceedings
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 10	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 87	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SALD/15	**Course name:** Algorithms on strings
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 0 **Per study period:** 28 / 0 **Course method:** present	
Number of credits: 8	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 4	

N	P
0.0	100.0

Provides: doc. RNDr. Gabriela Andrejková, CSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SCI/15	**Course name:** SCI citation

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

Number of credits: 20

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 5

abs	n
100.0	0.0

Provides:

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SDPR/15	**Course name:** Co-worker of a local project
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 55	
abs	n
100.0	0.0
Provides:	
Date of last modification: 20.02.2018	
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SDSD/15	**Course name:** Data and signal processing

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

Number of credits: 8

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Mastering the basics of data and signal processing methods and appropriate software.

Brief outline of the course:
The list of both applications based on advanced data and signal processing methods and the areas of their leveraging is continuously rising. The subject acquaints the students with the most significant methods for solution of tasks in signal processing and the appropriate software. It helps the students to understand random phenomena in science and technology and clarify the differences in data model types.

Recommended literature:
[1] Steven T. Karris, Signals and Systems with MATLAB, Orchard Publications, 2008
[2] Zarchan P., Fundamentals of Kalman Filtering, A Practical Approach, AIAA, 2005
[3] Mohinder S.G., Kalman filtering, Theory and Practice Using MATLAB, John Wiley & Sons, 2008
[4] CONGDON P., Bayesian Statistical Modelling, John Wiley & Sons, 2006
[5] Albert J., Bayesian Computation with R, Springer, 2009

Course language:

Course assessment
Total number of assessed students: 5

N	P
0.0	100.0

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SIZD/15	**Course name:** Data processing and information profit

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

Number of credits: 5

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Overview of stochastic and numerical methods of processing data and signals, their modeling and obtaining information from them.

Brief outline of the course:
States, representation of dependencies and statistical models. Search schema and dependencies in data, classification of objects, parametric and nonparametric methods, smoothing data, piecewise approximation, splines, multivariate methods. Discriminant, cluster, factor, Fourier and wavelet analysis. Entropy and information function.

Recommended literature:
- E.Alpaydin: Introduction To Machine Learning, MIT Press, 2004
- S.Mallat, A Wavelet Tour of Signal Processing, Academic Press, 1999
- J.Anděl: Matematická statistika, SNTL 1985

Course language:

Course assessment
Total number of assessed students: 1

N	P
0.0	100.0

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SMPR/15	**Course name:** Co-worker of an international project
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 15	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 10	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SOS1a/15	**Course name:** Special branch seminar

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

Number of credits: 5

Recommended semester/trimester of the course: 1.

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
Cieľom predmetu je usmernenie študenta k samostatnému a tvorivému získavaniu najnovších poznatkov orientovaných na problematiku príbuznú téme dizertačnej práce, a takisto priebežné overovanie jeho schopností novozískané poznatky prezentovať.

Brief outline of the course:

Recommended literature:

Course language:

Course assessment
Total number of assessed students: 32

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

<table>
<tr><td colspan="2">University: P. J. Šafárik University in Košice</td></tr>
<tr><td colspan="2">Faculty: Faculty of Science</td></tr>
<tr><td>Course ID: ÚINF/ SOS1b/15</td><td>Course name: Special branch seminar</td></tr>
<tr><td colspan="2">Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: 2 Per study period: 28
Course method: present</td></tr>
<tr><td colspan="2">Number of credits: 5</td></tr>
<tr><td colspan="2">Recommended semester/trimester of the course: 2.</td></tr>
<tr><td colspan="2">Course level: III.</td></tr>
<tr><td colspan="2">Prerequisities:</td></tr>
<tr><td colspan="2">Conditions for course completion:</td></tr>
<tr><td colspan="2">Learning outcomes:</td></tr>
<tr><td colspan="2">Brief outline of the course:</td></tr>
<tr><td colspan="2">Recommended literature:</td></tr>
<tr><td colspan="2">Course language:</td></tr>
<tr><td colspan="2">Course assessment
Total number of assessed students: 30</td></tr>
<tr><td colspan="2"><table>
<tr><td>abs</td><td>n</td></tr>
<tr><td>100.0</td><td>0.0</td></tr>
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<tr><td colspan="2">Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.</td></tr>
<tr><td colspan="2">Date of last modification: 20.02.2018</td></tr>
<tr><td colspan="2">Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.</td></tr>
</table>

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS2a/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 3.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 29	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS2b/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 4.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 28	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS3a/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 5.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 30	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS3b/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 6.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 31	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS4a/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 7.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 20	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SOS4b/15	**Course name:** Special branch seminar
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of credits: 5	
Recommended semester/trimester of the course: 8.	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 20	

abs	n
100.0	0.0

Provides: doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ TNSD/15	**Course name:** Theoretical aspects of neural networks

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To understand mathematical principles of neural networks and to know their capabilities. To be able to construct models of neural networks to solve some problems.

Brief outline of the course:
Different models of neural networks and their capabilities to solve some problems.
Computational complexity of neural networks, probabilistic neural networks, computational capability of neural networks, a transformation of neural networks to Turing machines, and Turing machines to neural networks.
Approximation of functions using neural networks, Kolmogorov theorem and its proof, theorems connected to Kolmogorov theorem.

Recommended literature:
1. HASSOUN, M. H.: Fundamentals of artificial neural networks, The MIT Press, 1995
2. HAYKIN, S.: Neural Networks, A comprehensive foundation, Prentice-Hall, second edition 1999
3. HERTZ, J., KROGH, A., PALMER, R.G.: Introduction to the theory of neural computation, Addison Wesley, 1991
4. ROJAS, R.: Neural networks. A systematic introduction. Springer - Verlag, 1996

Course language:

Course assessment
Total number of assessed students: 16

N	P
0.0	100.0

Provides: doc. RNDr. Gabriela Andrejková, CSc.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/TZLD/15	**Course name:** Algorithmically unsolvable problems

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To understand basic notions of algorithmically unsolvable problems, mutual reduction of problems and the grades of unsolvability.

Brief outline of the course:
Variants of halting problems and their algorithmical unsolvability.
Undecidability of the theory of natural numbers, Goedel's a Tarski's theorem.
Relationship between undecidability and completeness.
Algorithmical unsolvability of some mathematical problems.
Diofantesian equations and non-existence of an algorithm for existence of their solutions.
Mutual reduction of problems and the grades of unsolvability.

Recommended literature:
1. BARWISE, J. ed.: Handbook of mathematical logic, North Holland, 1977.
2. KLEENE, S. C.: Introduction to metamathematics, Van Nostrand, 1952.
3. MENDELSON, E.: Introduction to mathematical logic, Van Nostrand, 1963.
4. DAVIS, M.: Hilbert's tenth problem is unsolvable, Amer. Math. Monthly, 1973, pp.233-296.

Course language:

Course assessment
Total number of assessed students: 1

N	P
0.0	100.0

Provides: doc. RNDr. Stanislav Krajči, PhD.

Date of last modification: 20.02.2018

Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VBP/15	**Course name:** Supervision of bachelor thesis
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 43	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VPBP/15	**Course name:** Review of a bachelor thesis
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 41	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VPSV/15	**Course name:** Supervision of a students scientific work
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 6	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 16	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

Number of credits: 9

Recommended semester/trimester of the course:

Course level: III.

Prerequisities:

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

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

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

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

Course language:

Course assessment
Total number of assessed students: 21

N	P
0.0	100.0

Provides: prof. RNDr. Viliam Geffert, DrSc.
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VYS/15	**Course name:** Presentation of results in a seminar
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 67	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZKC/15	**Course name:** International currented journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 20	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 14	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZNC/15	**Course name:** International non-currented journal
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 8	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 11	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZSP/15	**Course name:** Studies at foreign universities
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of credits: 2	
Recommended semester/trimester of the course:	
Course level: III.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Course assessment Total number of assessed students: 17	

abs	n
100.0	0.0

Provides:
Date of last modification: 20.02.2018
Approved: Co-guaranteedoc. RNDr. Gabriela Andrejková, CSc.Co-guaranteeprof. RNDr. Gabriel Semanišin, PhD.Guaranteeprof. RNDr. Viliam Geffert, DrSc.