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:

Course level: I., II., N

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:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PPPy/18	**Course name:** Advanced programming in Python

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:

Course level: I., N

Prerequisities: ÚINF/PAZ1a/15 and leboÚINF/ePAZ1a/15 and leboÚINF/PRG1/15

Conditions for course completion:
Continuous assignment - 50%
Midterm test and final test - 50%
or
The final project - 100%

Learning outcomes:
Problem solving in Python with using various modules, to implement and use algorithms to solve selected problems, knowledge of the principles of object-oriented programming and its implementation in Python.

Brief outline of the course:
Introduction to the environment, basic features of Python, syntax.
Simple types (number, logical type), structured types (string, list, dictionary, tuple, set) and control structures (loops, conditional statements, exception handling).
Definition of functions (parameters, return value, variable number of parameters, default values od parameters). Generators.
Import and creation of modules.
Documentation of functions, modules, packages.
Types of errors and error handling. Capturing and raising exceptions.
Saving data to a file and reading data from a file.
Data serialization. Open data formats.
Definition of own classes. Decorators.
Modules, packages.
Tests and test-driven programming (unittest). Logging.
Parallelism, threads and processes.
Graphic interface for Python programs.
Problem solving using Python.
Classes and objects. Iterator, context manager.
Object-oriented approach to problem solving. Custom data structures.
Selected algorithms over data structures.

Recommended literature:

Pilgrim, M., (2012) Dive Into Python 3. PILGRIM, Mark. https://github.com/downloads/diveintomark/diveintopython3/dive-into-python3.pdf
SHIPMAN, John W. Tkinter 8.5 reference: a GUI for Python. Socorro, NM 87801: New Mexico Tech Computer Center, 2013. Dostupné také z: https://anzeljg.github.io/rin2/book2/2405/docs/tkinter/tkinter.pdf
LOTT, Steven F. Mastering Object-oriented Python. Birmingham B3 2PB, UK: Packt Publishing, 2014. ISBN 978-1-78328-097-1.

Course language:
The primary language is Slovak, English is useful for reading Python documentation

Notes:
Required knowledge: Ability to implement simple programs in a selected programming language (eg Java, Pascal, C ...), basic knowledge of the principles of object-oriented programming.

Course assessment
Total number of assessed students: 23

A	B	C	D	E	FX
13.04	21.74	34.78	17.39	0.0	13.04

Provides: PaedDr. Ján Guniš, PhD.

Date of last modification: 11.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ASU1/15	**Course name:** Algorithms and data structures

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities: (ÚINF/PAZ1a/15 and leboÚINF/ePAZ1a/15),(ÚINF/PAZ1b/15 and leboÚINF/ePAZ1b/15)

Conditions for course completion:
Practice activities, homeworks and midterm exam.
Final examination consisting of practice and theoretical test.

Learning outcomes:
Understand and learn algorithmic paradigms and data structures. Analyse time complexity of these algorithms.

Brief outline of the course:
Algorithms' time and space asymptotic complexity. Main Theorem. Amortized complexity.
Brute Force. Backtrack. Divide and Conquer. Dynamic programming. Comparison and non-comparison sort algorithms. Sweep line algorithms. Graph Theory Algorithms.
Data structures – queue, stack, priority queue, heap, prefix sum, binary search trees, interval trees, union & find, trie.

Recommended literature:
1, Laaksonen A.: Guide to Competitive Programming: Learning and Improving Algorithms Through Contests (Undergraduate Topics in Computer Science), Springer, 2017, ISBN 978-3319725468
2, Forišek M., Steinová M.: Explaining Algorithms Using Metaphors. Springer Briefs in Computer Science, Springer (2013), ISBN 978-1-4471-5018-3
3, R. Sedgewick, K. Wayne: Algorithms (4th Edition), Addison-Wesley Professional, 2011, ISBN 978-0321573513, http://algs4.cs.princeton.edu/home/
4, Open Data Structures: http://opendatastructures.org/

Course language:
Slovak or english

Notes:
Content prerequisities:
- programming skills in some programming language (Python/Java/C++/...)
- mathematics:
-- computing with polynomials, logarithmic and exponential functions

-- computing limits of sequences, L’Hospital rule

Course assessment
Total number of assessed students: 134

A	B	C	D	E	FX
11.94	5.97	17.16	23.13	38.81	2.99

Provides: RNDr. Rastislav Krivoš-Belluš, PhD.

Date of last modification: 25.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/APS1/15	**Course name:** Applied probability and statistics

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:

Course level: I., II., N

Prerequisities:

Conditions for course completion:

Learning outcomes:
Acquired basic concepts and techniques of probability theory, statistics and corresponding software.

Brief outline of the course:
Events, probability. Laws of probability distributions, characteristics of location, variability and dependency. Samples, estimates and tests of hypotheses. Modeling of dependencies, noise and smoothing. Bayes theory of decision. Pseudorandom values and Monte Carlo method.

Recommended literature:
- Cs. Török: Úvod do teórie pravdepodobnosti a matematickej štatistiky, Košice, 1992
- M.R.Spiegel, J.J.Schiller, R.A.Srinivasan, Probability and Statistics, McGraw Hill, 2009
- J. Maindonald, W.J. Braun, Data Analysis and Graphics Using R – an Example-Based Approach, CAMBRIDGE UNIVERSITY PRESS, 2010

Course language:
Slovak or english

Notes:
Content prerequisites:
the basics of differential and integral calculus

Course assessment
Total number of assessed students: 74

A	B	C	D	E	FX
17.57	17.57	21.62	12.16	29.73	1.35

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 10.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ UUI1/15	**Course name:** Artificial Intelligence and Cognitive Science

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

Number of ECTS credits: 3

Recommended semester/trimester of the course:

Course level: II., N

Prerequisities:

Conditions for course completion:
home work and written tests
final exam

Learning outcomes:
The goal of the course is to achieve basic information about artificial intelligence techniques. For a student it is possible to study more deeply from literature, if needed.

Brief outline of the course:
Goal of artificial intelligence, natural intelligence, edges of agent machine intelligence, knowledge representation in AI (semantic networks, frames), reasoning. Problem solving in status space - non-informed versus informed deep and wide search, A*, solving of problems described as the game, iterative enhancement algorithms, problem solving by decomposition. Planning and scheduling, constraint logic programming, machine learning, computer vision - image recognition (flag described objects recognition, structural scene analysis), image preprocessing, image representation and describtion, object recognition. Natural language processing, artificial neural networks, knowledge systems (structure, charakteristcs, direct and backward reasoning, working with vague information), genetic algorithms, distributed artificial intelligence and multi-agent systems.

Recommended literature:
Russell S.J., Norvig P: Artificial Intelligence: A Modern Approach (2nd Edition), Prentice Hall, 2002, ISBN: 0137903952
Negnevitsky Michael: Artificial Intelligence: A Guide to Intelligent Systems (2nd Edition), Addison Wesley, 2004, ISBN: 0321204662
Luger George: Artificial Intelligence: Structures and Strategies for Complex Problem Solving (5th Edition), Addison Wesley, 2004, ISBN: 0321263189

Course language:
Slovak or english

Notes:
Content prerequisities:
basic programing, neurobiology, cognitive psychology, or instructor's consent

Course assessment
Total number of assessed students: 89

A	B	C	D	E	FX
65.17	16.85	12.36	3.37	2.25	0.0

Provides: doc. Ing. Norbert Kopčo, PhD.

Date of last modification: 11.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ AFJ1a/15	**Course name:** Automata and formal languages

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities:

Conditions for course completion:
Oral examination.

Learning outcomes:
To provide theoretical background for studying computer science in general, by giving the necessary knowledge in theory of automata.

Brief outline of the course:
Chomsky hierarchy of grammars and languages. Finite-state transducers and mapping, construction of a reduced automaton. Finite-state acceptors, nondeterministic acceptors, regular expressions. Closure properties of regular languages. Context-free grammars, Chomsky and Greibach normal forms. Pushdown automata, Pumping lemma. Closure properties of context-free languages.

Recommended literature:
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.

Course language:

Notes:

Course assessment
Total number of assessed students: 832

A	B	C	D	E	FX
25.36	18.03	23.92	17.91	9.86	4.93

Provides: Mgr. Alexander Szabari, PhD., prof. RNDr. Viliam Geffert, DrSc., RNDr. Zuzana Bednárová, PhD.

Date of last modification: 24.08.2018

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ KKV1/21	**Course name:** Classical and quantum computations

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:

Course level: II., N

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:
Slovak or english

Notes:
Content prerequisites:
Linear algebra, Group theory, Probability theory, Theory of algorithms, Introduction to quantum computers.

Course assessment
Total number of assessed students: 71

A	B	C	D	E	FX
25.35	42.25	15.49	5.63	2.82	8.45

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

Date of last modification: 10.02.2021

Approved:

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:	
Course level: II., N	
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., RNDr. Keerthi Kumar Doreswamy

Date of last modification: 10.02.2021

Approved:

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:

Course level: II., N

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:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ ARP1/15	**Course name:** Computer architecture

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Homeworks, active participation in laboratory exercises, final written exam. Final oral examination.

Learning outcomes:
Obtain detailed information about the technical implementation of modern computer systems. Understand the principles of organization of work of processor and computer on concrete examples. Gain basic experience with programming at the level of machine instructions (Assembler language). Understand the current way a computer communicates with I / O devices. Students will get acquainted with the components of current computers, with their properties, connection, principle of operation and possibilities of use. They will be able to make informed decisions about the purchase of computer equipment, identify computer failures; make simpler repairs by replacing modules, including setting them correctly.

Brief outline of the course:
Milestones in computer organization, fundamental limitations. The representation of numbers and the implementation of floating point arithmetic. Combinatorial and sequential circuits, memory organization, RAMs and ROMs. Digital logic level architecture, data path timing, machine cycle. The microarchitecture level, microinstructions and microinstruction control. The instruction set architecture level, data types, addressing modes, instruction types. Instruction execution, pipelining, cache memory. I/O controllers, ports, interrupts, direct memory access. Multicore architectures, processor virtualization. Device drivers, operating system kernel, device-independent software. Laboratory practices and tutorials.

Recommended literature:
1. W. Stallings: Computer Organization and Architecture, Pearson, 2018
2. J. Ledin: Modern Computer Architecture and Organization, Packt Publishing, 2020
3. E. Upton, J. Duntemann, R. Roberts, T. Mamtora, B. Everard: Learning Computer Architecture with Raspberry Pi, Wiley, 2016

Course language:
Slovak or English

Notes:

Content prerequisities: understanding of fundamental concepts of computer architecture and design within the scope of a standard undergraduate course.
The course is not organized annually.

Course assessment
Total number of assessed students: 58

A	B	C	D	E	FX
17.24	18.97	17.24	20.69	18.97	6.9

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Juraj Šebej, PhD.

Date of last modification: 26.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PSIN/15	**Course name:** Computer network Internet

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

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities: ÚINF/PAZ1a/15 and leboÚINF/ePAZ1a/15 and leboÚINF/PRG1/15

Conditions for course completion:
Activity at excercises (max 18 points), home work (max 18 points), test (max 30 points).
Verbal exam (min 25 points, max 50 points). Required minimum for passing the course is 64 points.

Learning outcomes:
To understand ISO OSI reference model for network communication, to analyze communication channels parameters, to understand different access methods, to be familiar with the function of center network devices (hub, switch, router), to understand IP protocol, IP addresses and the transfer of internet packets, to understand reliable data transfer of the TCP protocol, to be able to use Sockets in won application, to know basic application protocols.

Brief outline of the course:
1. Introduction to computer networks, internet connection types, delay and loss in packet-switched networks, ISO OSI reference model and TCP/IP protocols family.
2. Application layer: Web and HTTP, protocol FTP ,e-mail and SMTP, POP3, IMAP,
3. Application layer: domain names and DNS, Peer-to-peer applications. Security in computer networks.
4. Transport layer: services, multiplexing and demultiplexing, protocol UDP, reliable data transfer
5. Transport layer: connection oriented transport protocol TCP, flow and congestion control.
6. Network Layer: Internet protocol IPv4, virtual circuit and datagram networks, packet fragmentation, routing table, application protocol DHCP
7. Network Layer: network address translation NAT, ICMP protocol, internet protocol IPv6
8. Network Layer: routing algorithms and protocols, broadcast and multicast routing
9. Link layer: error detection, multiple access methods CSMA/CD and CSMA/CA, Ethernet, frames, protocols ARP and RARP, link layer addressing
10. Link Layer and wireless and mobile networks: hub, switch, virtual LAN, 802.11 Wireless LAN, Bluetooth 802.15, WiMAX 802.16, Mobile IP, mobility in GSM
11. Physical Layer: Communication channels parameters, digital and analog encoding.

Recommended literature:
1. J. F. Kurose, Keith W. Ross: Computer Networking: A Top-Down Approach, 7. edition, 2016
2. A. S. Tanenbaum: Computer Networks, 5. edition, Pearson, 2010
3. W. Stallings: Local and Metropolitan Area Networks, Prentice Hall, 2000

4. E. Comer, R.E. Droms: Computer Networks and Internets, Prentice Hall, 2003
5. W. R. Stevens: TCP/IP Illustrated, Vol.1: The Protocols, Addison-Wesley, 1994

Course language:

Notes:

Course assessment
Total number of assessed students: 759

A	B	C	D	E	FX
9.62	5.27	12.38	16.47	37.29	18.97

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 06.02.2019

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ KRP1/15	**Course name:** Cryptographic protocols

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:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Homeworks, active participation in laboratory exercises, presentation of a selected topic at a course seminar. Final written exam.

Learning outcomes:
Understand the problems of designing secure cryptographic protocols for authentication and key management. Know the ways to compromise them and be able to apply methods of proving their correctness. Control some automated verification tools. Understand and be able to apply advanced cryptographic techniques in various application fields - signature schemes, electronic banking, electronic voting. Orientation in current problems of implementation of cryptographic protocols.

Brief outline of the course:
Authentication and key establishment using shared and public key cryptography, key agreement protocols, conference key agreement, zero-knowledge protocols, provable security. Protocol architecture and formal definition, goals for authentication and key establishment, formal verification. Digital signature, implementation, trust distribution.
The final seminar with presentations on selected current topics - electronic banking, electronic voting, secure communication ...

Recommended literature:
1. Colin Boyd, Anish Mathuria: Protocols for Authentication and Key Establishment, Springer, 2020
2. Douglas R. Stinson, Maura B. Paterson: Cryptography: Theory and Practice, Fourth Edition, Chapman & Hall/CRC, 2018
3. Paul C. van Oorschot: Computer Security and the Internet: Tools and Jewels, Springer, 2020
4. Peter Ryan, Steve Schneider: Modeling and Analysis of Security Protocols, Addison-Wesley, 2001

Course language:
Slovak or English

Notes:

Content prerequisities: understanding of fundamental cryptographic concepts and primitives (as taught in the course KRS/15 or in the scope of the textbook "Understanding Cryptography" by Christof Paar and Jan Pelzl).
The course is not organized annually.

Course assessment
Total number of assessed students: 21

A	B	C	D	E	FX
38.1	4.76	19.05	19.05	14.29	4.76

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

Date of last modification: 22.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ KRS/15	**Course name:** Cryptographic systems 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:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Homeworks, midterm written exam, active participation in laboratory exercises.
Final written exam, possibly oral exam.

Learning outcomes:
This course covers the basic knowledge in understanding and using cryptography. The main focus is on definitions, theoretical foundations, and rigorous proofs of security, with some programming practice. Topics include symmetric and public key encryption, message integrity, hash functions, block cipher design and analysis, number theory, and digital signatures. The course also provides an introduction to cryptographic protocols for authentication and key management, including PKI and certificates.

Brief outline of the course:
Classical cryptography, basic information theory, cryptoanalysis, security of classical ciphers. Symmetric ciphers - stream ciphers, block ciphers (DES, AES), modes of operation. Asymmetric ciphers - RSA, Elgamal, elliptic curve cryptosystems. Hash functions, message authentication codes, digital signatures. Authentication, key establishment and distribution, certificates.

Recommended literature:
1. PAAR, Ch., PELZL, J.: Understanding Cryptography, Springer 2010.
2. STINSON, D. R.. PATERSON, M. B.: Cryptography: Theory and Practie. CRC Press, 2018.
3. MAO, W. Modern Cryptography: Theory and Practice. Prentice Hall, 2003.
4. MENEZES, A., OORSCHOT, P. van, VANSTONE, S.: Handbook of Applied Cryptography. CRC Press, 1996.
5. SCHNEIER, B.: Applied Cryptography, 20th Edition, John Wiley & Sons Inc., 2015

Course language:
Slovak or English

Notes:
Content prerequisities: basic number theory and algebra, basic programming

Course assessment
Total number of assessed students: 112

A	B	C	D	E	FX
12.5	9.82	13.39	13.39	33.04	17.86

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

Date of last modification: 22.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ USU/19	**Course name:** Introduction to 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:	
Course level: I., N	
Prerequisities:	
Conditions for course completion: Evaluation of projects created for applications of machine learning algorithms. Written and oral exam.	
Learning outcomes: Theoretical knowledge in the area of machine learning. Basic concepts of machine learning. Basic machine learning algorithms.	
Brief outline of the course: Basic concepts of machine learning. Basic characteristics of data, types of attributes, characteristics for individual attributes, dependence between attributes. Data sources and their acquisition. Determination of the target task. Data preparation and cleaning, missing values, erroneous inputs. Models of classification - decision trees, k-nearest neighbors and others. Prediction models. Model evaluation - tru positive, false positive, tru negative, false negative, classification and prediction accuracy indicators. Cluster analysis. Association rules.	
Recommended literature: [1] Aggarwal, Ch.C.: Data Mining: The Textbook. Springer, 2015. [2] Alpaydin, E.: Introduction to Machine Learning. MIT Press, 2009. [3] Witten, I.E., Frank, E.: Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, 2005.	
Course language: Slovak or English	
Notes: Content prerequisites: Basics of programming in Python, or another alternative programming language suitable for data analysis	

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: RNDr. Ľubomír Antoni, PhD.

Date of last modification: 10.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/UNS1/15

Course name: Introduction to neural networks

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

Number of ECTS credits: 5

Recommended semester/trimester of the course:

Course level: I., II., N

Prerequisities:

Conditions for course completion:
Evaluation of projects created for neural network applications.
Written and oral exam.

Learning outcomes:
To understand and to know applications of basic paradigms of neural networks. To learn working with software for neural network models.

Brief outline of the course:
Basic models of computational units - neurons (linear threshold gates, polynomial threshold gates, perceptrons), their computational capability, algorithms of adaptations. Feed-forward neural networks, back propagation algorithm. Hopfield neural networks. ART neural networks. Using neural networks to solving of problems. Genetic and evolution algorithms.

Recommended literature:
J. Hertz, A.Krogh, R.G. Palmer: Introduction to the theory of neural computation, Addison Wesley, 1991
HASSOUN, M. H.: Fundamentals of artificial neural networks, The MIT Press, 1995.
Mitchell, M. (1998). An introduction to genetic algorithms. MIT press.

Course language:
Slovak or English

Notes:
Content prerequisites:
Basics of programming in Python, or another alternative programming language suitable for data analysis

Course assessment
Total number of assessed students: 439

A	B	C	D	E	FX
14.12	17.08	22.55	19.13	22.78	4.33

Provides: RNDr. Ľubomír Antoni, PhD., Mgr. Šimon Horvát

Date of last modification: 10.02.2021
Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ UNV1/15	**Course name:** Introduction to neurosciences

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:

Course level: I., N

Prerequisities:

Conditions for course completion:
Examination

Learning outcomes:
Introduction to anatomy and physiology of human brain, to cognitive processes corresponding to different mental functions, and to computational tools used in neuroscience.

Brief outline of the course:
Description of neural centers of basic cortical functions (visual, auditory, sensory and motor cortex, learning and memory). Basic physiological, psychological, psychophysical and computational methods used in neuroscience with focus on the application of computational tools for electrophysiological brain activity recording and imaging (e.g., magnetic resonance). Computational applications of neuroscience research.

Recommended literature:
1. Gazzaniga M. (ed.): The New Cognitive Neurosciences. 2nd ed. MIT Press. 1999
2. Dayan P and LF Abbott: Theoretical Neuroscience - Computational and Mathematical Modeling of Neural Systems. MIT Press, 2001
3. Stillings et al.: Cognitive Science: An Introduction, 2nd ed., MIT Press, 1995

Course language:
Slovak or English

Notes:
Content prerequisites:
Algebra, programming (Matlab).

Course assessment
Total number of assessed students: 29

A	B	C	D	E	FX
17.24	24.14	20.69	24.14	10.34	3.45

Provides: doc. Ing. Norbert Kopčo, PhD., Ing. Peter Lokša, RNDr. Keerthi Kumar Doreswamy

Date of last modification: 10.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ZLI/21	**Course name:** Linux basics

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:

Course level: I., N

Prerequisities:

Conditions for course completion:
(1) homeworks
(2) written final theoretical exam (score at least 50%),
(3) written final practical exam (score at least 50%)

Learning outcomes:
To provide theoretical and practical background for studying computer science, by giving the necessary knowledge in the usage of Unix/Linux operating systems.

Brief outline of the course:
(1) Introduction to Unix/Linux systems
(2) Linux ommand line
(3) Text processing tools
(4) Managing files
(5) Managing users, groups and rights
(6) Managing processes
(7) Managing software and packages
(8) Administering the system - system booting, jobs, logging
(9) Basic networking
(10) Managing network interfaces
(11) Managing disk partitions

Recommended literature:
(1) LPIC-1 Linux Professional Institute Certification Study Guide Exam 101-400 and Exam 102-400 4th Edition
(2) The Linux Documentation Project (https://www.tldp.org/)
(3) The Linux Command Line, 2nd Edition: A Complete Introduction 2nd Edition

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 28

A	B	C	D	E	FX
64.29	0.0	10.71	3.57	10.71	10.71

Provides: RNDr. JUDr. Pavol Sokol, PhD., Mgr. Richard Staňa

Date of last modification: 14.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ LAD1/15	**Course name:** Logical aspects of databases

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:

Course level: II., N

Prerequisities:

Conditions for course completion:

Learning outcomes:
to understand and to be able to formalize relationships between databases, symbolic logic and logic programming

Brief outline of the course:
1. Basic concepts of logic – a symbol, a term, a formula, an interpretation
2. Formalization of a table and a database
3. Conjunctive queries
4. Conjunctive calculus
5. Relations between Ccnjunctive calculus and conjunctive queries
6. Relational algebra
7. Relations of different models of databases

Recommended literature:
https://ics.upjs.sk/~krajci/skola/vyucba/ucebneTexty/LAD-presentation.pdf

Course language:
Slovak or English

Notes:
content prerequisites: databases (SQL), predicate logic (a symbol, a term, a formula, an interpretation)

Course assessment
Total number of assessed students: 90

A	B	C	D	E	FX
42.22	18.89	17.78	11.11	7.78	2.22

Provides: prof. RNDr. Stanislav Krajči, PhD.

Date of last modification: 19.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ MTL/15	**Course name:** MATLAB and neurocognition
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:	
Course level: I., N	
Prerequisities:	
Conditions for course completion: quizes, final exam	
Learning outcomes: Intro to programming in MATLAB with focus on its usage in Neural and Cognitive Science.	
Brief outline of the course: Intro to MATLAB: navigation and interaction, variables, vectors, matrices, operators, scripts, functions, toolboxes. Scripts for human-computer interaction in behavioraln experiments. Generation of visual and auditory stimuli. Analysis and visualization of behavioral, neurophyshiological and neuroimaging (fMRI, EEG, MEG) data. Cognitive and neural modeling in MATLAB.	
Recommended literature: 1. Wallisch et al. MATLAB for Neuroscientists: An Introduction to Scientific Computing in MATLAB. Academic Press 2008. 2. Duda, Hart, Stork: Pattern Classification, 2nd Edition, Wiley 2000 Stork, Yom-Tow: Computer Manual in MATLAB to accompany Pattern Classification, 2nd Edition, Wiley, 2004 3. Lewandowsky: Computational Modeling in Cognition. Sage, 2011 4. Levine: Introduction to Neural and Cognitive Modeling, Psychology Press, 2000 Dayan and Abbott: Theoretical Neuroscience: Computational and Mathematical Modeling of Neural Systems. MIT Press 2005.	
Course language: Slovak or English	
Notes: Content prerequisities: basic programing skills or instructor's consent	

Course assessment
Total number of assessed students: 8

A	B	C	D	E	FX
25.0	25.0	12.5	37.5	0.0	0.0

Provides: doc. Ing. Norbert Kopčo, PhD., Ing. Peter Lokša, RNDr. Keerthi Kumar Doreswamy

Date of last modification: 11.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PDS1/21	**Course name:** Parallel and distributed systems

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:

Course level: II., N

Prerequisities:

Conditions for course completion:
Home assignments, class project from tutorials, midterm written exam. Final written and oral exam.

Learning outcomes:
Understand the principles, basic problems and algorithms of parallel programming. Be able to implement synchronization procedures and manage and use interprocess communication. Master the basics of GPU programming. Understand the differences between parallel and distributed computational models. Master basic distributed algorithms and know how to implement them. Understand the problems of creating a distributed system environment and know how to solve them. Be able to use distributed environments in practical applications.

Brief outline of the course:
Parallel architectures, parallel computational model, access to shared memory. Basic algorithms, scaling, optimality. Effective methods of parallel search and sorting. Working in a GPU environment. Distributed computational model, communication protocols, characteristics of distributed systems. Intercomputer communication, distributed synchronization algorithms, transactions, termination and deadlock detection. Consistency issues with distributed memory sharing. Distributed application environment. Reliable calculations in an environment with errors.

Recommended literature:
1. J. JáJá: An Introduction to Parallel Algorithms, Addison-Wesley, 1992, ISBN 0-201-54856-9
2. P. Sanders, K. Mehlhorn, M. Dietzfelbinger, R. Dementiev: Sequential and Parallel Algorithms and Data Structures, Springer, 2019
3. Sukumar Ghosh: Distributed Systems and Algorithms (Second Edition), CRC Press 2014
4. M. Raynal: Distributed Algorithms for Message-Passing Systems, Springer, 2013
5. Gerard Tel: Introduction to Distributed Algorithms, Cambridge University Press, 2001

Course language:
Slovak or English

Notes:
Content prerequisities: basic of concurrent programming, basic of operating system principles

Course assessment
Total number of assessed students: 36

A	B	C	D	E	FX
22.22	5.56	13.89	11.11	27.78	19.44

Provides: doc. RNDr. Jozef Jirásek, PhD., RNDr. Rastislav Krivoš-Belluš, PhD., Mgr. Marián Dvorský, RNDr. Ladislav Mikeš, PhD.

Date of last modification: 22.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PMO1/15	**Course name:** Proces modelling
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:	
Course level: I., N	
Prerequisities: (ÚINF/PAZ1b/15 and leboÚINF/ePAZ1b/15),ÚINF/DBS1a/15,ÚINF/SWI1a/15	
Conditions for course completion: The assessment includes the continuous evaluation of partial tasks related to complex project solving during semester. The final evaluation is awarded on the basis of the continuous evaluation and the result of the exam. The exam requires demonstration of the ability to orientate oneself in the lectured issues, mastering the theoretical foundations of process modeling, basic skills for the creation and interpretation of process models. The exam consists of written and oral part.	
Learning outcomes: To get acquainted with the theoretical foundations of process modeling. To master the basic principles of creating process models. To get acquainted with standard languages for process modeling and gain practical experience in creating models using selected modeling tools.	
Brief outline of the course: Introduction to process modeling. Approaches to the development of large software systems. Theoretical foundations of process modeling. Petri nets. Process orchestration. Process choreography. Selected process properties. Process model architectures. Methodologies and standards.	
Recommended literature: 1. Ehrig, H.; Juhas, G.; Padberg, J.; Rozenberg, G. (Eds.), Advances in Petri Nets, Lecture Notes in Computer Science , Vol. 2128 (2001) 2. Eshuis, R. ; Wieringa R.: Comparing Petri Net and Activity Diagram Variants for Workflow Modelling – A Quest for Reactive Petri Nets, [dostupné online http://is.tm.tue.nl/staff/heshuis/pnt.pdf] 3. Madison D., Process Mapping, Process Improvement and Process Management, Paton Press 2005 4. Weske, M. Business Process Management, Springer 2007 5. White S.A., Miers D., Fischer L., BPMN Modeling and Reference Guide, Future Strategies Inc., Lighthouse Pt 2008 6. White:, S.A. Process Modeling Notations and Workflow Patterns, [available online http://www.omg.org/bp-corner/bp-files/Process_Modeling_Notations.pdf]	

Course language:
Slovak or English

Notes:
Content prerequisities: programming, bases of software engineering and database management systems, bases of project management

Course assessment
Total number of assessed students: 32

A	B	C	D	E	FX
15.63	28.13	25.0	21.88	0.0	9.38

Provides: prof. RNDr. Gabriel Semanišin, PhD.

Date of last modification: 23.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SPP1b/15	**Course name:** Programming environments in schools II

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities: ÚINF/SPP1a/15

Conditions for course completion:
Creation of educational software in selected educational programming environment.

Learning outcomes:
1. To get an overview of children's programming environments.
2. To acquire programming skills in selected children's programming environments.
3. Ability to design and program educational software in educational programming environments.

Brief outline of the course:
Teaching of algorithms and programming in elementary school - the objectives, content, textbooks and methodological materials. Algorithmic computer games. Overview of children's programming environments. Programming in environments - Scratch, App Inventor, MakeCode, MicroPython. Development of educational software.

Recommended literature:
BELL, Charles A., 2017. Micropython for the internet of things: a beginner's guide to programming with Python on microcontrollers. New York, NY: Springer Science+Business Media. ISBN 9781484231227.
WOLBER, David, 2014. App inventor. Brno: Computer Press. ISBN 978-80-251-4195-3.
Programování pro děti: naučte se programovat při tvorbě skvělých her, 2013. Brno: Computer Press. ISBN 978-80-251-3809-0.

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 17

A	B	C	D	E	FX
23.53	23.53	11.76	23.53	5.88	11.76

Provides: doc. RNDr. Ľubomír Šnajder, PhD.

Date of last modification: 10.02.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PRO1a/15	**Course name:** Project I.

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities:

Conditions for course completion:
Activity in exercises, elaboration of home assignments. Presentation of the results achieved in solving a specific problem. Uploading a software work.

Learning outcomes:
Acquire the way of working on a software work, communication in a software team, solving problems of computer systems administration in all phases of their life cycle.

Brief outline of the course:
Work in a 2-4 member team on the development, testing of a software product under the guidance of a mentor from software companies. Getting acquainted with continuous integration and working with git in command lines.

Recommended literature:
1. https://www.udemy.com/course/ Git & GitHub - The Complete Git & GitHub
2. https://www.jenkins.io/doc/
3. Study literature tied to the selected project (according to the client's recommendation)

Course language:
Slovak or English

Notes:
Content prerequisities:
advanced programming skills

Course assessment
Total number of assessed students: 95

A	B	C	D	E	FX
70.53	5.26	8.42	11.58	3.16	1.05

Provides: Mgr. Alexander Szabari, PhD., RNDr. Patrik Pekarčík, RNDr. Róbert Novotný, PhD.

Date of last modification: 25.03.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PRO1b/15	**Course name:** Project II.

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities:

Conditions for course completion:
Presentation of the results achieved in solving a specific problem. Uploading a software work. Preparation of materials for the promotion of the final work.

Learning outcomes:
Acquire the way of working on the software work with agile methodology, communication in the software team, solving problems of computer systems administration in all phases of their life cycle.

Brief outline of the course:
Work in a 4-5 member team on the development, testing of a software product under the guidance of a mentor from software companies. Improving with continuous integration and working with git in command lines. Software development using Agile methodology.

Recommended literature:
1. https://www.udemy.com/course/ Git & GitHub - The Complete Git & GitHub
2. https://www.jenkins.io/doc/
3. Study literature tied to the selected project (according to the client's recommendation)
4. "What is Agile Software Development?". Agile Alliance. 8 June 2013. Retrieved 4 April 2015.

Course language:
Slovak or english

Notes:
Content prerequisities:
advanced programming skills

Course assessment
Total number of assessed students: 70

A	B	C	D	E	FX
64.29	11.43	8.57	7.14	2.86	5.71

Provides: Mgr. Alexander Szabari, PhD., RNDr. Róbert Novotný, PhD., RNDr. Patrik Pekarčík

Date of last modification: 25.03.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PRM1/15	**Course name:** Project management

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I., N

Prerequisities:

Conditions for course completion:
The ongoing evaluation consists of the evaluation of the sub-tasks related to the project design. The final evaluation is based on a written and oral exam. The result of the ongoing evaluation will also be included in the overall evaluation.

Learning outcomes:
Gain basic knowledge and skills related to project preparation, project mplementation and project evaluation. Acquire basic knowledge of project team management and organization.

Brief outline of the course:
Introduction to project management. Project planning. Preparation of project documentation. Project specification. Decision making. Communication. Work organization. Project management. Short-term and long-term project management strategies. Specific approaches for projects in the field of informatics.

Recommended literature:
1. BERKUN, S. The Art Of Project Management. O Reilly, 2005.
2. Erik Larson and Clifford Gray : Project Management:
3. PRINCE2. Avaliable on internet: <http://www.prince2.com>.

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 86

A	B	C	D	E	FX
30.23	26.74	23.26	8.14	5.81	5.81

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

Date of last modification: 03.03.2021

Approved:

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ TYS1/15	**Course name:** Typographical systems
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:	
Course level: I., N	
Prerequisities:	
Conditions for course completion:	
Learning outcomes: To provide the basic information on principles for typesetting of documents containing mathematical formulas in Plain TeX, AMS-TeX, and LaTeX.	
Brief outline of the course: Typesetting of a plain text, special text symbols, using of text fonts. TeX macros. Enumerations in text and footnote command. Parameter setting determining the appearance of the pages. Typesetting of mathematical formulas in text and displays, aligning formulas. Definitions of TeX macros. Making tables and pictures. Definitions, theorems, and proofs in a mathematical document. Contents, bibliography, sections in a document.	
Recommended literature: 1. D. E. Knuth, The TeXbook, Computers and Typesetting, Addison-Wesley, Reading, Massachusetts, 1986. 2. M. Doob, Jemný úvod do TeXu, CSTUG, 1990; èeský preklad z "A Gentle Introduction to TeX" (text vo¾ne prístupný v CTAN archíve). 3. O. Ulrych, AMS-TeX za 59 minút, (verzia 1.0), Praha, 1989. 4. J. Chlebíková, AMS-TeX (verzia 2.0), Bratislava, 1992. 5. M. Spivak, The Joy of TeX, Amer. Math. Soc., 1986. 6. L. Lamport, LaTeX: A Document Preparation System, Addison-Wesley, Massachusetts, 1986. 7. L. Lamport, MakeIndex: An index processor for LaTeX, 17 February 1987. 8. J. Rybièka, LaTeX pro začátečníky, Konvoj, Brno, 1995. 9. H. Partl, E. Schlegl, I. Hyna, P. Sýkora, LaTeX – Stručný popis. 10. T. Oetiker, H. Partl, I. Hyna, E. Schlegl, M. Kocer, P. Sýkora, Ne příliš stručný úvod do systému LaTeX2e (neboli LaTeX2e v 73 minutách). 11. M. Goossens, F. Mittelbach, and A. Samarin, The LaTeX Companion, Addison-Wesley, Reading, Massachusetts, 1994. Kapitola 8 je volne prístupná v TeX archívoch (ch8.pdf). 4 12. G. Grätzer, Math into LaTeX, 3rd edition, Birkhäuser, Boston, 2000.	
Course language: Slovak or english	

Notes:

Course assessment
Total number of assessed students: 246

A	B	C	D	E	FX
47.97	18.29	19.51	6.5	6.91	0.81

Provides: RNDr. Zuzana Bednárová, PhD.

Date of last modification: 10.02.2021

Approved: