CONTENT

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ OPSP/16	**Course name:** ABAP and Object and Dialogue Programming

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: 3

Recommended semester/trimester of the course: 4., 6.

Course level: I., N

Prerequisities: ÚINF/RASP/16

Conditions for course completion:
Conditions for continuous evaluation:
Individual activities according to the teacher's assignment
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, within which the student has the ability to create screens and half-screens, can apply functional codes classes, inheritance and polymorphism.

Brief outline of the course:
1. Create a screen, half screen.
2.-3. Function codes.
4.-5. Local and global classes, inheritance
6. Polymorphism.
7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 35

A	B	C	D	E	FX
40.0	5.71	22.86	20.0	2.86	8.57

Provides:

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: CJP/ PFAJAKA/07	**Course name:** Academic English
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.	
Prerequisities:	
Conditions for course completion: Active classroom participation, assignments handed in on time, 2 absences tolerated 1 test (13th week), no retake. Presentation on chosen topic Final evaluation- average assessment of test (50%), and presentation (50%). Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less	
Learning outcomes: The development of students´ language skills - reading, writing, listening, speaking, improvement of their linguistic competence - students acquire knowledge of selected phonological, lexical and syntactic aspects, development of pragmatic competence - students can efectively use the language for a given purpose, with focus on Academic English, level B2.	
Brief outline of the course: Formal and informal English Academic English and its specific features Key academic verbs and nouns Linking words in academic writing, writing a paragraph, word-order, topic sentences Word-formation - affixation abstract Selected aspects of English pronunciation, academic vocabulary Selected functional grammar structures - defining, classifying, epressing opinion, cause-effect, paraphrasing	
Recommended literature: Seal B.: Academic Encounters, CUP, 2002 T. Armer :Cambridge English for Scientists, CUP 2011 M. McCarthy M., O´Dell F. - Academic Vocabulary in Use, CUP 2008 Zemach, D.E, Rumisek, L.A: Academic Writing, Macmillan 2005 Olsen, A. : Active Vocabulary, Pearson, 2013 www.bbclearningenglish.com Cambridge Academic Content Dictionary, CUP, 2009	

Course language:
English language, level B2 according to CEFR.

Notes:

Course assessment
Total number of assessed students: 416

A	B	C	D	E	FX
36.54	21.63	15.14	9.38	6.01	11.3

Provides: Mgr. Viktória Mária Slovenská

Date of last modification: 11.09.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SOP1/15	**Course name:** Administration and security of computer networks

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚINF/SKB1/15

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

Learning outcomes:
Gain practical experience with security analysis of network traffic, threat identification and network protection using hardware and software tools.

Brief outline of the course:
Network monitoring with emphasis on security, passive and active monitoring, methods of measurement and data collection, analytical and visualization tools. Simple and advanced methods for processing aggregated network traffic records. Volume quantities, statistical analysis, time series, prediction methods. Samples of available implementations. Network management tools, efficient use of SNMP, CMIS/CMIP protocols. Network attacks and their classification according to network layers, security threats. Basic elements of network security - firewall, proxy servers, IDS, IPS, antispam filter, anti-virus protection. Solving specific security tasks.

Recommended literature:
1. Bellovin, S. M. Security problems in the TCP/IP protocol suite.
2. Scarfone, K. Mell, P.: Guide to Intrusion Detection and Prevention Systems (IDPS). Recommendations of the National Institute of Standards and Technology, 2007.
3. Dostálek, L.: Velký průvodce protokoly TCP/IP - bezpečnost, Computer Press 2003

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 0

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

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

Date of last modification: 23.11.2021
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ADL1/15	**Course name:** Administration of GNU/Linux

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: 6.

Course level: I.

Prerequisities: ÚINF/AOS1/15

Conditions for course completion:
The condition for passing the course is the successful realization of a project focused on the Linux operating system configuration.

Learning outcomes:
The result of the education is a deeper understanding of the theoretical and practical background of the Linux operating system.

Brief outline of the course:
1. The kernel of the Linux operating system. Kernel compilation,
2. Linux operating system startup. Loaders,
3. Backup (general view). Bacula.
4. Email services (general view),
5. Email services - Postfix,
6. Event logs. Syslog,
7. Access control - AppArmor,
8. Access control - SELinux,
9. X.509 Certificates and PKI in the Linux operating system environment,
10. Encrypted file systems (dm-crypt, LUKS),
11. Virtualization (general view) ,
12. XEN and KVM,
13. LXC and Docker.

Recommended literature:
1. LPIC-1 Exam 102. LPI [online]. Canada: The Linux Professional Institute, 2021 [cit. 2021-9-22]. Available online: https://learning.lpi.org/en/learning-materials/102-500/,
2. Linux - Dokumentační projekt [online]. 4. Praha: Computer Press, 2007 [cit. 2021-9-22]. Available online: https://i.iinfo.cz/files/root/k/LDP_4.pdf,
3. The LPIC2 Exam Prep [online]. Sue B.V. - Open Sourced, 2021 [cit. 2021-9-26]. Available online: https://lpic2book.github.io/src/

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 0

abs	n	neabs	z
0.0	0.0	0.0	0.0

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. PhDr. Peter Pisarčík

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 5.

Course level: I., II., N

Prerequisities:

Conditions for course completion:
The condition for passing the course is successful realization of a project focused on the network services configuration.

Learning outcomes:
The result of the education is an understanding of the theoretical and practical background of Windows and Linux operating systems and selected network services.

Brief outline of the course:
1. Management of Linux operating system (basic system tools for troubleshooting, system startup, network configuration), 2. File systems (general view), 3. File systems (RAID, LVM), 4. Web hosting services I. (basic concept, APACHE), 5. Web hosting services II. (SQL, HTTPS, security, NGINX), 6. File services I. (SAMBA, NFS), 7. File services II. (FTP), 8. Management of local computer network I. (routing, DHCP), 9. Management of local computer network II. (firewall), 10. VPN, 11. SSH and Proxy, 12. Kernel of the Linux operating system, 13. Administration of the Windows operating system.

Recommended literature:
1. LPIC-1 Exam 102. LPI [online]. Canada: The Linux Professional Institute, 2021 [cit. 2021-9-22]. Dostupné z: https://learning.lpi.org/en/learning-materials/102-500/, 2. Linux - Dokumentační projekt [online]. 4. Praha: Computer Press, 2007 [cit. 2021-9-22]. Dostupné z: https://i.iinfo.cz/files/root/k/LDP_4.pdf, 3. The LPIC2 Exam Prep [online]. Sue B.V. - Open Sourced, 2021 [cit. 2021-9-26]. Dostupné z: https://lpic2book.github.io/src/

Course language:
Slovak or English

Notes:
Content prerequisites: understanding of fundamental concepts of operating systems, computer networks, basic skill in Linux shell (e.g. bash) and Powershell.

Course assessment
Total number of assessed students: 36

A	B	C	D	E	FX
58.33	22.22	11.11	0.0	8.33	0.0

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

Date of last modification: 26.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ADW1/15	**Course name:** Administration of Windows

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: 5.

Course level: I.

Prerequisities: ÚINF/OSY/24 and ÚINF/AOS1/15

Conditions for course completion:
Practics activity, home assignment, test.
Final test.

Learning outcomes:
Deep insight into system concepts and components of operating system Windows along with the practical techniques concerning with configuration and management corresponding to the professional administrator level. Completing the course allows to become oriented and experienced in the Active Directory administration, net services configuration and management and in the virtualization concepts.

Brief outline of the course:
Active Directory infrastructure and its management and configuration. Zone configuration, DNS setup, replication. Trust configuration. Roles and services. Account management, group policy, auditing. Certification authority and management. Network configuration and network services. DHCP, routing, firewall, remote access configuration. Monitoring and security breach handling. Licences for multiple remote access. Website configuration and management. FTP and mail server configuration. Data Storage configuration, filesystems and backup, network services. Installing and configuring devices, monitoring system health and settings. System log. Creating system images and image recovery. Installing and activating distribution. Virtualization support, installing and configuring virtual machines. Configuring access to network, memory and disk resources. Clustering.

Recommended literature:
1. J. C. Mackin, T. Northrup: MCTS self-paced training kit (exam 70-642) : configuring Windows server 2008 network infrastructure, Microsoft Press, 2008, ISBN 0-7356-2512-3.
2. S. Reimer, M. Mulcare, C. Kezema, B. Wright: Windows server 2008 Active Directory resource kit, Microsoft Press, 2008, ISBN 0-7356-2515-8.
3. D. Holme: Windows administration resource kit: productivity solutions for IT professionals, Microsoft Press, 2008, ISBN 0-7356-2431-3.

Course language:

Notes:

Course assessment
Total number of assessed students: 1

abs	n	neabs	z
100.0	0.0	0.0	0.0

Provides:

Date of last modification: 10.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ASSP/16	**Course name:** Administration of the SAP System
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: 3	
Recommended semester/trimester of the course: 6.	
Course level: I., N	
Prerequisities: ÚINF/ZLSP/16	
Conditions for course completion: Conditions for the final evaluation: Final test (practical) Conditions for successful completion of the course: 1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions. 2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.	
Learning outcomes: During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student after completing the course manages the basics of SAP system administration, can set the basic configuration of the system, can administer the database.	
Brief outline of the course: 1. Fundamentals (System Logon, Configuring SAP Logon), Starting and Stopping (Starting SAP/ Database, Stopping SAP/Database). 2. System configuration (Parameters in SAP, Parameters in Database). 3.-4. Background Tasks (Scheduling Background Jobs, Monitoring of Background Jobs). 5.-6. Database Administration (Extend Tablespaces). 7. Individual work for practice.	
Recommended literature: Company literature of SAP. Available on-line: <http://www.sap.com>	
Course language: slovak	
Notes: By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.	

Course assessment Total number of assessed students: 58	
abs	n
93.1	6.9
Provides: Bc. Martin Tomko	
Date of last modification: 21.11.2021	
Approved: doc. RNDr. Jozef Jirásek, PhD.	

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: 4., 6.

Course level: I., N

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
At least 50 % of the marks in the continuous assessment
A minimum of 50 % marks in the mid-term and end-of-semester practical tests
or
The final project - 100%

Learning outcomes:
Implement solutions to selected problems in Python using available modules. Use and implement non-trivial algorithms to solve selected problems. Use an object-oriented approach to problem solving. Program in Python in an object-oriented manner using Python specifics. Test programs. Implement parallel computing.

Brief outline of the course:
1. Introduction to the environment, basic features of Python, simple and structured data types.
2. Input, output, function definition, lambda function, generator notation, function as parameter, string formatting.
3. Control structures, iterating over data structures, context manager.
4. Exception handling and exception raising. Philosophy of exceptions in Python.
5. Working with files. Serialization and deserialization of data - json and pickle protocol. Text and binary files. Manipulation with files. Open data.
6. Object-oriented programming 1. Design of custom classes, special methods, properties, philosophy of accessing methods and attributes.
7. Object-oriented programming 2. Comparison and differences with Java. Multiple inheritance.
8. Method overloading. Static methods, abstract classes, data class.
9. Decorators, memoization, modules, packages.
10. Code validation (debugging), testing (doctest, unittest), test-driven development.
11. Parallel computing, processes, process triggering and inter-process communication (shared variable, pipe, queue).
12. Graphical program design and implementation.

Recommended literature:
PILGRIM, Mark. Dive into Python 3. 2. United States of America: Apress, 2004. ISBN 978-1430224150. Dostupné také z: https://diveintopython3.net/

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:
Slovak language, knowledge of English language is only required to read documentation of Python.

Notes:

Course assessment
Total number of assessed students: 85

A	B	C	D	E	FX
7.06	14.12	27.06	17.65	20.0	14.12

Provides: PaedDr. Ján Guniš, PhD., univerzitný docent, doc. RNDr. Ľubomír Šnajder, PhD.

Date of last modification: 10.02.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 6.

Course level: I., N

Prerequisities: ÚINF/PAZ1a/15 and ÚINF/PAZ1b/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: 209

A	B	C	D	E	FX
12.44	5.74	18.18	26.32	34.45	2.87

Provides: RNDr. Rastislav Krivoš-Belluš, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 4.

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:
1: Chomsky hierarchy of grammars: alphabet, symbol (letter, character), transitive closure, word (string), empty word (empty string), length of a string, concatenation, language, grammar, nonterminal symbol, terminal symbol, initial nonterminal (initial symbol), grammar rule, derivation step, language generated by a grammar, Chomsky hierarchy of grammars - phrase-structure, context sensitive, context free, regular
2: Deterministic finite state automata: finite state automaton, state, input symbol, output symbol, initial state, transition function, output function, examples of automata and their graphic representation, generalized transition and output functions and their basic properties
3: Reduction of automata I: equivalent automata, minimal (optimal) automaton, reachable state, properties of reachable states, elimination of unreachable states
4: Reduction of automata II: equivalent states, k-equivalent states, properties of equivalence and k-equivalence, relation between k-equivalence and (k+1)-equivalence, partitioning the state set into equivalence classes, elimination of equivalent states
5: Reduction of automata III: proof of correctness, unambiguity, and optimality of reduced automaton, testing equivalence of two automata
6: Deterministic finite state acceptors: basic definitions, language recognized by a finite state acceptor, common properties of acceptors and automata with an output, minimizing a finite state acceptor
7: Operations with regular languages: complement, intersection, union, difference, symmetric difference, testing of emptiness, inclusion, equality, and disjointness for regular languages
8: Nondeterministic finite state acceptors: definition, transition function, language recognized by a nondeterministic acceptor, elimination of nondeterminism
9: epsilon-acceptors: definition, properties, elimination of epsilon-transitions

10: Regular grammars: regular grammar, extended regular grammar, transformation of acceptor to a regular grammar, transformation of extended regular grammar to an epsilon-acceptor
11: Regular expressions I: basic properties, transformation of regular expression to an epsilon-acceptor
12: Regular expressions II: regular equations, valid algebraic manipulations with regular expressions, solving an equation with a single unknown variable, solving a system of regular equations, transformation of acceptor to a regular expression
13: Another constructions: review of transformations among various representations, an example of a direct transformation of a grammar to a regular expression, closure of the class of regular languages under another language operations – concatenation and Kleene star, mirror image
14: Another operations: homomorphism and inverse homomorphism, a context-free language that is not regular

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:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 928

A	B	C	D	E	FX
27.16	18.32	23.6	16.49	9.7	4.74

Provides: prof. RNDr. Viliam Geffert, DrSc., RNDr. Juraj Šebej, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ BPO/14	**Course name:** Bachelor Thesis and its Defence
Course type, scope and the method: **Course type:** **Recommended course-load (hours):** **Per week: Per study period:** **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course:	
Course level: I.	
Prerequisities:	
Conditions for course completion: The bachelor thesis is the result of the student's own work. It must not show elements of academic fraud and must meet the criteria of good research practice defined in the Rector's Decision no. 21/2021, which lays down the rules for assessing plagiarism at Pavol Jozef Šafárik University in Košice and its components. Fulfillment of the criteria is verified mainly in the supervision process and in the process of thesis defense. Failure to do so is reason for disciplinary action.	
Learning outcomes: The bachelor's thesis demonstrates mastery of the basics of theory and professional terminology of the field of study, acquisition of knowledge, skills and competencies in accordance with the declared profile of the graduate of the study program, as well as the ability to apply them creatively in solving selected field problems. The bachelor thesis may have elements of compilation. The student demonstrates the ability of independent professional work in terms of content, formal and ethical. Further details on the bachelor thesis are determined by Directive no. 1/2011 on the basic requirements of final theses and the Study Regulations of UPJŠ in Košice for the 1st, 2nd and combined 1st and 2nd degree.	
Brief outline of the course: 1. Elaboration of the bachelor thesis in accordance with the instructions of the supervisor. 2, Presentation of the results of the bachelor's thesis before the examination commission. 3. Answering questions related to the topic of the bachelor thesis within the discussion.	
Recommended literature: The recommended literature is determined individually in accordance with the topic of the bachelor's thesis.	
Course language: Slovak and optionally English.	
Notes:	

Course assessment
Total number of assessed students: 153

A	B	C	D	E	FX
44.44	26.8	14.38	7.84	6.54	0.0

Provides:

Date of last modification: 28.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ KMU1/15	**Course name:** Coding and multimedial data transition
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 1 **Per study period:** 28 / 14 **Course method:** present	
Number of ECTS credits: 4	
Recommended semester/trimester of the course: 5.	
Course level: I., II.	
Prerequisities:	
Conditions for course completion: Homeworks, active participation in laboratory exercises, midterm test. Final written exam, oral examination.	
Learning outcomes: Understand the principles of lossy compression algorithms. Be able to apply different methods of quantization, prediction and difference procedures in lossy image and sound compression algorithms. Understand the JPEG and MPEG compression standards.	
Brief outline of the course: 1. Formal model of coding and information transfer, compression ratio, criteria of uniquely decodable codes, block and prefix lossless codes. 2. Coding with known distribution of probabilities of occurrences of input characters, relation to entropy, Huffman construction, adaptive variants. 3. Arithmetic coding, integer, binary, adaptive versions, advantages and disadvantages of statistical codes. 4. Context coding, prediction methods, JBIG, JPEG-LS standards, PPM. 5. Dictionary compression methods, LZ77, LZW, use of transformations, BWT, ACB, dynamic Markov chains. 6. Principles of lossy compression, RD function, probabilistic and physiological models for efficient compression. Uniform and non-uniform scalar quantization, adaptive versions. 7. Vector quantization, optimization according to distribution function, compressors and expanders. 8. Differential techniques, prediction methods, adaptive quantization with prediction, DPCM method, use in audio and video coding. 9. Transformations in lossy coding, orthonormal representations, component analysis, two-dimensional transformations. 10. Discrete Fourier transform, use in image compression, JPEG encoder. 11. Subband filters, signal decomposition, signal synthesis from subbands, use in sound compression, psychoacoustic models, MP3, AAC coding. 12. Wavelet transforms, EZW encoder, use in audio and video coding. 13. Video compression, MPEG standards, adaptive algorithms for streaming and video conferencing.	

Recommended literature:

1. D. Salomon: Data Compression, The Complete Reference, Springer, 2004.
2. K. Sayood: Introduction to Data Compression, Morgan Kaufmann, 2012.

Course language:

Slovak or English

Notes:

Course assessment

Total number of assessed students: 21

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

Provides: doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: CJP/ PFAJKKA/07	**Course name:** Communicative Competence in English

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.

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss two classes at the most.
2 credit tests (presumably in weeks 6/7 and 12/13) and an oral presentation in English.
Final evaluation consists of the scores obtained for the 2 tests (50%) and the presentation (50%).
Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.

Learning outcomes:

Brief outline of the course:

Recommended literature:
www.bbclearningenglish.com
Štěpánek, Libor a kol. Academic English-Akademická angličtina. Praha: Grada Publishing, a.s., 2011.
McCarthy M., O'Dell F.: English Vocabulary in Use, Upper-Intermediate. CUP, 1994.
Fictumova J., Ceccarelli J., Long T.: Angličtina, konverzace pro pokročilé. Barrister and Principal, 2008.
Peters S., Gráf T.: Time to practise. Polyglot, 2007.
Jones L.: Communicative Grammar Practice. CUP, 1985.
Additional study materials.

Course language:
English language, B2-C1 level according to CEFR

Notes:

Course assessment
Total number of assessed students: 301

A	B	C	D	E	FX
45.18	20.93	17.61	7.64	5.98	2.66

Provides: Mgr. Barbara Mitríková

Date of last modification: 11.02.2024
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: CJP/ PFAJGA/07	**Course name:** Communicative Grammar in English

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.

Prerequisities:

Conditions for course completion:
Active classroom participation (maximum 2 absences tolerated), homework assignments completed by given deadlines.
Powerpoint presentation of a topic related to the study field.
Final Test - end of semester, no retake
Final assessment = average of test and presentation.
Grading scale: A 93-100%, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64% and less

Learning outcomes:
The development of students´ language skills - reading, writing, listening, speaking, improvement of their communicative linguistic competence. Students acquire knowledge of selected phonological, lexical and syntactic aspects, development of pragmatic competence. Students can efectively use the language for a given purpose, with focus on Academic English and English on level B2.

Brief outline of the course:
Selected aspects of English grammar and pronunciation
Word formation
Contrast of tenses in English
The passive voice
Types of Conditionals
Phrasal verbs and English idioms
Words order and collocations, prepositional phrases

Recommended literature:
Vince M.: Macmillan Grammar in Context, Macmillan, 2008
McCarthy, O'Dell: English Vocabulary in Use, CUP, 1994
www.linguahouse.com
esllibrary.com
bbclearningenglish.com
ted.com/talks

Course language:

English language, level B2 according to CEFR.

Notes:

Course assessment
Total number of assessed students: 446

A	B	C	D	E	FX
41.48	19.51	15.7	7.85	5.61	9.87

Provides: Mgr. Viktória Mária Slovenská, Mgr. Lýdia Markovičová, PhD.

Date of last modification: 20.09.2023

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: KGER/ NJKG/07	**Course name:** Communicative Grammar in German Language

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.

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most (2x90 min.). 2 control tests during the semester. Final grade will be calculated as follows: A 93-100 %, B 86-92%, C 79-85%, D 72-78%, E 65-71%, FX 64 % and less.

Learning outcomes:
The aim of the course is to identify and eliminate the most frequent grammatical errors in oral and written communication, learning language skills of listening comprehension, speaking, reading and writing, increasing students 'language competence (acquisition of selected phonological, lexical and syntactic knowledge), development of students' pragmatic competence (acquisition of the ability to express selected language functions), development of presentation skills, etc.

Brief outline of the course:
The course is aimed at practicing and consolidating knowledge of morphology and syntax of German in order to show the context in grammar as a whole. The course is intended for students who often make grammatical errors in oral as well as written communication. Through the analysis of texts, audio recordings, tests, grammar exercises, monologic and dialogical expressions of students focused on specific grammatical structures, problematic cases are solved individually and in groups. Emphasis is placed on the balanced development of grammatical thinking in the communication process, which ultimately contributes to the development of all four language skills.

Recommended literature:
Dreyer, H. – Schmitt, R.: Lehr- und Übungsbuch der deutschen Grammatik. Hueber Verlag GmbH & Co. Ismaning, 2009.
Krüger, M.: Motive Kursbuch, Lektion 1 – 30. Huebert Verlag GmbH & Co. Ismaning, 2020.
Brill, L.M. – Techmer, M.: Deutsch. Großes Übungsbuch. Wortschatz. Huebert Verlag GmbH & Co. Ismaning, 2011.
Földeak, Hans: Sag's besser!. Grammatik. Arbeitsbuch für Fortgeschrittene. Huebert Verlag GmbH & Co. Ismaning, 2001.
Geiger, S. – Dinsel, S.: Deutsch Übungsbuch Grammatik A2-B2. Huebert Verlag GmbH & Co. Ismaning, 2018.
Dittelová, E. – Zavatčanová, M.: Einführung in das Studium der deutschen Fachsprache. Košice: ES UPJŠ, 2000.

Course language:
German, Slovak language

Notes:

Course assessment
Total number of assessed students: 57

A	B	C	D	E	FX
61.4	10.53	8.77	3.51	8.77	7.02

Provides: Mgr. Ulrika Strömplová, PhD.

Date of last modification: 13.08.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ POF1a/99	**Course name:** Computational Physics I

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: 4.

Course level: I.

Prerequisities: ÚFV/NUM/10

Conditions for course completion:
To successfully complete the course, the student must demonstrate a sufficient degree of understanding of the principles of computer solution of some typical physical problems. The basis of continuous assessment is participation and activity in exercises and work on assignments. The course ends with a final oral exam, the completion of which is conditional on the submission of all four assignments (projects) electronically and with the attached computer program. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits) and individual work on projects (2 credits). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).

Learning outcomes:
To teach the basic principles of computer solution of some typical physical problems. The course covers both the area of deterministic methods for solving problems by ordinary and partial differential equations as well as the area of stochastic Monte Carlo simulations and thus forms the basis for further study of more advanced computer methods contained in the follow-up course Computational Physics II.

Brief outline of the course:
1. Introduction to dynamical systems.
2. Numerical solution of systems of ordinary differential equations with initial condition.
3. Euler's method, convergence, error estimation and order of the method. One-step methods, Tylor-type and Runge-Kuta (RK2, RK4) methods.
4. Multistep methods, general linear method (explicit, implicit). Methods based on numerical quadrature.
5. Boundary value problems for ordinary differential equations.
6. Numerical solution of partial differential equations (PDE). Difference methods, their consistence, convergence and stability. Elliptic PDE.
7. Parabolic PDE, diffusion equation. Explicit and implicit methods.
8. Introduction to the Monte Carlo method. Monte Carlo integration and application in statistical physics.

9. Basics of probability theory. Monte Carlo estimate of mean and standard deviation. Central theorem of Monte Carlo sampling.
10. Simple and importance sampling. Markov chain. Perron-Frobenius theorem. Metropolis algorithm, detailed balance condition.
11. Monte Carlo simulations of lattice spin systems - application to Ising model.
12. Statistical analysis of Monte Carlo data.

Recommended literature:

Basic literature:

POZRIKIDIS, C.: Num. Comp. in Science and Engineering, Oxford Univ. Press, 2008.
GARCIA A.L.: Numerical Methods for Physics, Prentice-Hall, 1994.
LANDAU D.P., BINDER K.: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 5-th edition, 2021.

Other literature:

BERG, B.A.: Introduction to Markov Chain Monte Carlo Simulations and Their Statistical Analysis (http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf)
JANKE, W.: Monte Carlo Simulations of Spin Systems (http://www.physik.uni-leipzig.de/~janke/Paper/spinmc.pdf)

Course language:

Notes:

Course assessment

Total number of assessed students: 140

A	B	C	D	E	FX	N	P
29.29	17.86	12.14	14.29	19.29	2.86	0.0	4.29

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ POF1b/99	**Course name:** Computational Physics II

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: 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate a sufficient understanding of the basic methods of computer simulations of multiparticle systems. The basis of continuous assessment is participation and activity in exercises and work on assignments. The course ends with a final oral exam, the completion of which is conditional on the submission of all four assignments (projects) electronically and with the attached computer program. Credit rating of the course takes into account the following student workload: direct teaching (2 credits) and individual work on projects (2 credits). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%).

Learning outcomes:
To teach students to create simulation projects to help to solve various physical problems. To acquaint students with basic simulation methods of multiparticle systems by Monte Carlo and molecular dynamics and verify their practical implementation by preparing a computer program and analyzing the obtained results.

Brief outline of the course:
1. Methods of Monte Carlo (MC) simulations of lattice spin systems.
2. Local and cluster perturbation algorithms.
3. Errors and histogram analysis of MC data.
4. Reweighting by simple and histogram methods.
5. Universality and finite-size scaling.
6. Determination of order of phase transitions and calculation of critical exponents.
7. Basics of quantum MC simulations.
8. MC simulations of stochastic processes.
9. Diffusion equation.
10. Stochastic processes in financial analysis.
11.Basics of molecular dynamics method.
12. Discretization schemes of molecular dynamics.

Recommended literature:
Basic study literature:

LANDAU, D.P., BINDER, K.: A Guide to Monte Carlo Simulations in Statistical Physics, Cambridge Univ. Press, 5-th edition, 2021.
BOTTCHER, L., HERRMANN, H.J., Computational Statistical Physics, Cambridge Univ. Press, 2021.
Other study literature:
BERG, B.A.: Introduction to Markov Chain Monte Carlo Simulations and Their Statistical Analysis (http://www.worldscibooks.com/etextbook/5904/5904_intro.pdf)
JANKE, W.: Monte Carlo Simulations of Spin Systems (http://www.physik.uni-leipzig.de/~janke/Paper/spinmc.pdf)

Course language:

Notes:

Course assessment
Total number of assessed students: 57

A	B	C	D	E	FX
52.63	15.79	17.54	10.53	1.75	1.75

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VKN1/22	**Course name:** Computational and cognitive neuroscience I
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 2 **Per study period:** 28 / 28 **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 3., 5.	
Course level: I., N	
Prerequisities:	
Conditions for course completion: Midterm exam Final exam consisting of written and/or oral part	
Learning outcomes: Overview anatomy, physiology, and cognitive processes in the human brain with focus on computational aspects of cognition and computational tools used in neuroscience.	
Brief outline of the course: 1. Intro to neural and cognitive science 2. Overview of anatomy and physiology of the central nervous system (CNS) 3. Methods of study in neuroscience. Sensory, motor and associative brain areas. 4. Neuron: anatomy, types, action potential 5. Propagation of signals in the neuron, neural coding. 6. Synaptic transmission and plasticity - neural basis of learning and memory. 7. Psychology of memory and learning. 8. Vision: Intro. Perception of brightness, edges, color. Model BCS/FCS. Perception of size and sitance. 9. Hearing and auditory cognition. 10. Language, psycholinguistics, speech perception and production. 11. Attention. 12. Crossmodal interaction (vision, hearing, touch). 13. Reasoning and decision making.	
Recommended literature: 1. Poeppel D., Mangun G., Gazzaniga M. (ed.): The Cognitive Neurosciences. 6th ed. MIT Press. 2020. ISBN-13: 978-0262043250 2. Dayan P and LF Abbott: Theoretical Neuroscience - Computational and Mathematical Modeling of Neural Systems. MIT Press, 2005 ISBN-13: 978-0262541855 3. Thagard P: Mind: Introduction to Cognitive Science, 2nd Edition. Bradford Books. ISBN-13‏ : ‎978-0262701099	
Course language:	

Slovak or English

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

Course assessment
Total number of assessed students: 31

A	B	C	D	E	FX
25.81	19.35	25.81	22.58	3.23	3.23

Provides: doc. Ing. Norbert Kopčo, PhD., Ing. Peter Lokša, PhD., RNDr. Keerthi Kumar Doreswamy, Ing. Udbhav Singhal, Myroslav Fedorenko

Date of last modification: 14.02.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PTS/21	**Course name:** Computer and telecommunication networks

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Homeworks, active participation in laboratory exercises.
Final practical test, oral examination.

Learning outcomes:
Gain an orientation in the basic concepts and technologies used in computer and telecommunications networks. Acquire the main procedures and protocols of the physical and communication layer of the communication model. Gain practical experience in designing and setting up small local area and wireless computer networks and managing them using switches.

Brief outline of the course:
Transmission channels, principles of information dissemination, limitations of information theories. Types of signals, methods of modulation, synchronous and asynchronous transmission, synchronization. Merging data flows. Public telecommunications network, circuit switching, DSL, synchronous optical networks, digital hierarchy. Wireless transmissions, mobile networks, satellite communications. Communication standards, standardization organizations, ISO OSI reference model, tasks of individual layers of the model. Communication interface standards, signal coding, error handling - parity, sum, CRC. Media access control in local computer networks - competing method CSMA/CD, credential methods - protocols, algorithms, special event handling, priorities, quality of service. Access methods of wireless and WAN networks, use of mobile networks, Bluetooth, WPAN. Data flow control - simple acknowledge, continuous, sliding window confirmation method. Repeaters and bridges at the link layer. Transparent bridges - function, used algorithms, interconnection, remote bridging. Spanning-tree protocol, channel merging, virtual VLANs. Communication security, access control lists (ACLs). Computer network monitoring and troubleshooting.

Recommended literature:
1. TANENBAUM, A.S. Computer Networks, Prentice Hall, 2010, ISBN 0132126958
2. FOROUZAN, Behrouz A. a Sophia Chung FEGAN. Data communications and networking. 3rd ed. Boston: McGraw-Hill, 2004, ISBN 0-07-123241-9.
3. STALLINGS, William. Wireless Communications and Networks. : Prentice Hall, 2002, ISBN 0130408646

4. STALLINGS, William. Local and metropolitan area networks. 6th ed. Prentice Hall, 2000, ISBN 0-13-012939-0
5. PUŽMANOVÁ, Rita. Moderní komunikační sítě od A do Z, Brno: Computer Press, 2006. ISBN 80-251-1278-0.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 7

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

Provides: doc. RNDr. Jozef Jirásek, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 4.

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: 60

A	B	C	D	E	FX
16.67	18.33	16.67	23.33	18.33	6.67

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

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 2.

Course level: I., N

Prerequisities: ÚINF/PAZ1a/15 or ÚINF/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 55 points.

Learning outcomes:
Students will get the informations about principles and achitecture of Internet. They will understand the principles of ISO/OSI layers reference model for network communication. They will understand the meaning and usage of terms protocol, service, interface. They will analyze the parameters of communication channels, understand the function of interconnection devices (hub, switch, router). They will understand the structure of IP packets, addressing and how packets are transmitted, the principle of routing protocols and the creation of routing tables. They will understand the priciples of acknowledged TCP transport transmission and its implementation. They will know how to use the interface of UDP and TCP protocols in a program code. They will understand the basic application protocols of the Internet.

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 protocols 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:

Slovak or English

Notes:

Content prerequisities: basic programming skills in Java

Course assessment

Total number of assessed students: 315

A	B	C	D	E	FX
10.79	8.25	19.68	20.0	30.16	11.11

Provides: RNDr. Peter Gurský, PhD., doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Richard Staňa

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ KOPR/19	**Course name:** Concurrent programming

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
Creation and defense of given final projects. First project in area of parallel programming and the second one in area of distributed programming.

Learning outcomes:
Students will acquire the ability to practically create thread-safe programs, design solutions for cooperation and synchronization of threads, correctly terminate the work of threads, coordinate the thread of the graphical user interface with working threads, to create high-throughput programs based on Reactor's reactive current structures, coordinate the work of a distributed system through the Message Broker systems RabbitMQ and Apache Kafka.

Brief outline of the course:
1, Thread programming: Introduction to threads
2, Thread programming: Race conditions and atomicity of objects state
3, Thread programming: Composition of thread-safe classes
4, Thread programming: Concurrent collections
5, Thread programming: Threads coordination, synchronizers
6, Thread Programming: Executors
7, Thread programming: ForkJoinPool - work stealing design pattern
8, Thread programming: Termination of tasks, threads and executors
9, Thread Programming: Threads in JavaFx
10, Reactive programming: Reactive stream functions
11, Reactive programming: Stream generation, error handling, stream termination
12, Reactive programming: Design of reactive programs, reactive communication with a database
13, Reactive programming: WebFlux - reactive programming on the web
14, Message Brokers: Basic concepts for RabbitMQ - exchange, queues
15, Message Brokers: RabbitMQ - complex message routing, failover, structured messages, message acknowledgment
16, Message Brokery: Apache Kafka

Recommended literature:
1. GOETZ, Brian. Java concurrency in practice. Upper Saddle River, NJ: Addison-Wesley, c2006. ISBN 9780321349606.

2. HYDE, Paul. Java thread programming. Indianapolis, Ind.: Sams Pub., c1999. ISBN 0672315858.
3. Project Reactor documentation. Available online: <https://projectreactor.io/docs>
4. Project RabbitMQ documentation. Available online: <https://www.rabbitmq.com/documentation.html>
5. Project Apache Kafka documentation. Available online: <https://kafka.apache.org/documentation/>

Course language:
Slovak

Notes:
Content prerequisites: It is necessary to have mastered the basics of programming in Java in the scope of PAZ1a. There is an advantage if students know the JavaFX framework and Rest API in the range of PAZ1c.

Course assessment
Total number of assessed students: 112

A	B	C	D	E	FX
38.39	27.68	17.86	13.39	2.68	0.0

Provides: RNDr. Peter Gurský, PhD., RNDr. Róbert Novotný, PhD.

Date of last modification: 06.09.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ RASP/16	**Course name:** Creation of Reports in ABAP

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: 3

Recommended semester/trimester of the course: 4., 6.

Course level: I., N

Prerequisities: ÚINF/ABSP/16

Conditions for course completion:
Conditions for continuous evaluation:
Individual activities according to the teacher's assignment
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student has the ability to read database tables, , knows the structuring of the code.

Brief outline of the course:
1.-2. Reading database tables, selection screens, events.
3.-4. Declarations and branching of programs, working with internal tables.
5.-6. Function modules: upload, download and module creation, code structure, forms and includes.
7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 38

A	B	C	D	E	FX
65.79	10.53	2.63	0.0	15.79	5.26

Provides:

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/KZP/21	**Course name:** Creativity, responsibility and entrepreneurship

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

Number of ECTS credits: 3

Recommended semester/trimester of the course:

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 67

A	B	C	D	E	FX
88.06	5.97	0.0	0.0	1.49	4.48

Provides: RNDr. Rastislav Krivoš-Belluš, PhD., doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., Mgr. Zuzana Kožárová, PhD.

Date of last modification: 25.08.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 3., 5.

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: 27

A	B	C	D	E	FX
29.63	7.41	14.81	29.63	14.81	3.7

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

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 3., 5.

Course level: I., 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: 128

A	B	C	D	E	FX
14.06	9.38	14.84	14.84	31.25	15.63

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

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ DBS1a/15	**Course name:** Database 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: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Demonstration of adequate mastery of the content standard of the subject in the ongoing and final evaluation, the ability to formulate a problem in the acquired terminology and solve it within a project.
Written works during the semester, project.
Written and oral exam.

Learning outcomes:
After completing the course, the student acquires the principles of relational databases, is able to apply standard data models, design relational databases and formulate filtering queries.

Brief outline of the course:
1) Relational databases. Query language SQL, filtering.
2) Data types, operators, numerical, string and time functions.
3) JOIN operations.
4) AGGREGATION AND GROUP BY.
5) Data and database models. Relational scheme. RDB principles. Data integrity.
6) DB design, ER diagrams.
7) System commands about DB and tables. Cascading deletion and update.
8) Nested queries. ROLLUP. CASE expression.
9) Three-valued logic. Quantifiers and NOT. Set operations.
10) Data science and knowledge acquisition using R.
11) Data warehouses. Data cube. Pivot table.
12) Normalization of relational databases - 1. Relational algebra.

Recommended literature:
C.J. Date, Database Design and Relational Theory, 2012, O'Reilly Media, Inc., ISBN: 978-1-449-32801-6
J. Murach, Murach's MySQL, 3rd Edition, 2019, Mike Murach & Associates, Inc., ISBN-10: 1943872368
- R. Ramakrishnan, J. Gehrke, Database Management Systems, 2020, McGraw-Hill, ISBN13 9780071231510
- S. Krajčí: Databázové systémy, UPJŠ, 2005

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 950

A	B	C	D	E	FX
11.26	10.32	18.53	22.21	31.05	6.63

Provides: doc. RNDr. Csaba Török, CSc., RNDr. Lukáš Miňo, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ DBS1b/15	**Course name:** Database 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: 6

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚINF/DBS1a/15

Conditions for course completion:
Demonstration of adequate mastery of the content standard of the subject in the ongoing and final evaluation, the ability to formulate a problem in the acquired terminology and solve it within a project.
Written works during the semester, project.
Written and oral exam.

Learning outcomes:
After completing the course, the student will be able to apply more sophisticated techniques of relational databases, theoretical analysis of functional dependencies of attributes and is able to work with non-relational databases.

Brief outline of the course:
1) Introduction to SQL Server. Set operations. Window functions.
2) Stored procedures. System and user functions.
3) Views. CTE, recursion and transitive closure.
4) Transactions. Cursors. Pivoting.
5) Triggers and integrity. Physical organization of data, B-trees and indexes.
6) XML documents and their querying. JSON.
7) Functional dependencies and NF.
8) The latest normal form - ETNF.
9) Big data and NoSQL.
10) MongoDB, CRUD and cursors.
11) Aggregations and indices.
12) Replication and sharding.

Recommended literature:
- Date C.J., Database Design and Relational Theory, O'Reilly, 2012
- I. Ben-Gan, D. Sarka, A. Machanic, K. Farlee, T-SQL Querying, 2015, Microsoft Press, ISBN: 978-0-7356-8504-8
- I. Ben-Gan, T-SQL Fundamentals, Third Edition, 2016, Microsoft Press, ISBN: 978-1-5093-0200-0

- L. Davidson, Pro SQL Server Relational Database Design and Implementation, 2021, Apress, ISBN-13: 978-1-4842-6496-6
- K. Chodorow, MongoDB: The Definitive Guide, O'Reilly, second edition, 2013

Course language:
Slovak or English

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

Course assessment
Total number of assessed students: 793

A	B	C	D	E	FX
9.58	8.7	14.12	24.34	33.54	9.71

Provides: doc. RNDr. Csaba Török, CSc., RNDr. Dávid Varga, RNDr. Lukáš Miňo, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ VMA1/21	**Course name:** Development of mobile applications

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Active participation in course chat. Implementing and delivering a complex mobile app and presenting technical approach and implementation in a public demo.

Learning outcomes:
Student is able to develop and deliver mobile apps on Android. She knows platform-specic features and is able to program in Kotlin.

Brief outline of the course:
1. Principles and specifics of mobile app development. IDEs. Activities and widgets. Attributes and event handling.
2. Widget layout for flexible and dynamic user interfaces. Activity lifecycle. Persisting state between activity restarts.
3. List widget. RecyclerView. Multiple activities and passing data between them.
4. ViewModels as a separation between data, view and business logic.
5. Using SQL for persistent data. Connecting widgets and data via viewbinding.
6. Internet communication via REST API. Coroutines for asynchronous code.
7. Layouting apps for tablets and small devices.
8. Permissions. Sending SMS messages. Persisting simple app data via Shared Preferences.
9. Camera and multimedia. Using content providers for system-wide data.
10. Services as a means of long background operations. Notifications.
11. Complex navigation by using Navigator components. Animating transitions between activities.
12. Recyclerview and batch event handling.

Recommended literature:
1. Mark L. Murphy: The Busy Coder's Guide to Android Development. CommonsWare, LLC, 2009. ISBN: 978-0981678009
2. W. Frank Ableson, Robi Sen, Chris King and C. Enrique Ortiz: Android in Action Third Edition. Manning, 2011. ISBN 9781617290503
3. Bill Philips, Christ Stewart, Kristin Marsicano: Android Programming: The Big Nerd Ranch Guide. Big Nerd Ranch Guides. ISBN 978-0134706054

Course language:

Slovak or English

Notes:
Content prerequisities: Java programming skills. Object-oriented programming proficiency. Basic experience in concurrent and thread programming.

Course assessment
Total number of assessed students: 106

A	B	C	D	E	FX
53.77	4.72	13.21	5.66	5.66	16.98

Provides: RNDr. Miroslav Opiela, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ DSM3a/10	**Course name:** Discrete mathematics for informaticians

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: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Course evaluations consists of small tests (5x2 points), 2 semestral tests (each for 20 points), exam test (for 30 points) and oral exam (for 20 points).
During the semester it is possible to get an additional 10 bonus points for activity on classes or for solving bonus homework, respectively (these points are extra and they do not count to maximum of 100 points).
Evaluation:
100 - 90p: A, 89.5 - 80p: B, 79.5 - 70p: C, 69.5 - 60p: D, 59.5 - 50p: E, 49.5p and less: Fx

Learning outcomes:
To present the basics of combinatorics and their applications in computer science. After successful completion of the course, the student should understand the basic principles of combinatorics, calculating different types of configurations, understand the basic concepts of graph theory and the basic principles of selected graph algorithms, usage of graphs for solving the real life problems.

Brief outline of the course:
Mathematical induction and Dirichlet principle. The sum and the product rule. Permutations, k-permutations, combinations. Selections with repetitions. The inclusion/exclusion principle. Recurrent equations. Introduction to graph theory. Trees and spanning trees. Search algorithms in graphs, shortest path algorithms. Eulerian and Hamiltonian graphs. Planar graphs. Graph colorings.

Recommended literature:
1. S. Jendroľ, P. Mihók: Diskrétna matematika I., UPJŠ Košice 1992
2. J. Nešetřil, J. Matoušek: Kapitoly z diskrétni matematiky
3. E. R. Scheinerman: Mathematics - a discrete introduction, Brooks/Cole Publ. Comp. Pacific Grove 2000.
4. R.P. Grimaldi: Discrete and Computational Mathematics, Addison-Wesley Publ. Co.-Rending 1994.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 743

A	B	C	D	E	FX
12.79	12.38	16.02	20.32	31.36	7.13

Provides: prof. RNDr. Tomáš Madaras, PhD., RNDr. Daniela Matisová

Date of last modification: 16.04.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: CJP/ PFAJ4/07	**Course name:** English Language of Natural Science

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Active participation in class and completed homework assignments. Students are allowed to miss 2 classes at the most
Continuous assessment:
1 credit test taken presumably in weeks 6/7
1 project (quiz on the topic of the student´s field of study) 25% of the continuous assessment
5 LMS quizzes (25% of the continuous assessment)
In order to be admitted to the final exam, a student has to score at least 65 % from the continuous assessment
The exam test results represent 50% of the final grade for the course, continuous assessment results represent the other 50% of the final grade.
The final grade for the course will be calculated as follows:
A 93-100, B 86-92, C 79-85, D 72-78, E 65-71, FX 64 and less.

Learning outcomes:
Enhancement of students' language skills (speaking, writing, reading and listening comprehension) in English for specific and academic purposes and development of students' linguistic competence. Students obtain knowledge of selected phonological, lexical and syntactic aspects of professional English, improve their pragmatic competence - students can effectively use the language for a given purpose, and acquire presentation skills at B2 level (CEFR) with focus on terminology of natural sciences.

Brief outline of the course:
1. Introduction to studying language
2. Selected aspects of scientific language
3. Talking about academic study
4. Discussing science
5. Defining scientific terminology and concepts
6. Expressing cause and effect
7. Describing structures
8. Explaining processes
9. Comparing objects, structures and concepts

10. Talking about problem and solution
11. Referencing authors
12. Giving examples
13. Visual aids and numbers
14. Referencing time and place
Presentation topics related to students´study fields.

Recommended literature:

lms.upjs.sk - e-kurz Odborný anglický jazyk pre prírodné vedy.
Redman, S.: English Vocabulary in Use, Pre-intermetdiate, Intermediate. Cambridge University Press, 2003.
Armer, T.: Cambridge English for Scientists. CUP, 2011.
Wharton J.: Academic Encounters. The Natural World. CUP, 2009.
P. Fitzgerald : English for ICT studies. Garnet Publishing, 2011.
https://worldservice/learningenglish, https://spectator.sme.sk
www.isllibrary.com
linguahouse.com

Course language:
English, level B2 (CEFR)

Notes:

Course assessment
Total number of assessed students: 3239

A	B	C	D	E	FX
38.53	26.37	16.3	9.54	7.19	2.07

Provides: Mgr. Viktória Mária Slovenská, Mgr. Lenka Klimčáková, Mgr. Katarína Szabová, PhD.

Date of last modification: 06.02.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ABSP/16	**Course name:** Essentials of ABAP

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: 3

Recommended semester/trimester of the course: 3., 5.

Course level: I., N

Prerequisities: ÚINF/ZTSP/16

Conditions for course completion:
Conditions for continuous evaluation:
Individual activities according to the teacher's assignment
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student has the ability to create basic reports in the ABAP programming language, create queries and subsequently process the data using different data types, got acquainted with the selection screen and function modules.

Brief outline of the course:
1.-2. Principles of programming in ABAP, declaration of variables, the basic syntax of the language ABAP Open SQL, ABAP Workbench navigation, ABAP editor.
3.-4. Arithmetic, logic conditions, string operations, cycles, test programs using a debugger.
5.-6. An overview of the most important commands of ABAP, definition elementary and structured data objects, functional groups and function modules.
7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic),

teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 68

A	B	C	D	E	FX
26.47	36.76	22.06	1.47	10.29	2.94

Provides:

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZLSP/16	**Course name:** Essentials of Linux for the SAP

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: 3

Recommended semester/trimester of the course: 5.

Course level: I., N

Prerequisities: ÚINF/ZTSP/16

Conditions for course completion:
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student masters the basics of Linux - commands, permissions and work with files advanced, masters the basics of networking and scripting and knows the SAP architecture at the OS level.

Brief outline of the course:
1.-2. Introduction to Linux: commands, permissions & processes, work with the files.
3.-4. Advanced Linux: advanced commands.
5. Basics of networking & scripting.
6. SAP architecture on OS level.
7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment Total number of assessed students: 38	
abs	n
92.11	7.89
Provides: RNDr. PhDr. Peter Pisarčík	
Date of last modification: 21.11.2021	
Approved: doc. RNDr. Jozef Jirásek, PhD.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZSSP/16	**Course name:** Essentials of the SAP System for Users

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: 3

Recommended semester/trimester of the course: 3., 5.

Course level: I., N

Prerequisities: ÚINF/ZTSP/16

Conditions for course completion:
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student has a basic overview of the meaning and impact of SAP, SAP processes and modules, basic concepts of financial accounting, FI components, the principle of documentation, can solve practical tasks in general ledger accounting - enter a document, display a document, display / change GL account items, can display account balances, can cancel a document, controls transactions to choose from cashier on the bank account, posting the subsidy to the cashier, posting the sent payment according to the bank statement.

Brief outline of the course:
1. Characteristics of modern systems, effective solutions for the management and operation of the institution, fundamental processes in the institution of government, support for the process from the system - the meaning and impact of SAP, processes and SAP modules, support in terms of functionality, technical and implementation, user roles and profiles in SAP, analysis of realized case studies of SAP deployment in the conditions of the company.
2. SAP ERP Financials (FI) - basic concepts of financial accounting, basic characteristics of FI. FI components. Principles and organizational elements of FI. Principle of documentation, accounting periods, FI master data (chart of accounts, accounting groups, general ledger (GL) accounts, account balances, control accounts).
3.-4. FI - general and secondary books, general ledger accounting, entering general ledger account documents, display of GL document, display / change of GL account items, display of account balances, cancellation of document - cancellation.

5. FI - withdrawal from the cashier to the bank account, posting the subsidy to the cashier, posting of the sent payment according to the bank statement.
6.-7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 100

abs	n	neabs
96.0	2.0	2.0

Provides: Bc. Martin Tomko

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ZTSP/16	**Course name:** Essentials of the SAP Technology

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3., 5.

Course level: I., N

Prerequisities:

Conditions for course completion:
Conditions for the final evaluation:
Final test (theoretical and practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, within which the student has a basic overview of enterprise information systems, SAP system, overview of processes in the system, overview of roles and profiles in SAP, controls basic navigation in the system, can start a specific transaction, manages data search and display, running multiple modes, creating favorites, can customize output formats and can create reports.

Brief outline of the course:
1. Enterprise information systems - enterprise architecture, processes, deployment of enterprise IS. Introduction to mySAP technology. SAP - benefits, distribution, components, modules, transactions, economic benefits of deployment in the organization.
2. SAP applications and components, overview of SAP solutions for large, medium and small businesses. SAP technology infrastructure (client / server architecture, transactions, client as a logically integrated organizational unit, job positions).
3. SAP basics and navigation - login, SAP screen elements, form design, system movement, use of standard keys and screen icons, transaction start, input fields, command shortcuts, Favorites tab, user-specific settings.
4. SAP basics and navigation - multiple modes, command shortcuts, searching and displaying data - variants, output format - changing and saving the layout, creating a report.
5. SAP basics and navigation - Business Workplace, report printing, report export to local file, system information.

6.-7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 408

abs	n	neabs
96.81	0.98	2.21

Provides: Bc. Martin Tomko

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ FAN/15	**Course name:** Forensic analysis

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities: ÚINF/BPD1/15

Conditions for course completion:
The condition for passing the course is: 1. Homeworks (25% of the total number of points), 2. Written final theoretical exam (40% of the total number of points), 3. Successful realization of a project focused on the forensic analysis of a specific case (35% of the total number of points).

Learning outcomes:
The result of the education is an understanding of the technical, legal and procedural methods and procedures in digital forensic analysis, from the identification and acquiring of digital evidence to their usage in security incident handling or in civil or criminal proceedings.

Brief outline of the course:
1. Introduction to forensic analysis, 2. Legal and ethical aspects of forensic analysis, 3. Security incident handling and the first response, 4. Live forensic analysis, 5. Identification and acquiring of digital evidence, 6. Extraction of digital evidence and forensic images handling, 7. Analysis of the Windows operating system I. (basic aspects), 8. Analysis of the Windows operating system II. (user data), 10. Analysis of Linux operating system, 11. Network forensic analysis, 12. Forensic analysis of mobile devices, 13. Evaluation and presentation of digital evidence analysis, 14. OSINT.

Recommended literature:
1. ARNES, André. Digital Forensics. 1. Wiley, 2017. ISBN 978-1119262381, 2. FORTUNA, Andrea. The little handbook of Windows Memory Analysis: Just some thoughts about memory, Forensics and Volatility!. 1. 2019. ISBN 978-1798027400, 3. CARRIER, Brian. File System Forensic Analysis. 1. Addison-Wesley Professional, 2005. ISBN 978-0321268174, 4. CARVEY, Harlan. Investigating Windows Systems. 1. Academic Press, 2018. ISBN 978-0128114155.

Course language:
Slovak or English

Notes:
Content prerequisites: understanding of fundamental concepts of operating systems, computer networks, basic skill in Linux shell (e.g. bash) and Powershell.

Course assessment
Total number of assessed students: 29

A	B	C	D	E	FX
41.38	31.03	13.79	6.9	6.9	0.0

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

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/FUN1/21	**Course name:** Functional programming

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Evaluation of active participation in exercises and evaluation of homeworks. Work on a semester project.

Learning outcomes:
To learn bases of declarative programming (as complementary method to procedural programming) and basic methods of implementations of functional programming language Haskell.

Brief outline of the course:
1. Introduction to functional programming
2. Types, types of types, type variables
3. Syntax and the most important specifics of the Haskell language
4. Recursion
5. Lists
6. Data analysis 1.
7. Data analysis 2.
8. Data analysis 3.
9. Graphic outputs
10. Functions of higher ranks
11. Creating your own types
12. Monads

Recommended literature:
ABELSON, H. a G. J. SUSSMAN. Structure and interpretation of computer programs. Cambridge: MIT Press, 2002. ISBN 0-262-01153-0.
LIPOVAČA, Miran. Learn you a haskell for great good!: a beginner's guide. San Francisco: No Starch Press, 2011. ISBN 978-1-59327-283-8.
O´SULLIVAN, Bryan, Don STEWART a John GOERZEN. Real world Haskell. Beijing: O´Reilly, 2008. ISBN 978-0-596-51498-3.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 95

A	B	C	D	E	FX
44.21	13.68	16.84	14.74	10.53	0.0

Provides: doc. RNDr. Ondrej Krídlo, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ GRP/13	**Course name:** GRID computing

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 7

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

Provides: RNDr. Martin Vaľa, PhD.

Date of last modification: 30.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚGE/ GIS/15	**Course name:** Geographic Information 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: 6

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
The assessment is a combination of continual control during the practicals and the final exam in the examination period. The continual assessment is performed during the semester and it involves 2 written tests in the mid-term and end of the semester and a project report generated according to the assignment and practical skills acquired during the practicals. The student can proceed to the final exam in case he or she acquired at least 50 points of 100 in all elements of the the continual assessment. The final assessment mark is based on the average number points received in the mid-term test, project report, practicals assessment, and final exam. The final exam is a written test comprising 3-4 questions. The credits are given in case the student had reached at least the E mark in continual assessment and final exam. The following marking scheme is applied in the assessment: A (100-90 points), B (80-89 points), C (70-79 points), D (60-69 points), E (50-59 points), FX (0-49 points).

Learning outcomes:
The students gain knowledge on the intermediate levele in the theory of geoinformation science, GIS, and Remote Sensing, GIS data models, methods of data processing and spatial analysis.
They gain practical skills in processing of geographic data, management, analysis, and visualisation of the geographic data in a GIS project.
Students acquire competence in defining a GIS project, suitabla data models, methods of data acquisition, data processing, analysis and visualisation, presentation skills and skills in team work.

Brief outline of the course:
The course is focused on the following topics: geoinformatics as a scientific discipline, components of geographic information system, digital landscape representation and data models, GIS standards for coordinate systems and transformations, collection of geographic data for GIS (GNSS, photogrammetry, multispectral satellite imagery, lidar, radar) , data management in GIS, attribute and spatial demands, layer overlap, map algebra, spatial prediction, quality and uncertainty of geographic data, GIS web solutions, legislative aspects in GIS, GIS applications in practice.
Exercises are focused on working in ArcGIS Pro: basic and advanced vectorization, data organization in the geodatabase, import / export of various data formats to GIS, creation of color compositions from satellite images, mapping, 3D visualization and animation of geographic data, geoprocessing, map algebra, spatial and attribute demands, spatial prediction, analysis of digital

elevation models (DEM). Students learn the topics of the semester project in the middle of the semester and solve the assigned task in the team using the skills and knowledge acquired during the semester.

Recommended literature:

Course language:
Slovak or Czech or English

Notes:

Course assessment
Total number of assessed students: 393

A	B	C	D	E	FX
27.99	26.72	27.23	12.47	5.6	0.0

Provides: doc. Mgr. Michal Gallay, PhD., Mgr. Michaela Nováková, PhD.

Date of last modification: 27.06.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ANO/15	**Course name:** Image analysis

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3., 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Rules of the final examination: two parts of the final exam - theoretical oral exam and disscussion on the practical assignment.
Rules to pass the subject: Get at least 50% from both parts of the final exam. The grade will be calculated based on the result from the final exam and assignments during semester.

Learning outcomes:
To examine selected computer vision methods. To get an ability to implement chosen solutions and evaluate them on practical problems.

Brief outline of the course:
1. Introduction to computer vision.
2. Color, grayscale, binary image. Thresholding, histogram, histogram equalisation. Mathematical morphology.
3. Noise, noise removal. Filtering, convolution.
4. Frequency domain filtering, Fourier transformation, convolution theorem, sinusoid, sampling, aliasing. Method of least squares, RANSAC. Hough transform for line and circle detection.
5. Edge detection, gradient, Laplacian, Canny edge detector, corner detection.
6. Image segmentation. Clustering (k-means, meanshift). Grabcut. Active contour method. Textures.
7. Features. Blob detection. SIFT detector and descriptor. Geometric transformations.
8. Recognition. Machine learning and neural networks in computer vision. Image preprocessing, image whitening, data augmentation. Face detection, Haar features.
9. Object tracking in image sequences, mixture of Gaussians, template matching, tracking.
10. Image formation - pinhole camera. Projection from 3D to 2D, external and internal matrix, camera calibration, epipolar geometry, depth of image.

Recommended literature:
1. SZELISKI, Richard. Computer Vision: Algorithms and Applications. London: Springer, 2010. Texts in computer science. ISBN 978-1-84882-934-3.
2. ŠONKA, MIlan, HLAVÁČ, Václav a Roger BOYLE: Image Processing, Analysis, and Machine Vision. Cengage Learning, 2014. ISBN 978-1-133-59360-7.

3. ŠONKA, Milan a Václav HLAVÁČ. Počítačové vidění: první česká kniha o zpracování digitalizovaných obrazů ; rozpoznávání objektů v obrazech ; analýza trojrozměrných a pohybujících se objektů ; příklady aplikací počítačového vidění. Praha: Grada, 1992. Nestůjte za dveřmi (Grada).
4. ŠIKUDOVÁ, Elena. Počítačové videnie: detekcia a rozpoznávanie objektov. Praha: Wikina, [2014]. ISBN 978-80-87925-06-5.
5. NAYAR, Shree. First Principles of Computer Vision. [online: https://fpcv.cs.columbia.edu/]

Course language:
Slovak, English.

Notes:

Course assessment
Total number of assessed students: 53

A	B	C	D	E	FX
39.62	18.87	16.98	7.55	16.98	0.0

Provides: RNDr. Miroslav Opiela, PhD.

Date of last modification: 24.05.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/MIN1/15	**Course name:** Informatics for medicine

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3., 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Conditions for continuous evaluation: activity on excercises, homeworks, test
Conditions for the final evaluation: Oral and written exam

Learning outcomes:
To present an application of computer science in medicine domain with emphasis on the specific conditions for so-called safety-relevant domain.

Brief outline of the course:
Introduction to medical informatics. Clinical workflow. Healthcare services. SW projects in the medical domain. Development methodologies in SW projects in the medical domain. Agile methods in medical projects, eXtreme programming, fast methods versus robust methods. Development tools in SW projects in the medical domain.

Recommended literature:
1. Company literature of SIEMENS. Available on-line: <http://www.siemens.com>
2. Company literature of SYNGO. Available on-line: <http://www.syngo.com>

Course language:
Slovak or English

Notes:
Content prerequisities: foundations of software engineering

Course assessment
Total number of assessed students: 87

A	B	C	D	E	FX
78.16	21.84	0.0	0.0	0.0	0.0

Provides: Ing. Marián Zorkovský

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/MIN2/15	**Course name:** Informatics for medicine

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities: ÚINF/MIN1/15

Conditions for course completion:
Conditions for continuous evaluation: homeworks, test
Conditions for the final evaluation: oral and written part of exam

Learning outcomes:
Point out the application of informatics in the medical domain, taking into account the specifics for the so-called safety-relevant domain.

Brief outline of the course:
Medical standards and protocols. Integration testing. Project management in the medical domain. Quality management in the medical domain. CM - configuration management. Organization and management of the company's SW.

Recommended literature:
1. Company literature of SIEMENS. Available on-line: <http://www.siemens.com>
2. Company literature of SYNGO. Available on-line: <http://www.syngo.com>

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 13

A	B	C	D	E	FX
46.15	23.08	7.69	7.69	15.38	0.0

Provides: Ing. Marián Zorkovský

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/MAIN/15	**Course name:** Interdisciplinary applications of informatics

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: (ÚINF/ANO/15 or ÚINF/AFJ1a/15) and (ÚINF/ASU1/15 or ÚFV/POF1b/99 or ÚFV/UPF1/12) and (ÚINF/UNS1/15 or ÚINF/VKN1/22 or ÚFV/NOT1b/03)

Conditions for course completion:
Appropriate knowledge and competencies from the profile courses of specialisation Interdisciplinary applications of informatics, demonstrating the ability to synthesise the acquired knowledge and
procedures and apply them to problems from the area of informatics.

Learning outcomes:
Verification of acquired student competencies in accordance with the graduate profile.

Brief outline of the course:
1. Programming techniques, data structures, algorithms and their complexity.
2. Principles of operating systems.
3. Database systems.
4. Neural networks.
5. Computational and cognitive neuroscience.
6. Non-traditional optimization techniques.
7. Image analysis methods.
8. Automata, formal languages and their applications.

Recommended literature:
Information sources recommended within individual profile courses.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 9

A	B	C	D	E	FX
22.22	11.11	33.33	11.11	22.22	0.0

Provides:

Date of last modification: 28.11.2021
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ZIV1/21	**Course name:** Internet of Things

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
Graded activities: small assignments, final complex project.
Rules to pass the subject: Create the final project matching minimal requirements and write the report. Get at least 50% of points from assignments.

Learning outcomes:
To get an overview in the field of Internet of Things and to understand basic concepts. To get an ability to design and implement particular IoT solutions (connecting sensors and actuators to microcontrollers, inter-device communication, data processing and cloud services).

Brief outline of the course:
1. Introduction to IoT, repetition of physics curriculum covering direct current, voltage divider.
2. Arduino, programming in Arduino IDE, sensors and actuators, basic components connection (button, LED, potentiometer, photoresistor).
3. Serial communication, UART, turtle graphics (Java) in connection with sensors and actuators (Arduino).
4. Digital synchronous and asynchronous communication, SPI, I2C protocol, 7-segment display, I2C expander, buzzer and creating melodies.
5. Sensor data, overview of sensor modules, smartphone sensors, filtering measured values.
6. Application layer protocols (MQTT), overview of IoT protocols.
7. Node-RED, open-data processing, IoT dashboard, connection with Arduino.
8. Raspberry PI, remote access, security in IoT.
9. Cloud computing, AWS services dedicated to IoT.
10. Machine learning, basic overview from the IoT point of view, focus on data preprocessing and evaluation.
11. Existing solutions - projects developed by students and IT companies.

Recommended literature:
1. SELECKÝ, Matúš. Arduino: uživatelská příručka. Přeložil Martin HERODEK. Brno: Computer Press, 2016. ISBN 9788025148402.
2. UPTON, Eben a Gareth HALFACREE. Raspberry Pi: uživatelská příručka. 2., aktualizované vydání. Přeložil Jakub GONER. Brno: Computer Press, 2016. ISBN 9788025148198.
3. MONK, Simon. Programming Arduino, 2. vyd, McGraw-Hill, 2016. ISBN 9781259641633

Course language:
Slovak language. English language is required for accessing AWS and other resources.

Notes:

Course assessment
Total number of assessed students: 66

A	B	C	D	E	FX
68.18	9.09	9.09	7.58	3.03	3.03

Provides: RNDr. Miroslav Opiela, PhD., RNDr. Viktor Pristaš

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: Dek. PF UPJŠ/USPV/13	**Course name:** Introduction to Study of Sciences
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week: Per study period:** 12s / 3d **Course method:** present	
Number of ECTS credits: 2	
Recommended semester/trimester of the course: 1.	
Course level: I.	
Prerequisities:	
Conditions for course completion:	
Learning outcomes:	
Brief outline of the course:	
Recommended literature:	
Course language:	
Notes:	

Course assessment
Total number of assessed students: 2206

abs	n
89.39	10.61

Provides: doc. RNDr. Marián Kireš, PhD.
Date of last modification: 30.08.2022
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ UUI/23	**Course name:** Introduction to artificial intelligence
Course type, scope and the method: **Course type:** Practice **Recommended course-load (hours):** **Per week:** 2 **Per study period:** 28 **Course method:** present	
Number of ECTS credits: 3	
Recommended semester/trimester of the course:	
Course level: I.	
Prerequisities:	
Conditions for course completion: 1. Participation in exercises (max. 3 absences per semester) 2. Take the Elements of AI course (with certificate) 3. Write an essay on the given topic (min. 50% points) 4. Develop and present a AI implementation proposal project (min. 50% points)	
Learning outcomes: After completing the course, students can - To identify the basic application areas of the use of AI nowadays - Characterize basic AI tools and procedures - Critically analyze the acquired knowledge, reevaluate it and use it in practice - Discuss the ethical, legal and social aspects of using AI - Propose the possibilities of using AI in the chosen field of science, research, industry, art or everyday life	
Brief outline of the course: 1. First encounter with artificial intelligence - what is and what is not AI, basic terminology, domains of AI 2. UI tools and procedures 3. Machine learning 4. Neural networks 5. Robotics and AI 6. AI around us 7. AI in art and entertainment 8. Chatbots and linguistic models 9. Ethical, legal and social applications of AI 10. Design Thinking exercises: AI implementation design project 11. Projects presentations	
Recommended literature: Elements of AI (https://course.elementsofai.com/)	

Microsoft Azure AI fundamentals: get started with artificial intelligence (https://learn.microsoft.com/sk-sk/training/paths/get-started-with-artificial-intelligence-on-azure/?wt.mc_id=academic-77998-cacaste)
People + AI guidebook (https://pair.withgoogle.com/guidebook/)
Fan, S.: will AI replace us? A primer for the 21st century. Thames&Hudson, 2019. ISBN 978-0-500-29457-4
Using AI for social good (https://ai.google/education/social-good-guide/)
Europe's approach to artificial intelligence: how AI strategy is evolving (https://www.accessnow.org/cms/assets/uploads/2020/12/europes-approach-to-ai-strategy-is-evolving.pdf)
The essential AI handbook for leaders (https://peltarion.com/peltarions-essential-ai-handbook-for-leaders.pdf)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 22

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

Provides: Ing. Zuzana Tkáčová, Ing.Paed.IGIP.

Date of last modification: 07.03.2023

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/UGR1/15	**Course name:** Introduction to computer graphics

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3., 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To provide the students with knowledge of graphics algorithms and basic principles of computer graphics.

Brief outline of the course:
Graphics hardware, input and output devices. Color models, palettes. Raster graphics algorithms for drawing 2D primitives. Filling and clipping. Curve modeling, interpolations and approximations, spline forms, Bézier curves, B-splines, surfaces. Homogenous coordinates, affine transformations, perspective and parallel projections. Visible-surface determination, illumination and shading. Rendering techniques, photorealism, textures, ray tracing, radiosity. Object representations, computer animation, virtual reality.

Recommended literature:
FOLEY, J. D., van DAM, A., FEINER, S., HUGHES, J.: Computer Graphics: Principles and Practice, Addison-Wesley, 1991
MORTENSON, M.E.: Geometric modeling, 2.ed., Willey, 1997

Course language:

Notes:

Course assessment
Total number of assessed students: 326

A	B	C	D	E	FX
12.58	10.12	13.8	23.62	32.21	7.67

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

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ UIB1/21	**Course name:** Introduction to information security
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: 5.	
Course level: I., N	
Prerequisities:	
Conditions for course completion: The condition for passing the course is: 1. Exercise tasks (20% of the total number of points), 2. Homeworks (30% of the total number of points), 3. Written final theoretical exam (25% of the total number of points), 4. Written final practical exam (25% of the total number of points).	
Learning outcomes: The result of the education is an understanding of the basic concepts of information security from the technical, legal and procedural views of point.	
Brief outline of the course: 1. Introduction to information security and information security model, 2. Information security management, 3. Risk and risk management, 4. Legal, normative and ethical aspects of information security, 5. Continuity management of activities, processes and security incidents handling, 6. Introduction to cryptology, 7. Access control, 8. Physical and environmental security, 9. Human resources security and social engineering, 10. End point security and malicious code, 11. Computer network security, 12. Application security, 13. Final exam.	
Recommended literature: 1. MARTIN, Andrew, Awais RASHID, Steve SCHNEIDER a Howard CHIVERS. CyBOK: The Cyber Security Body of Knowledge. The National Cyber Security Centre, 2021, 2. ANDRESS, Jason, Awais RASHID, Steve SCHNEIDER a Howard CHIVERS. Foundations of Information Security: A Straightforward Introduction. 1. No Starch Press, 2019. ISBN 978-1718500044, 3. PELTIER, Thomas, Awais RASHID, Steve SCHNEIDER a Howard CHIVERS. Information Security Fundamentals. 2. Boca Raton: Auerbach Publications, 2013. ISBN 978-1138436893.	
Course language: Slovak or English	
Notes:	

Course assessment
Total number of assessed students: 154

A	B	C	D	E	FX
38.96	25.97	22.08	7.14	2.6	3.25

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Eva Marková

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 3., 5.

Course level: I., N

Prerequisities:

Conditions for course completion:
The condition for passing the course is the realization of a project with the application of neural networks, successful completion of two written tests in the field of neural networks, their basic types, and genetic algorithms, as well as successful completion of the written and oral part of the exam.

Learning outcomes:
The result of the education is an understanding of the basic principles of neural networks and genetic algorithms. The student will gain the ability to apply the acquired knowledge in intelligent data analysis and also work with a selected tool for modeling neural networks.

Brief outline of the course:
1. Basic concept arising from biology. Linear threshold units, polynomial threshold units, functions calculable by threshold units.
2. Perceptrons. Linear separable objects, adaptation process (learning), convergence of perceptron learning rule, higher order perceptrons.
3. Forward neural networks, hidden neurons, adaptation process (learning), backpropagation method.
4. Recurrent neural networks. Hopfield neural networks, properties, associative memory model, energy function, learning, optimization problems (business traveler problem).
5. Model of gradually created network. ART network, architecture, operations, initialization phase, recognition phase, search and adaptation phase. Use of the ART network.
6. Applications of studied models in solving practical problems.
7. Written test I.
8. Motivation to model genetic elements. Genetic algorithm. Application of genetic algorithms.
9. Genetic programming, root trees, Read's linear code. Basic stochastic optimization algorithms: blind algorithm and climbing algorithm. Forbidden search method.
10. Genetic and evolutionary programming with typing, examples of use. Grammatical evolution.
11. Special techniques of evolutionary computations. Selection mechanisms in evolutionary algorithms.
12. Use of genetic algorithms in training neural networks. Artificial life.
13. Written test II.

Recommended literature:

1. AGGARWAL, Charu C. Neural networks and deep learning: a textbook. Cham: Springer, 2018. ISBN 978-3319944623.
2. KVASNIČKA, Vladimír. Úvod do teórie neurónových sietí. [Slovenská republika]: IRIS, 1997. ISBN 80-88778-30-1.
3. KVASNIČKA, Vladimír. Evolučné algoritmy. Bratislava: Vydavateľstvo STU, 2000. Edícia vysokoškolských učebníc. ISBN 80-227-1377-5.
4. MITCHEL, Melanie. An Introduction to Genetic Algorithms. Cambridge: MIT Press, 2002. ISBN 0-262-63185-7.
5. SINČÁK, Peter, ANDREJKOVÁ, G. Úvod do neurónových sietí, I. diel, Košice: ELFA, 1996. ISBN 808878638X

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: 493

A	B	C	D	E	FX
19.27	17.85	21.5	17.24	20.28	3.85

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

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ MZI/21	**Course name:** Introduction to study of informatics

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: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Understanding of basic mathematical notions

Learning outcomes:
Understanding of basic mathematical notions

Brief outline of the course:
1. Mathematical text
2. Connections and quantifiers
3. Classes and sets
4. Other operarions operácie
5. Relations
6. Relational algebra
7. Orderings
8. Equivalences
9. Functions
10. Cardinalities
11. Infinities
12. Cardinal arithmetics

Recommended literature:
https://ics.upjs.sk/~krajci/skola/vyucba/jesen/predmety/MZI.html

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 346

A	B	C	D	E	FX
44.51	21.1	11.27	3.18	1.73	18.21

Provides: prof. RNDr. Stanislav Krajči, PhD.

Date of last modification: 23.11.2021
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PAI1/21	**Course name:** Legal aspects of informatics

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: 3

Recommended semester/trimester of the course: 2., 4., 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
The condition for passing the course is the final written exam (score at least 50%).

Learning outcomes:
The result of the education is an understanding of the necessary knowledge in the legal aspects of information and communications technologies (ICT law), especially data protection, criminal aspecs of IT, intellectual property, information society services.

Brief outline of the course:
1. Introduction to information technology law, 2. Electronic legal acts and electronic signature, 3. Trust-building services, 4. Electronic commerce I. - introduction to electronic commerce, information society services, types of electronic contracts, legal aspects of e-shops, concluding contracts, 5. Electronic commerce II. - consumer protection, 6. Protection of privacy and personal data I. - protection of personality, definition of personal data, processing of personal data, rights of data subjects, 7. Protection of privacy and personal data II. - online identifiers - IP addresses, cookies, 8. Digital single market - digital single market - geoblocking, shared economy, 9. Liability on the Internet, 10. Intellectual property law I. - industrial property law, copyright rights, 11. Intellectual property law II. - legal aspects of computer programs, databases, license agreements, open licenses, 12. Computer crime I., 13. Computer crime II., 14. Cyber and information security.

Recommended literature:
1. HUSOVEC, Martin, Matúš MESARČÍK a Jozef ANDRAŠKO. Právo informačných a komunikačných technológií 1. Bratislava: TINCT, 2021. ISBN 9788097383701, 2. ANDRAŠKO, Jozef, Martin DAŇKO, Petra DRAŽOVÁ, Zoltán GYURÁSZ, Matúš MESARČÍK, Rastislav MUNK a Soňa SOPÚCHOVÁ. Právo informačných a komunikačných technológií 2. Bratislava: TINCT, 2021. ISBN 9788097383725, 3. HUČKOVÁ, Regina, Diana TREŠČÁKOVÁ a Laura RÓZENFELDOVÁ. Právo informačných a komunikačných technológií. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach, 2020. ISBN 9788081529108.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 89

A	B	C	D	E	FX
22.47	21.35	19.1	13.48	19.1	4.49

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., JUDr. Laura Bachňáková Rózenfeldová, PhD.

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 1.

Course level: I., N

Prerequisities:

Conditions for course completion:
The condition for passing the course is: 1. Homeworks (50% of the total number of points), 2. Written final theoretical exam (25% of the total number of points), 3. Written final practical exam (25% of the total number of points).

Learning outcomes:
The result of the education is an understanding of the 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, 12. Exam.

Recommended literature:
1. LPIC-1 Exam 101. LPI [online]. Canada: The Linux Professional Institute, 2021 [cit. 2021-9-22]. Dostupné z: https://learning.lpi.org/en/learning-materials/101-500/, 2. LPIC-1 Exam 102. LPI [online]. Canada: The Linux Professional Institute, 2021 [cit. 2021-9-22]. Dostupné z: https://learning.lpi.org/en/learning-materials/102-500/, 3. Linux - Dokumentační projekt [online]. 4. Praha: Computer Press, 2007 [cit. 2021-9-22]. Dostupné z: https://i.iinfo.cz/files/root/k/LDP_4.pdf.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 159

A	B	C	D	E	FX
40.88	20.75	18.24	6.29	6.92	6.92

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Eva Marková, RNDr. Richard Staňa
Date of last modification: 04.01.2022
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ LOP1/15	**Course name:** Logic programming
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 2 **Per study period:** 28 / 28 **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 4.	
Course level: I., II.	
Prerequisities:	
Conditions for course completion: Evaluation of active participation in exercises and homework, test of theoretical knowledge during the semester. Written and oral exam together with assessment from exercises.	
Learning outcomes: To learn bases of declarative programming (as complementary method to procedural programming) and basic methods of implementations of logic programming languages.	
Brief outline of the course: 1. Introduction to logic 2. theory, models, Herbrand model 3. SLD resolution 4. Basics of Prolog language 5. Prologue in examples 6. Lists 7., 8., 9. Data analysis in Prolog 10., 11., 12. Graph theory in Prolog	
Recommended literature: BRATKO, Ivan. Prolog. Programming for Artificial Intelligence. 2 ed. Wokingham: Addison-Wesley, 1990. ISBN 0-201-41606-9. NILSON U., MALUSINSKI J.: Logic, Programming and Prolog, John Wiley & Sons Ltd. 1995 NIENHUYIS-CHENG Sh.H., WOLF R.: Foundations of Inductive Logic Programming, Springer-Verlag, 1997	
Course language: Slovak or English	
Notes: Prerequisites: none	

Course assessment Total number of assessed students: 339					
A	B	C	D	E	FX
24.48	13.27	16.52	22.42	21.83	1.47
Provides: doc. RNDr. Ondrej Krídlo, PhD.					
Date of last modification: 23.11.2021					
Approved: doc. RNDr. Jozef Jirásek, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/MTL/22	**Course name:** MATLAB and neurocognition

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3., 5.

Course level: I., N

Prerequisities:

Conditions for course completion:
Written quizes, midterm and final exam.

Learning outcomes:
Intro to programming in MATLAB with focus on its usage in neural and cognitive Science.

Brief outline of the course:
1. Intro to Matlab
2. Navigation, interaction, variables, vectors, matrices, scripts, toolboxes
3. Interaction with humans in behaviroal experiments
4. Auditory and visual stimulus generation
5. Analysis and visualization of behavioral data
6. Analysis of neurophysiological data
7. Analysis of neuroimaging data.
8. Cognitive and neural modeling in Matlab
9. Auditory modeling tools
10. Visual modeling tools
11. Tools for modeling of learning
12. Tools for psychological experiments

Recommended literature:
1. Wallisch P, et al. MATLAB for Neuroscientists: An Introduction to Scientific Computing in MATLAB. Academic Press 2008. ISBN-13: 978-0123838360
2. Stork D, Yom-Tow E: Computer Manual in MATLAB to accompany Pattern Classification, 2nd Edition, Wiley, 2004 ISBN-13: 978-0471429777
3. Dayan P and LF Abbott: Theoretical Neuroscience - Computational and Mathematical Modeling of Neural Systems. MIT Press, 2005 ISBN-13: 978-0262541855

Course language:
Slovak or English

Notes:
Content prerequisities:
basic programing skills or instructor's consent

Course assessment
Total number of assessed students: 13

A	B	C	D	E	FX
7.69	30.77	38.46	23.08	0.0	0.0

Provides: doc. Ing. Norbert Kopčo, PhD., Ing. Peter Lokša, PhD., RNDr. Keerthi Kumar Doreswamy, Ing. Udbhav Singhal, Myroslav Fedorenko

Date of last modification: 04.04.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ MIS/15	**Course name:** Management of information systems

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Completion of the subject is conditional on the completion of partial tasks within the group project during the semester in an appropriate quality. The project is aimed at:
- mastering the basic concepts and methods taught,
- mastering the principles of related IT tools,
- presentation and defense of the created project.

Detailed conditions for evaluating partial tasks and obtaining a final evaluation are published in the AIS.

Learning outcomes:
By completing the subject, students will gain
- knowledge of the general aspects of the design and use of information systems for managing the organisation in relation to the strategic goals of the organisation,
- knowledge of the principles of basic ICT technologies used to manage processes in various areas of the company's functioning,
- basic knowledge and skills on the use of relevant IT tools,
- experience of working in a heterogeneous team and with project presentation.

Brief outline of the course:
1. Introduction to information systems.
2. Organisational strategy and the role of information systems in gaining competitive advantage.
3. Managing data and knowledge.
4. Business Intelligence.
5. Ethics and privacy protection.
6. Information security.
7. Social computing
8. Electronic commerce.
9. Wireless and mobile computing.
10. The role of information systems within the organisation and public administration.
11. CRM systems.
12. Management of supply-customer chains.
13: Procurement and implementation of information systems.

Recommended literature:

1. R. Kelly Rainer, Brad Prince, Hugh J. Watson, Management Information Systems, Wiley 2015, ISBN : 978-1-118-89538-2
2. Voříšek, J.: Strategické řízení informačního systému a systémová integrace, Praha, Management Press, 1999.
3. O'Brien, J., Marakas, G.: Management Information Systems, McGraw-Hill, 2010, ISBN 0073376813.
4. Laudon, K., Traver, C.G.: Management Information Systems: Managing the Digital Firm, Prentice Hall, 2011, ISBN 0132142856.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 52

A	B	C	D	E	FX
42.31	26.92	13.46	11.54	3.85	1.92

Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Richard Staňa, RNDr. Viliam Kačala, PhD.

Date of last modification: 25.07.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MTIa/21	**Course name:** Mathematics I for informaticians

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

Number of ECTS credits: 6

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Two tests, completion of individual and group homework. Assessment is given on the basis of semestral evaluation and examination test. The ability to solve selected types of problems (without context/with context) also in combination with mathematical software is evaluated. Furthermore, the understanding of concepts and relationships between them (conceptual questions / tasks) is taken into account. A total of 100 points can be obtained (60 points during the semester and 40 points for the exam test). In addition, it is possible to obtain bonus points for various activities (solving bonus tasks, active approach to the subject during the semester ...). A minimum of 30 points (out of a possible 60) and the submission of a sufficient number of individual assignments according to the instructions are required from the semester.

Learning outcomes:
To obtain basic mathematical knowledge about the divisibility of integers, congruences, number systems, vectors, matrices and determinants, as well as the functions of one real variable.
To get acquainted with the applications (including the information technologies) of some fundamental mathematical concepts. To learn to work with mathematical software and together with the acquired knowledge to use it in solving various types of problems.

Brief outline of the course:
Introduction to the teaching system, technologies and mathematical software (1 week).
Integers and divisibility, prime numbers and congruences, applications of congruences and residue classes - basic properties of integer divisibility, canonical decomposition of a number, greatest common divisor and least common multiple of numbers, Euclidean algorithm, solution of (linear) Diophantine equations and (linear) congruences, addition and subtraction of residue classes (3 weeks).
Number systems and conversions between them - positional number systems and conversions between them, arithmetic operations in different number systems (1 week).
Vectors, matrices, determinants, their applications and introduction to analytical geometry - vector and matrix operations, scalar and vector product, angles of vectors, calculation of matrix determinants (from definition, Saruss rule, row/column expansion), inverse matrix determination (using determinant and adjoint matrix, Gaussian-Jordan method), solution of linear systems equations (Gaussian elimination method, Cramer's rule, substitution/addition method), eigenvalues/

eigenvectors of a matrix, analytical expressions of a line/plane/circle/sphere - determination of their mutual position and angles (3 weeks).
Introduction to (elementary) functions - domains and graphs of functions, basic properties of functions (boundedness, monotonicity, parity, periodicity), operations with functions, inverse function, basic properties of elementary functions (polynomial, power, exponential, logarithmic, trigonometric, cyclometric) (2 weeks).

Recommended literature:

Hallet D. H. (2014). Applied Calculus. John Wiley & Sons.
Koshy T. (2007). Elementary Number Theory with Applications. Elsevier.
Judson T. W., Austin S. F. (2019). Abstract Algebra: Theory and Applications. GNU Free Documentation License.
Lay D. C. (2012). Linear Algebra And Its Applications. Boston: Addison-Wesley.
Studenovská D., Madaras T. (2006). Matematika pre nematematické odbory. UPJŠ.
Studenovská D., Madaras T., Mockovciak S. (2006). Zbierka úloh z matematiky pre nematematické odbory. UPJŠ.
Zimmermann P. et al. (2018). Computational Mathematics with SageMath. Springer.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 245

A	B	C	D	E	FX
2.45	8.16	9.8	22.86	44.9	11.84

Provides: RNDr. Andrej Gajdoš, PhD., RNDr. Stanislav Basarik, PhD., Mgr. Martin Vodička

Date of last modification: 18.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚMV/ MTIb/21	**Course name:** Mathematics II for informaticians

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

Number of ECTS credits: 6

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚMV/MTIa/21

Conditions for course completion:
Two tests, completion of individual and group homework during the semester. Assessment is given on the basis of semestral evaluation and examination test. The ability to solve selected types of problems (without context / with context) also in combination with mathematical software is evaluated. Furthermore, the understanding of concepts and relationships between them (conceptual questions / tasks) is taken into account. A total of 100 points can be obtained (60 points during the semester and 40 points for the exam test). In addition, it is possible to obtain bonus points for various activities (solving bonus tasks, active approach to the subject during the semester ...). A minimum of 30 points (out of a possible 60) and the submission of a sufficient number of individual assignments according to the instructions are required from the semester.

Learning outcomes:
Gain basic knowledge of differential and integral calculus of functions of one real variable. Also get acquainted with numerical sequences, infinite numerical series and with the functions of several (mostly two) variables.

Brief outline of the course:
Differential calculus of functions of one real variable - limits and continuity of functions, derivatives of functions, applications of derivatives of functions (4 weeks).
Numerical sequences and infinite numerical series - limits of numerical sequences, geometric series, harmonic series, convergence criteria for infinite series with non-negative terms, infinite series with alternating signs (1 week).
Integral calculus of functions of one real variable - primitive function, substitution method, per partes, applications of a definite integral, improper integrals (3 weeks).
Functions of several (two) variables - domains and visualization, function limits, partial derivatives, determination of (local) extremes of functions (3 weeks).

Recommended literature:
Boelkins M., Austin D., Schlicker S. (2018). Active Calculus. 978-1085940856.
Hallet D. H. et al. (2012). Calculus: Single & Multivariable Variable. Wiley.
Hallet D. H. (2014). Applied Calculus. John Wiley & Sons.
Hallet D. H. et al. (2017). Calculus: Single Variable. Wiley.
Hartman G. et al. (2018). APEX Calculus. 978-1514225158.

Schlicker S., Austin D., Boelkins M. (2018). Active Calculus - Multivariable. 978-1548655525.
D. Studenovská, T. Madaras, S. Mockovčiak: Zbierka úloh z matematiky pre nematematické odbory, UPJŠ 2006
D. Studenovská, T. Madaras: Matematika pre nematematické odbory, UPJŠ 2006

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 163

A	B	C	D	E	FX
4.29	9.82	10.43	27.61	42.33	5.52

Provides: RNDr. Andrej Gajdoš, PhD., RNDr. Stanislav Basarik, PhD., doc. Mgr. Jozef Kiseľák, PhD.

Date of last modification: 18.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ MPJ1/15	**Course name:** Modern programming languages

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Demonstration of adequate mastery of the content standard of the subject in the ongoing and final evaluation, the ability to formulate a problem in the acquired terminology and solve it within a project.
Written works during the semester, project.
Written and oral exam.

Learning outcomes:
During the completion of the course, the student will master the use of standard and more sophisticated programming models and techniques within .NET.

Brief outline of the course:
1) Common type system, boxing, Common Intermediate Language (CIL), Common Language Runtime (CLR) - .NET Framework.
2) Imperative and procedural programming. OOP, libraries, classes, assembly, reflection and Module.
3) Generic programming - parametric polymorphism.
4) Functional programming - lambda expressions.
5) LINQ and querying data structures.
6) Event programming - delegates.
7) Communication between windows. Design of new controls.
8) Graphic primitives and Chart.
9) Database applications, ADO.NET, Entity Framework.
10) Vector programming - operator overloading, indexer.
11) MS Office programming using C#.
12) .NET Core. Tuple vs record.

Recommended literature:
1. J. Glynn, Cs. Török et al, Professional Windows GUI Programming Using C#, 2002, Wrox, ISBN-10:‍1861007663
2. A. Troelsen , Ph. Japikse, Pro C# 9 with .NET 5 : Foundational Principles and Practices in Programming, 2021, Apress, ISBN10 1484269381

3. J. Albahari, C# 9.0 in a Nutshell : The Definitive Reference, 2021, O'Reilly Media, ISBN10 1098100964
4. C. Solis, C. Schrotenboer, Illustrated C# 7 : The C# Language Presented Clearly, Concisely, and Visually, 2018, Apress, ISBN10 1484232879

Course language:
Slovak or English.

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

Course assessment
Total number of assessed students: 162

A	B	C	D	E	FX
17.28	19.14	25.93	19.75	16.67	1.23

Provides: doc. RNDr. Csaba Török, CSc.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ MWT1/19	**Course name:** Modern web technologies

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Conditions for continuous evaluation: Active participation in seminars and participation on creation of a semestal project.
Conditions for the final evaluation: Completion of the final project according to requirements.

Learning outcomes:
Students will know how to design and create a complex web application in the Angular framework that cooperates with REST services on the server side.

Brief outline of the course:
1, Selected parts of Javascript and Typescript, High order functions.
2, Pure functions, curried functions and their chaining.
3, Angular - components, services, Observable, Http client, simple Material table
4, Angular - introduction to Router, Template driven forms, Material components button, input, icon and card, HTTP post
5, Angular - universal catching of HTTP client error states, localStorage, Material snackbar and toolbar, navigation bar with Login / Logout status display
6, Angular - custom pipe, pagination, arrangement and filtering of Material table via MatTableDataSource; template-driven validation.
7, Angular - Reactive forms, custom validators, user registration, Zxcvbn library
8, Angular - Deleting users, Material dialog, slide and checkbox, URL parameters obtained through the router, children's components, editing of User, FormArray
9, Angular - @Output, feature module, routing guards - CanActivate, CanDeactivate, Resolver
10, Angular - adding Users, hierarchical routing, canLoad guard, preloading and on-demand loading modules, using header to send a token via HTTP
11, Angular - DataSource for MatTable, server-side pagination, filtering and sorting, HttpParams
12, Angular - NGXS repository
13, Angular - WebSocket, simple chat application

Recommended literature:
1. Angular framework homepage. Available online: <https://angular.io/>
2. Material design Angularu extension homepage. Available online: <https://material.angular.io/>
3. NGXS storage homepage. Available online: <https://www.ngxs.io/>

4. RXJS Library homepage. Available online: <https://rxjs.dev/>
5, WALLS, Craig. Spring in action. Fifth edition. Shelter Island: Manning, [2019]. ISBN 9781617294945.

Course language:
slovak

Notes:
Content prerequisites: basics of programming in any language

Course assessment
Total number of assessed students: 53

A	B	C	D	E	FX
62.26	3.77	11.32	13.21	7.55	1.89

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SKB1/15	**Course name:** Network and communication security

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities: ÚINF/PSIN/15 and ÚINF/UIB1/21

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

Learning outcomes:
Understand the importance and possibilities of information systems security, system and network security threats. Be able to detect security threats in the implementation of individual layers of the Internet. Understand the principle and risks of SSL and IPSec security protocols and know how to use them. Know and be able to implement authentication techniques, understand the principles of certification and know how to use them effectively. Be able to configure and use firewalls and proxy servers.

Brief outline of the course:
1. IS security principles, assets, threats, risks, attacks, the role of network and communication security, security objectives, functions and mechanisms.
2. Data transfer methods, technological and theoretical limits, transmission media, vulnerabilities and security threats.
3. Security threats of data transmission at the communication level of the communication model, data flow management in local networks, switching, STP, virtualization, MACsec, multiprotocol switching.
4. Security specifics of wireless transmission, WLAN networks, authentication mechanisms for WDS, data transmissions via mobile networks (GSM, LTE).
5. Remote access to the local network, EAP authentication, RADIUS protocol, trust management, certificate usage, certification process, certification authority tasks.
6. Security of IPv4 and IPv6 network protocols, possible attacks and protection, IPsec protocol, security associations and policies, exchange of cryptographic information.
7. Vulnerabilities of TCP and UDP transport protocols, TLS protocol, data security in TLS sessions, tunneling, VPN.
8. Security aspects of Internet application layer protocols, telnet, FTP, use of SSH protocol.
9. HTTP vulnerabilities, CSP, XSS content protection, code embedding, browser and server level protection, current implementation attacks.

10. Secure e-mail, MIME and S/MIME extensions, digitally signed and encrypted messages, security of mail servers, filtering of malicious content.
11. Internet, DNS and DNSSEC network security, DHCP, SNMPv3.
12. Connection filtering, proxy servers, hidden networking, NAT, NPT.
13. Security gate architecture, demilitarized zone, filtering rules, intrusion detection and prediction at the firewall level.

Recommended literature:

1. Paul C. van Oorschot: Computer Security and the Internet: Tools and Jewels, Springer, 2020
2. W. Stallings: Cryptography & Network Security, Pearson Education, 7th edition, 2017
3. L. Dostálek: Velký průvodce protokoly TCP/IP - bezpečnost, Computer Press 2003

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 4

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

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

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NOT1a/03	**Course name:** Nontraditional Optimization Techniques I

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3., 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Oral examination (50%), results and quality of the
personal presentation of the projects (50%).
Monitoring progress in solving applied projects. From given set of problems, the student must pick 1 to 3 projects and develop functioning implementation of the solution in form of computer program. In case of more challenging problems, collaborative work of students is acceptable, but each student must be able to present her/his individual contribution.

Learning outcomes:
To familiarize students with biologically and physically inspired optimization, simulation and prediction techniques. To expand students' creativity and programming skills by applying heuristic techniques in solving applied problems.
Upon successful completion of course, student shall possess knowledge about most typical non-traditional optimization techniques, as well as practical experience of solving concrete problems.

Brief outline of the course:
1. Fundamentals terms and definitions of optimization theory. Physical laws as optimization tasks. Variational principle.
2. Model optimization problems. Basic types of objective functions. Classification of optimization methods. Computational scaling of optimization methods. Big O notation. Parallelization, Metcalf's law, Amdahl's bottleneck.
3. Exhaustive search, Gradient-based optimization techniques.
4. Evolutionary algorithms. Canonical Genetic algorithm. Genetic algorithms as Markov processes. Statistical Mechanics description of Genetic Algorithms.
5. Monte Carlo simulation and simulated annealing. Metropolis algorithm and statistics of sampling in solution space.
6. Swarm optimization. Ant algorithms.
7. Cellular Automata and their applications in simulations of complex systems.
8. data structures and representation of solution space and optimization problems. Compression of information and symmetry. Manifolds.
9. Generators. grammars and languages. Genetic programming. AST and operations on AST representation of programs.

10. Fractals. Lindenmayer systems. Life-like and agent-based models.
11. Evolutionary games. Evolution of cooperation.
12. Fundamentals of Neural Networks. Stochastic gradient optimization.

Recommended literature:

Hartmann, A. K., Rieger, H., Optimization Algorithms in Physics, Wiley, 2002
Reeves, C. R., Rowe, J. E., Genetic Algorithms: Principles and perspectives, Kluwer, 2003
Mitchell, M., Complexity. A Guided Tour, Oxford University Press, 2009
Solé, R. V., Phase Transitions, Princeton University Press, 2011
Ilachinski, A., Cellular Automata. A Discrete universe, World Scientific, 2002
Haykin, S., Neural Networks. A Comprehensive Foundation, Prentice-Hall, 1999
Actual literature and data related to problem sets

Course language:

English language is essential for students as "lingua franca" for the latest advancements and applications of optimization techniques.

Notes:

The subject is taught using direct contact form. Should the epidemiological situation (or other relevant circumstances) mandate, the distant form will be used, preferentially using MS Teams learning environment.

Course assessment

Total number of assessed students: 100

A	B	C	D	E	FX
69.0	19.0	7.0	2.0	3.0	0.0

Provides: doc. RNDr. Jozef Uličný, CSc.

Date of last modification: 22.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NOT1b/03	**Course name:** Nontraditional Optimization Techniques 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: 5

Recommended semester/trimester of the course: 4., 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Presentation of the project in written form. Oral exam and discussion of the presented project. Should corona-virus quarantine persist, written report and answer to posed questions suffice.

Learning outcomes:
By using examples from the biology to learn applications of optimization techniques on study and interpretation of complex systems. Introduction to new paradigms in the area of systems biology, including parasite/host coevolution.

Brief outline of the course:
Complex systems, emergent behavior. Evolutionary theory and memetics. Application of optimization techniques on complex systems. Application of methods /genetic algorithms, simulated annealing, taboo search/ on selected problems of biomolecular simulations. Molecular dynamics, protein folding. Population dynamics, metabolic networks and complexity in bioinformatics.

Recommended literature:
The actual scientific papers.

Course language:

Notes:

Course assessment
Total number of assessed students: 62

A	B	C	D	E	FX
87.1	6.45	4.84	1.61	0.0	0.0

Provides: doc. RNDr. Jozef Uličný, CSc.

Date of last modification: 08.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ NUM/10	**Course name:** Numerical Methods

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: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate a sufficient degree of understanding and ability to apply the basic numerical methods of mathematical analysis and algebra, which are necessary for subsequent courses in computational physics. The basis of evaluation is participation and activity in exercises and work on assignments. The condition for obtaining credits is passing 2 written tests at seminars and submitting 4 assignments (projects) electronically and with the attached computer program. The credit evaluation of the course takes into account the following student workload: direct teaching (2 credits) and individual work on projects (2 credits). The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), E (50-59%), F (0-49%).

Learning outcomes:
To acquaint students with the basic numerical methods of mathematical analysis and algebra needed for the next course of computational physics. The student will learn to approximate and interpolate functions, solve systems of linear and nonlinear equations, numerically derive and integrate or determine eigenvalues and eigenvectors of matrices.

Brief outline of the course:
1. Computational solution of problems and errors of numerical solution.
2. Approximation of functions.
3. Interpolation of functions.
4. Approximation by trigonometric polynomials. Fast Fourier analysis.
5. Solution of nonlinear equations, convergence conditions and error estimation of the methods.
6. Numerical methods for solving nonlinear equations.
7. Solution of systems of linear equations - direct methods.
8. Solution of systems of linear equations - iterative methods.
9. Numerical integration (quadrature) of functions.
10. Numerical differentiation of functions.
11. Eigenvalues and eigenvectors of a matrix - partial problem.
12. The complete problem of eigenvalues.

Recommended literature:

Basic literature:
POZRIKIDIS, C.: Numerical Computation in Science and Engineering, Oxford University Press, 2008.
Other literature:
HAMMING, R.W.: Numerical Methods for Scientists and Engineers, Dover, 1973.
GARCIA, A.L.: Numerical Methods for Physics, Prentice-Hall, 1994.

Course language:

Notes:

Course assessment
Total number of assessed students: 183

A	B	C	D	E	FX
13.66	14.75	22.95	24.04	20.77	3.83

Provides: prof. RNDr. Milan Žukovič, PhD.

Date of last modification: 14.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/OSY1/21	**Course name:** Operating systems

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Oral exam

Learning outcomes:
Student obtains base knowledge about the properties and internal processes of operating systems, their structure and concept. By completing the course, the student will gain a comprehensive picture of the life cycle of processes, their planning and communication between them. He will also gets a knowledge of physical, logical and virtual memory management and understands synchronization as well as phenomena such as deadlocks or starvation. The acquired knowledge will enable the student to understand the behavior of the operating system, which leads to gaining the ability to intervene with running operating system, eventually optimize it.

Brief outline of the course:
1. History, development, user interface and structure of operating systems.
2. Kernel of the operating system and system calls, implementation.
3. Process - definition, structure, life cycle, implementation.
4. Process - planning algorithms, multiprocessing.
5. Process - inter-process communication.
6. Thread - definition, structure, life cycle, implementation.
7. Synchronization of processes and system resources.
8. Deadlock and starvation - prevention, detection, recovery.
9. Memory - definition, types of memories, usage, volatility, DMA.
10. Memory - allocation strategies, paging, fragmentation.
11. Memory - MMU, TLB, MPU, segmentation.
12. Memory - virtual memory management strategies.
13. File system - definition, structure, implementation.
14. File system - file, directory, attributes, access control, ACL.

Recommended literature:
1. SILBERSCHATZ, Abraham, Peter B. GALVIN a Greg GAGNE. Operating System Concepts. 10th Revised edition. New York, United States: John Wiley, 2021. ISBN 9781119800361.
2. TANENBAUM, Andrew, Herbert BOS. Modern Operating Systems. 4th edition. London, UK: Pearson Education Limited, 2014. ISBN 9781292061429.

3. The Linux Kernel documentation. Linux Kernel Library [online]. Dostupné z: https://www.kernel.org/doc/html/latest/
4. DOWNEY, Allen B. The Little Book of Semaphores [online]. Version 2.2.1. Green Tea Press, 2016. Dostupné z: https://greenteapress.com/semaphores/LittleBookOfSemaphores.pdf

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 222

A	B	C	D	E	FX
22.52	20.27	22.07	23.42	10.36	1.35

Provides: RNDr. PhDr. Peter Pisarčík, doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD.

Date of last modification: 08.10.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ ORSP/16	**Course name:** Oracle Database Administration

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: 3

Recommended semester/trimester of the course: 6.

Course level: I., N

Prerequisities: ÚINF/ASSP/16

Conditions for course completion:
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student has an overview of databases (architecture, connection, administration tools), knows the management of the premises, manages practical tasks for database backup, recovery and recovery.

Brief outline of the course:
1.-2. Database Overview: database architecture, connecting to the database, using database administration tools, administrating Oracle instances.
3.-4. Space management: administrating “Table Spaces”, Performing reorganization of tables, housekeeping and troubleshooting.
5.-6. Backup, Restore and Recovery.
7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment Total number of assessed students: 52	
abs	n
96.15	3.85
Provides: Jana Vanková	
Date of last modification: 21.11.2021	
Approved: doc. RNDr. Jozef Jirásek, PhD.	

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PDS2/21	**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: 6.

Course level: I.

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., Bc. Marián Dvorský, RNDr. Ladislav Mikeš, PhD.

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚFV/ LEK1/99	**Course name:** Physical Principles of Medicine Technique

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: 5.

Course level: I.

Prerequisities:

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 42

A	B	C	D	E	FX
88.1	9.52	2.38	0.0	0.0	0.0

Provides: doc. RNDr. Karol Flachbart, DrSc.

Date of last modification: 03.05.2015

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ PPLO/15	**Course name:** Principles of Computers, Logic Circuits

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
To successfully complete the course, the student must demonstrate sufficient understanding of the basic principles in the field of logic circuits. The credit evaluation of the course takes into account the following student workload: direct teaching 1 credit, final exam 1 credit. The condition for obtaining credits is the written report of the selected topic and passing an oral exam on questions outside the selected topic. The minimum threshold for completing the course is to obtain at least 50% of the total score, using the following rating scale: A (90-100%), B (80-89%), C (70-79%), D (60- 69%), E (50-59%), F (0-49%).

Learning outcomes:
Student will obtain knowledge about principles of functioning, analysis and synthesis of logical electronic circuits, as a basic unit of computing technology. Student will use his theoretical knowledge to design and to construct of electronic circuits and he/she will learn how to interpret measured results.

Brief outline of the course:
1. Combinatorial logical circuits (definitions, laws of logical algebra, electronic models of operations of Boolean algebra, NAND, digital multiplexor and demultiplexor, detector of errors for BDC code, arithmetic addition of two one bit binary operands). 2. Digital memory circuits (bistable circuit as basic memory unit, synchronous and asynchronous switching circuits). 3. Sequentional logical circuits (sequentional behavior, structure and stability of sequentional logical circuits, basic sequentional functions and their realization, arithmetic unit of digital computer)

Recommended literature:
Petrovič P.: Elektronika I – Vybrané obvody číslicovej techniky. Skriptum PF, Edičné stredisko UPJŠ, Košice 2003. 2. vydanie: Vydavateľstvo UPJŠ, Košice, 2006.

Course language:
slovak

Notes:
Teaching is carried out full-time or part-time using the MS teams platform. Form of teaching are specified by the teacher at the beginning of the semester and continuously updated as needed.

Course assessment
Total number of assessed students: 51

A	B	C	D	E	FX
35.29	47.06	15.69	1.96	0.0	0.0

Provides: doc. Mgr. Vladimír Komanický, Ph.D.

Date of last modification: 14.12.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PRP2/15	**Course name:** Principles of computers

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities:

Conditions for course completion:
Graded activities: assignments, mid semester exam, final exam

Learning outcomes:
- Know brief history of computer, classification and construction principles of computers of von Neumann type.
- Understand relation between real numbers, integers and their binary representation as well as be able to perform basic arithmetic and logic operations over binary represented numbers.
- Learn basics about logic gates, combination and sequence circuits and their structure. Understand principles of how basic circuits realize arithmetic-logic unit and other parts of computers e.g. memory.
- Know principles of communication of processor and other devices via interruptions and direct memory access.
- Get idea of device drivers, device controllers and their functionality.

Brief outline of the course:
1. Computers of von Neumannovho type, brief history of computer science.
2. Encoding of integers, real numbers and arithmetic operations. Encoding of symbols.
3. Logic functions and their realization and optimisation.
4. Combination circuits. Realization of basic functional and control elements on computer circuits.
5. Arithmetic logic unit ant its realization.
6. Sequential circuits, memory cell, organization of memory matrix, types of memories.
7. Machine cycle.
8. Types of instruction and instructions sets.
9. Instruction cycle and processing of instructions.
10. Memory and memory subsistem.
11. Communication between processor and peripheral devices. Input output devices, mechanism of interruption in computer, direct memory access. Functionality of device drivers. Device controllers and functionality.
12. Portability of programs. External and peripheral memories their principles and their use. Graphical adapters, monitors, printers, digital scanners.

Recommended literature:

1. STALLINGS, William. Computer Organization and Architecture. Prentice Hall, 2002. ISBN 978-0-13-410161-3.
2. DEMBOWSKI, Klaus. Mistrovství v hardware. Computer Press, 2009. ISBN 978-80-251-2310-2.
3. MINASI, Mark. Velký průvodce hardwarem. Grada, 2002. ISBN 978-80-251-2310-2.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 341

A	B	C	D	E	FX
28.45	15.54	15.84	13.78	22.29	4.11

Provides: RNDr. PhDr. Peter Pisarčík

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PBS/15	**Course name:** Pro-seminar to bachelor thesis

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

Number of ECTS credits: 1

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities:

Conditions for course completion:
Creating a website about a bachelor's thesis. Selection of bachelor thesis topic. Presentation of the bachelor's thesis assignment and its objectives. Preparation of an essay in the extent of 1 page on the motivation to select a bachelor's thesis. Creation of the bachelor's thesis assignment and its insertion into the AIS by the thesis supervisor.

Learning outcomes:
Basic knowledge of the principles of creation and structure of bachelor's theses. Criteria and requirements for selecting an appropriate bachelor thesis topic. Knowledge about the structure of the bachelor's thesis assignment.

Brief outline of the course:
1. Principles in creating a final thesis.
2. The presentations of bachelor thesis topics by potential supervisors.
3. The presentations of bachelor thesis topics by potential supervisors.
4. The presentations of bachelor thesis topics by potential supervisors.
5. Bachelor thesis and its objectives.
6. Assignment of bachelor thesis.
7. Basic types of bachelor theses.
8. Structure of different types of bachelor theses.
9. Requirements for final bachelor theses.
10. External company final theses.
11. Presentation of selected topics of final theses.
12. Presentation of selected topics of final theses.
13. Presentation of selected topics of final theses.

Recommended literature:
1. STN 01 6910. Rules of writing and editing documents. 2011.
2. STN ISO 2145. Documentation. Numbering of sections and subsections of written documents. 1997.
3. STN ISO 690. Information and documentation. Instructions for creating bibliographic references to information sources and their citation. 2012
4. KATUŠČÁK, Daniel. How to write final and qualification theses. Enigma, 2013

5. Scientific literature related to the topic of the final thesis according to the recommendation of the thesis supervisor.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 389

abs	n
95.37	4.63

Provides: doc. RNDr. Ľubomír Antoni, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 4., 6.

Course level: I., N

Prerequisities: ÚINF/PAZ1b/15 and ÚINF/DBS1a/15 and ÚINF/SWI1a/15

Conditions for course completion:
The interim evaluation is based on the evaluation of partial tasks within the solution of the semester project.
The final assessment is given on the basis of the interim assessment and the result of the exam. On the exam, it is required to prove the ability to orient oneself in the presented issue, to master the theoretical foundations of process modeling, basic skills for the creation and interpretation of process models.
The evaluation is awarded if the student gets at least 50% of the possible points from each part of the exam. Detailed requirements are given in the AIS.

Learning outcomes:
By completing the subject, the student:
- acquires knowledge about the theoretical starting points and basics of process modeling,
- can master the basic principles of creating process models
- get familiar with standard languages for process modeling
- will gain practical experience in creating models using selected modeling tools.

Brief outline of the course:
1. Introduction to process modeling.
2. Development of approaches to the development of large software systems.
3. Theoretical foundations of process modeling.
4. Petri nets.
5. Process orchestration.
6. Choreography of processes.
7. Selected properties of processes and process models.
8. Architectures of process models.
9. 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: 59

A	B	C	D	E	FX
15.25	22.03	27.12	20.34	8.47	6.78

Provides: prof. RNDr. Gabriel Semanišin, PhD.

Date of last modification: 25.07.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/OP/14	**Course name:** Professional experience

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Prior to the realization of the internship, the schedule need to be approved by the administrator of the subject from university. After completing the internship, the student submits attendance at the internship, a positive evaluation of the internship written by responsible person from the institution, where the internship was performed and student's own final report from the internship, where he/she describes the activities performed together with acquired knowledge and experience.

Learning outcomes:
Within the professional practice, the student gets acquainted with the institution, its main tasks, organizational structure, processes and basic software used. Student gains experience through practice on some processes in the host institution.

Brief outline of the course:
Student completes 10 days of professional practice in institutions that are focused on development, implementation or testing of software or related focused companies. The selection of an appropriate institution will take place in accordance with the focus of the student within the bachelor's study. The internship normally takes place over a period of 2 weeks during the examination period, or 1 to 2 days per week during the semester or examination period.

Recommended literature:
The student works with resources and literature that are specified by the host institution.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 28

abs	n
96.43	3.57

Provides: Ing. Miron Kuzma, PhD.

Date of last modification: 12.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/JAC1/15	**Course name:** Programming language C

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: 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Practics attendance and activity. Home assigment
Final project.

Learning outcomes:
The student will gain the ability to create source code files in the C programming language, which is the primary system programming language used in the creation of operating systems and system components, as well as firmware for embedded devices. The aim of the exercise is to guide students from the simple language constructs to a full understanding of working with pointers and their use in the management of static and dynamic memory.

Brief outline of the course:
1. Short overview of language history, explanation of terms, code compilation, linking and program execution.
2. Variables and data types, unary, binary and ternary operations, operator precedence.
3. Cycles, conditions. Structures, unions and enumerators.
4. Functions.
5. Pointers - concept, implementation, pointer arithmetic.
6. Fields - principle, implementation.
7. Dynamic memory allocation.
8. N-dimensional fields and pointers.
9. Text strings.
10. Input and output, command line arguments, process return codes.
11. Dynamic fields and structures.
12. Basic operations with regular files.
13. Pointer to a function.
14. Compiling a program from source code using the "make" utility.

Recommended literature:
1. KERNIGHAN, Brian W., Dennis M. RITCHIE. Programovací jazyk C. Brno: Computer Press, 2006. ISBN:802510897X.
2. PRATA, Stephen. C Primer Plus. 6th Edition. Addison-Wesley Professional, 2014. ISBN 9780321928429.

3. SEACORD, Robert C. Effective C: An Introduction to Professional C Programming. San Francisco, United States: No Starch Press, 2020. ISBN 9781718501041.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 268

A	B	C	D	E	FX
38.06	19.78	14.55	14.93	8.96	3.73

Provides: RNDr. PhDr. Peter Pisarčík

Date of last modification: 08.10.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PRS/15	**Course name:** Programming of robotic kits

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Evaluation of independent work with kits and in educational programming environments in solving robotic mini-projects.
Creation of own task and presentation of the solution with methodological recommendations.

Learning outcomes:
1. To acquire an overview of robotic sets and robotic programming environments.
2. To acquire skills in constructing and programming robots in selected robotic programming environments.

Brief outline of the course:
1. Robotic kit (Lego Mindstorms EV3 and Spike Prime) - parts, motors, sensors, basics of building mechanical parts of models
2. Programming of robotic models in Lego Education Mindstorms EV3 and Classroom, Lego Education Spike - branching commands, cycles, blocks, events, parallel processes, working with sensors, datalogging. Creating mini-projects (eg explorer, rescuer, parking, Super Cleanup, Life Hacks, Rain or shine?)
3. Programming of robotic models in the block programming environment EV3 and Spike - creation of mini-projects
4. Robotic competitions, ideas for more demanding projects.
5. Creation and presentation of the final project - a programmed robotic model (eg going through a maze, sports, rescuer) with documentation.

Recommended literature:
1. BUMGARDNER, J. (2007) The Origins of Mindstorms. Wired, 2007. http://www.wired.com/geekdad/2007/03/the_origins_of_/
2. Carnegie Mellon. Robotics Academy. http://www.education.rec.ri.cmu.edu/
3. Pavel Petrovič, http://robotika.sk/events/18Skolenia/priruckaEV3.pdf
4. Get ready with Lessons: https://education.lego.com/en-us/lesson
5. LEGO® Education Professional Development, https://education.lego.com/en-us/professional-development#about
6. SCRATCH Programming Lessons, https://primelessons.org/en/Lessons.html,

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 54

A	B	C	D	E	FX
53.7	24.07	11.11	1.85	0.0	9.26

Provides: Ing. Angelika Hanesz

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PSW1/06	**Course name:** Programming of web-pages

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: (ÚINF/DBS1a/15 or ÚINF/DBS/15) and (ÚINF/PAZ1a/15 or ÚINF/PRG1/15)

Conditions for course completion:
50% of the marks from continuous assignments

Learning outcomes:
An overview of modern technologies for creating dynamic websites. Describing and appliyng the basic principles of creating dynamic web pages. Utilize client-side (JavaScript) and server-side (PHP) web programming technologies. Using relational databases (MySQL) to create application web pages. Know the security risks of dynamic websites and be able to eliminate them.

Brief outline of the course:
1. JavaScript - introduction to JavaScript programming.
2. JavaScript - communication with the user, validation of data in forms using JavaScript.
3. JavaScript - introduction to using the jQuery library.
4. PHP - introduction to PHP programming.
5. PHP - data and control structures of the PHP language.
6. PHP - communication with the user, validation of data in forms using PHP.
7. PHP - object oriented problem solving in PHP language. File manipulation.
8. PHP - User authentication (cookies, session).
9. MySQL - introduction to working with MySQL database system.
10. MySQL - Simple applications using the database for data storage and access.
11. Web application security - an introduction to web application security.
12. Web application security - the most common web application security problems and how to eliminate them.

Recommended literature:
BLUM, Richard. PHP, MySQL& JavaScript: All-in-One. Hoboken, New Jersey: John Wiley, 2018. ISBN 978-1-119-46838-7.
KROMANN, Frank M. Beginning PHP and MySQL: From Novice to Professional. 5. CA, USA: Apress, 2018. ISBN 978-1-4302-6043-1.
HUSEBY, Sverre H. Zranitelný kód. Brno: Computer Press, 2006, 207 s. ISBN 80-251-1180-6.
SNYDER, Chris, Thomas MYER a Michael SOUTHWELL. Pro PHP Security: From Application Security Principles to the Implementation of XSS Defenses. 2. United States of America: Apress, 2010. ISBN 978-1-4302-3318-3.

Course language:
Slovak language, knowledge of English language is only necessary for reading documentation.

Notes:
Content prerequisite: WBdi/15 Web and user interface design

Course assessment
Total number of assessed students: 34

abs	n	neabs	z
76.47	23.53	0.0	0.0

Provides: PaedDr. Ján Guniš, PhD., univerzitný docent

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PAZ1a/15	**Course name:** Programming, algorithms, and complexity

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 3 / 4 **Per study period:** 42 / 56
Course method: present

Number of ECTS credits: 8

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Graded activities during semester: assignments, small exams, midterm, final project.
Final examination: practical finalterm focused on a complex task.
Rules to pass the subject: Pass the minimal limit of points for category of homeworks (assignments, final project) and tests (small exams, midterm). Get at least 42% from the finalterm and pass the defined limit of total points for all graded activities.

Learning outcomes:
Get an ability to implement basic Java programs and obtain essential knowledge related to object-oriented programming.

Brief outline of the course:
1. Introduction to Java and JPAZ2 framework, first Eclipse project, interactive communication with objects using turtle graphics, repeating code in loops, notion of class, object, and method.
2. For-loops, local variables, variable types, arithmetic expressions, random numbers, random walk, conditions.
3. While-loop, returning a value from a method, reference and reference variables, debugging.
4. Primitive and reference types, chars, String objects (including basic algorithms), mouse events, instance variables.
5. Array of primitive values and array of references, simple array algorithms.
6. Advanced array algorithms, two-dimensional array.
7. Exceptions and exception handling, files and directories, writing to text files.
8. Reading from text files.
9. Creating classes, encapsulation, getters and setters, constructors and their hierarchy, method overloading.
10. Inheritance and polymorphism.
11. Java Collections Framework, ArrayList class, wrapper classes for primitive types and autoboxing, interfaces List, Set, Map and their implementations, methods equals and hashCode.
12. Access modifiers, abstract classes and methods, creating and implementing interfaces, sorting, static methods and variables.
13. Creating and throwing exceptions, checked and runtime exceptions, JavaDoc, Maven.

Recommended literature:

1. ECKEL, Bruce. Thinking in Java. Fourth edition. Upper Saddle River, NJ: Prentice Hall, c[2006]. ISBN 978-01-318-7248-6.
2. PECINOVSKÝ, Rudolf. OOP: naučte se myslet a programovat objektově. Brno: Computer Press, 2010. ISBN 978-80-251-2126-9.
3. SIERRA, Kathy a Bert BATES. Head first Java. Vyd. 2. Sebastopol: O´Reilly, 2005. ISBN 978-05-960-0920-5.

Course language:
Slovak language, english language is required only to read Java API documentation.

Notes:

Course assessment
Total number of assessed students: 897

A	B	C	D	E	FX
16.05	8.7	11.71	18.28	14.05	31.22

Provides: RNDr. Juraj Šebej, PhD., RNDr. Miroslav Opiela, PhD., RNDr. Zoltán Szoplák, RNDr. Viktor Pristaš, doc. RNDr. Ondrej Krídlo, PhD., RNDr. Richard Staňa, Mgr. Viktor Olejár

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PAZ1b/15	**Course name:** Programming, algorithms, and complexity

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 4 **Per study period:** 28 / 56
Course method: present

Number of ECTS credits: 7

Recommended semester/trimester of the course: 2.

Course level: I.

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
Graded activities during semester: assignments, small theoretical exams, practical and theoretical midterm.
Final examination: practical and theoretical finalterm.
Rules to pass the subject: Get at least 50% from theoretical activities (small exams, theoretical midterm and theoretical finalterm) and from practical activities (practical midterm and finalterm). Pass the defined limit of total points for all graded activities.

Learning outcomes:
To know essential algorithms, data structures, and methods used for efficient algorithms design. To understand time complexity analysis. To practice efficient implementation of algorithms. To recognize combinatorial and graph algorithms.

Brief outline of the course:
1. Recursion and fractals.
2. Binary search, basic sorting algorithms, time complexity analysis, O-notation.
3. Basic data structures and algorithms: linked list, stack, queue.
4. Trees and their applications.
5. Efficient sorting algorithms (QuickSort, MergeSort, HeapSort).
6. Backtracking.
7. Dynamic programming, divide and conquer strategy.
8. Unweighted graphs, graph traversal, graph topological sort.
9. Weighted graphs, the shortest path algorithms.
10. Minimum spanning tree, greedy algorithms.
11. Hashing, amortized time complexity, string-searching algorithms.

Recommended literature:
1. WRÓBLEWSKI, Piotr. Algoritmy: datové struktury a programovací techniky. Brno: Computer Press, 2004. ISBN 80-251-0343-9.
2. CORMEN, Thomas H. Introduction to algorithms. 3rd ed. Cambridge: MIT Press, c2009. ISBN 978-0-262-03384-8.
3. KLEINBERG, Jon a Éva TARDOS. Algorithm design. Thirteenth impression. Noida, India: Pearson, c2014. ISBN 9789332518643.

4. MAREŠ, Martin a Tomáš VALLA. Průvodce labyrintem algoritmů. Praha: CZ.NIC, z.s.p.o., 2017. CZ.NIC. ISBN 978-80-88168-19-5.

Course language:
Slovak language, literature is available in english and czech language.

Notes:

Course assessment
Total number of assessed students: 1356

A	B	C	D	E	FX
14.97	7.82	10.62	18.88	20.65	27.06

Provides: RNDr. Juraj Šebej, PhD., RNDr. Miroslav Opiela, PhD., RNDr. Viktor Pristaš, doc. RNDr. Ondrej Krídlo, PhD.

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PAZ1c/17	**Course name:** Programming, algorithms, and complexity

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
Conditions for continuous evaulation: Active participation in exercises.
Conditions for the final evaluation: Implementation and presentation of one or two team projects with sufficient score. Criteria for obtaining points are listed on the course page https://paz1c.ics.upjs.sk/

Learning outcomes:
Ability to design and implement more complex applications with a three-tier architecture, relational database and standard design patterns. The ability to create a REST server in the Spring boot framework and a simple Angular application that can communicate with this server.

Brief outline of the course:
1. Identification of Classes, Methods and Instance Variables, Entities, Unit Tests and JUnit.
2. Introduction to JavaFX, FXML, Scene Builder, Controller.
3. Model-View-Controller design pattern, Observable and Property classes, model of JavaFx models, persistent layer, entities and identifiers, CRUD in-memory storage, GUI and persistent layer interconnection.
4. Design of interfaces for DAO objects. Advantages and disadvantages of associations between classes against manually wired associations. Implementation of the Factory design pattern as an abstraction of wired classes. Enum. Database persistent layer. JDBCTemplate configuration, RowMapper.
5. Data input via JDBCTemplate. Associations between classes. Relationships with cardinalities: 1:1, 1:M, M:N. RDB design and implementation in code. Design of a more complex data model, ResultSetExtractor.
6. Business layer, three-tier application, modal windows, entity modification in JavaFX and MySQL.
7. Logging - System.out.println as the easiest way to log. Logging with Slf4j. Secure password storage.
8. Annotations, work with lambda expressions, generic classes.
9. Spring Boot and REST services. Json format.
10. Angular - installation, TypeScript, DOM model, components and their properties, event capture in components.

11. Angular - communication between components, forms, input validation.
12. Angular - services, Observable, injection, communication with REST server via HTTP.

Recommended literature:

1. WALLS Craig. Spring in Action. Manning Publications; 5th edition, 2018. ISBN 978-1-617-29494-5.
2. ECKEL, B. Thinking in Java. ľPearson; 4th edition,2006. ISBN 0131872486.
3. Website of framework Angular. Available online: <https://angular.io/>

Course language:
Slovak

Notes:
Content prerequisites: basic programming in Java

Course assessment
Total number of assessed students: 173

A	B	C	D	E	FX
22.54	10.4	13.87	28.32	21.39	3.47

Provides: RNDr. Peter Gurský, PhD., RNDr. Viliam Kačala, PhD.

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 4.	
Course level: I.	
Prerequisities:	
Conditions for course completion: Work on a software project in a team, presentation of the resulting project	
Learning outcomes: Experience in developing a software product in a team, ability to present the final software product	
Brief outline of the course: 1. Creation of project documentation using Markdown and Asciidoc 2. Versioning of source codes via git and the GitLab platform 3. Continuous integration and delivery (CI/CD) via GitLab Pipelines 4. Database migration scripts and deployment to production 5. Securing the backend REST API using HTTP Basic (Spring Boot and Spring Security) 6. Securing the backend REST API using OAuth via an authorization server (Keycloak) 7. Application containerization via Docker 8. Custom docker image and integration into CI/CD 9. Testing applications via Testcontainers 10. Frontend and backend integration via API Gateway and loadbalancer (Traefik)	
Recommended literature: 1. Study literature tied to the selected project (according to the client's recommendation) 2. Joost Evertse. Mastering GitLab 12: Implement DevOps culture and repository management solutions. Packt Publishing Ltd, 2019. ISBN 1789534062 3. Lauren#iu Spilcă. Spring Security in Action. Manning, október 2020. ISBN 9781617297731 4. Thomas Vitale. Cloud Native Spring in Action. Manning, november 2022. ISBN 9781617298424 5. Jeff Nickoloff, Stephen Kuenzli. Docker in Action, Second Edition. Manning, október 2019. ISBN 9781617294761	
Course language: Slovak or English	
Notes: content prerequisities: programming skills, basics of shell scripts in Linux	

Course assessment
Total number of assessed students: 147

A	B	C	D	E	FX
67.35	11.56	6.8	8.16	4.76	1.36

Provides: RNDr. Peter Gurský, PhD., RNDr. Viliam Kačala, PhD.

Date of last modification: 06.09.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 5.

Course level: I., N

Prerequisities:

Conditions for course completion:
Active participation in the project. Participating in regular project team meetings. 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:
Learn how to work on a larger software part at all stages of its life cycle. Be able to analyze and explicitly express user requirements, precisely specify the task, design a solution and evaluate alternatives. Implement and test an effective and correctly designed solution. Learn to keep detailed documentation and present the results of the work in writing and in public. Learn to work together in a development team, share work effectively and exchange ideas.

Brief outline of the course:
The course is realized as part of "Živé projekty" (Live projects) in cooperation with the Technical University of Košice and several software companies. Students work in a team of 4-5 members to develop, test and present a software product under the guidance of a mentor from a university or a software company.
1. Team creation and project selection takes place at the beginning of October
2. Students meet with the project mentor on a weekly basis and continuously work on the creation of a software product
3. Around mid-January, students submit a video with a short presentation of the project
4. At the beginning of February, the project presentation takes place. The best teams are awarded with material prizes.

Recommended literature:
The sources of information depend on the selected project.

Course language:
Slovak or english

Notes:
Content prerequisities:
advanced programming skills

Course assessment
Total number of assessed students: 94

A	B	C	D	E	FX
56.38	18.09	8.51	8.51	3.19	5.32

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 06.09.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 1.

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:
1. Introduction to project management.
2. Project planning. Preparation of project documentation.
3. Project specification.
4. Estimating project Time and Costs.
5. Work organization.
6. Monitoring and project control.
7. Project closure.
8. Project management models.
9. Estimating project times and costs.
10. Project documentation.
11. Specific approaches for projects in the field computer science.
12. Prince2

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: 133					
A	B	C	D	E	FX
25.56	25.56	24.06	11.28	5.26	8.27
Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Viktor Pristaš, RNDr. Viliam Kačala, PhD.					
Date of last modification: 23.09.2021					
Approved: doc. RNDr. Jozef Jirásek, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ RPBI/20	**Course name:** Resolving computer security incidents

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
The condition for passing the course are homeworks (50% of the total number of points) and the final practical task (50% of the total number of points).

Learning outcomes:
The result of the education is an understanding of the basic approaches to solving computer security incidents from procedural and legal requirements to ways of identifying the security incident and the method of its technical solution.

Brief outline of the course:
1. Introduction to computer security incident hadling and response, 2. The process of handling and response to computer security incidents and computer security incident response teams, 3. Legal aspects of the computer security incidents handling, 4. Preparing for the security incidents handling and the first response, 5. Introduction to digital forensic analysis, 6. Incident handling and response to computer security incidents in the field of malware, 7. Incident handling and responseto computer security incidents in the field of email communication, 8. Incident handling and response to network security incidents I., 9. Incident handling and response to network security incidents II., 10. Incident handling and responseto computer security incidents in the field of web applications I., 11. Incident handling and responseto computer security incidents in the field of web applications II., 12. Incident handling and response to cloud security incidents, 13. Incident handling and responseto cyber security incidents in the field of insiders, 14. Final assignment.

Recommended literature:
1. MURDOCH, Don. Blue Team Handbook: Incident Response Edition: A condensed field guide for the Cyber Security Incident Responder. South Carolina, United States: CreateSpace Independent Publishing Platform, 2014. ISBN 978-1500734756, 2. ANSON, Steve. Applied Incident Response. New York, United States: Wiley, 2020. ISBN 978-1119560265, 3. ROBERTS, Scott. Intelligence-Driven Incident Response: Outwitting the Adversary. Sebastopol, California, United States: O'Reilly Media, 2017. ISBN 978-1491934944.

Course language:
Slovak or English

Notes:

Content prerequisites: basic knowledge in the field of information security, basics of working with the Linux operating system, basic knowledge of computer networks.

Course assessment
Total number of assessed students: 24

A	B	C	D	E	FX
54.17	25.0	16.67	4.17	0.0	0.0

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Eva Marková

Date of last modification: 26.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ APSP/16	**Course name:** SAP Applications in Public Administration / a Company

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: 3

Recommended semester/trimester of the course: 4., 6.

Course level: I., N

Prerequisities: ÚINF/ZSSP/16

Conditions for course completion:
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, within which the student has a basic overview of accounting of suppliers and customers - establishment / change / display / blocking / unblocking the supplier / customer and knows the accounting transactions related to the supplier / customer invoice, also knows how to solve practical tasks related to project accounting - structured project plan, budget management, budget program, establishment of the SPP element, budget output reports.

Brief outline of the course:
1.-2. FI - vendor accounting - master data (creation, change, display, blocking / unblocking), accounting transactions - vendor invoice (document entry, display / change of items on the supplier's account, document cancellation), sending payment for the vendor invoice.
3.-4. FI - customer accounting - master data (creation, change, display, blocking / unblocking), accounting transactions - customer invoice (document entry, display / change of items on the customer's account, document cancellation), receipt of payment for customer invoice, customer credit memo, display balances, settlement of customer account items, reminders.
5. FI - project accounting - structured project plan, budget management - master data (financial items, financial centers, funds, functional areas and elements of program classification), budget program, establishment of SPP element, output reports to the budget.
6.-7. Individual work for practice.

Recommended literature:
Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 162

abs	n	neabs
95.68	0.0	4.32

Provides: Bc. Martin Tomko

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ PUSP/16	**Course name:** SAP for Advanced Users

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: 3

Recommended semester/trimester of the course: 4., 6.

Course level: I., N

Prerequisities: ÚINF/APSP/16

Conditions for course completion:
Conditions for the final evaluation:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in teaching in accordance with the study regulations and according to the teacher's instructions.
2. Mastering the conditions of the final evaluation in the overall expression at the level of at least 80%.

Learning outcomes:
During teaching and especially in the final evaluation, the student demonstrates adequate mastery of the content standard of the course, which is defined by the course syllabus, and demonstrates mastery of the performance standard, in which the student has a basic overview of fixed asset accounting after completing the course. - creation / change / display / blocking / deletion of the IM card, calculation and correction of depreciation, controls the purchase process within the MM module - order, material receipt, invoicing, payment, bank statement, controls transactions related to inventory management, liquidation of incoming invoice and material , has a basic overview of the HR module.

Brief outline of the course:
1.-2. FI - asset accounting - master data (asset class, depreciation area), asset transactions - current (acquisition, disposal) - creation / change / display / blocking / deletion of an asset card, display of asset values, calculation of depreciation, depreciation corrections, other transactions (transfers, credits, valuation, leasing, rental).
3.-4. MM (Material Management) - procurement process (order, material receipt, invoicing, payment, bank statement), inventory management, liquidation of incoming invoice (preliminary procurement of incoming invoice, document entry, document cancellation, document display, invoice overview), material (creation, change, view, list).
5. HR (Human Resources) - basic components (organizational management, personnel management), infotypes and subtypes of infotypes, personnel actions (only in the form of a sample)
6.-7. Individual work for practice.

Recommended literature:

Company literature of SAP. Available on-line: <http://www.sap.com>

Course language:
slovak

Notes:
By default, teaching is carried out face to face. If this is not possible (eg due to a pandemic), teaching is provided at a distance through video conferencing programs and LMS.

Course assessment
Total number of assessed students: 152

abs	n
99.34	0.66

Provides:

Date of last modification: 21.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ ÚTVŠ/CM/13	**Course name:** Seaside Aerobic Exercise

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks- aerobics, water exercise, yoga, Pilates and others

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- perform basic aerobics steps and basics of health exercises,
- conduct verbal and non-verbal communication with clients during exercise,
- organise and manage the process of physical recreation in leisure time

Brief outline of the course:
Brief outline of the course:
1. Basic aerobics – low impact aerobics, high impact aerobics, basic steps and cuing
2. Basics of aqua fitness
3. Basics of Pilates
4. Health exercises
5. Bodyweight exercises
6. Swimming
7. Relaxing yoga exercises
8. Power yoga
9. Yoga relaxation
10. Final assessment

Students can engage in different sport activities offered by the sea resort – swimming, rafting, volleyball, football, table tennis, tennis and other water sports in particular.

Recommended literature:
1. BUZKOVÁ, K. 2006. Fitness jóga. Praha: Grada. 167 s.

2. ČECHOVSKÁ, I., MILEROVÁ, H., NOVOTNÁ, V. Aqua-fitness. Praha: Grada. 136 s.
3. EVANS, M ., HUDSON, J., TUCKER, P. 2001. Umění harmonie: meditace, jóga, tai-či, strečink. 192 s.
4. JARKOVSKÁ, H., JARKOVSKÁ, M. 2005. Posilováni s vlastním tělem 417 krát jinak. Praha: Grada. 209 s.
5. KOVAŘÍKOVÁ, K. 2017. Aerobik a fitness. Karolium, 130 s.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 62

abs	n
9.68	90.32

Provides: Mgr. Agata Dorota Horbacz, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/BAPS/15	**Course name:** Security and administration of computer systems

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚINF/KRS/15 and (ÚINF/ADL1/15 or ÚINF/ADW1/15) and ÚINF/FAN/15 and ÚINF/SKB1/15

Conditions for course completion:
Appropriate knowledge and competencies from the profile courses of the specialisation Security and administration of computer systems, demonstrating the ability to synthesise the acquired knowledge and procedures and apply them to computer problems.

Learning outcomes:
Verification of acquired student competencies in accordance with the graduate profile.

Brief outline of the course:
1. Programming techniques, data structures, algorithms and their complexity.
2. Principles of operating.
3. Database systems.
4. Fundamental computer architectures.
5. Cryptographic systems and their applications.
6. Network and communication security.

Recommended literature:
Information sources recommended within individual profile courses.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 2

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

Provides:

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

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

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

Number of ECTS credits: 5

Recommended semester/trimester of the course: 3., 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Homeworks, active participation in laboratory exercises.
Final practical test, oral examination.

Learning outcomes:
Familiarize with the concepts, methods, and means to ensure the confidentiality, integrity, and availability of computer systems assets. To control in more detail the issues of access control to computer system resources, operating system security, program security, database systems security. Gain the ability to create security models, use cryptographic methods to ensure security, know how to evaluate system and communication security. By completing the course the student will gain the knowledge necessary in the design of secure computer and information systems, risk analysis and security audit of information systems.

Brief outline of the course:
1. Computer security concepts, information security, security policies for its individual components.
2. User authentication principles, password generation and management, multifactor authentication, vulnerabilities.
3. Access control models, access matrices, attribute models, multilevel models, reference monitors, access monitoring and audit.
4. System security. System installation, update management, service configuration, resource management and monitoring, user administration, remote access, virtualization, hardening.
5. Equipment for digital data storage, coding, durability, confidentiality, integrity, availability, replication, archiving, disposal.
6. System startup (BIOS, UEFI), disk data organization, file systems and their vulnerabilities.
7. Management and monitoring of processes, operating system services, executable files and their structure, metadata.
8. Intel and ARM processor architecture, assembler, memory access organization, segmentation and paging support, process execution support.
9. Malicious software, advanced persistence threat. Methods of system attacks, static analysis of potentially malicious software, countermeasures.
10. Dynamic analysis of malicious software, basics of disassembly techniques.

11. Mechanisms of attacks at the level of application programs, exceeding the allocated resources, code insertion, social engineering.
12. Vulnerabilities of database systems, security of requirements, inference channels, problems of cloud implementations, archiving and secure data deletion.
13. Secure software development, defensive programming, input validation, formal verification, OWASP principles for web application development.

Recommended literature:

1. STALLINGS, W.: Computer Security: Principles and Practice, 4.ed., Pearson, 2017, ISBN 978-0134794105
2. PFLEEGER, CH.,P.: Security in Computing. 4th ed. Prentice-Hall International, Inc., 2006, ISBN: 0-13-2390779
3. GOLLMANN, D.: Computer Security. John Wiley & Sons, 2011, ISBN: 0-470-741155.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 68

A	B	C	D	E	FX
20.59	17.65	17.65	20.59	23.53	0.0

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

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SPS1/15	**Course name:** Seminar in network programming

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I., II.

Prerequisities:

Conditions for course completion:

Learning outcomes:
To render current technologies of programing in network distributed environment.

Brief outline of the course:
Basics of programming the client-server applications, iterative and concurrent servers, Remote Procedure Calls. Server-side programming, CGI, PHP, basics of Perl and Python. Script languages, ASP, JSP, Component Object Model, Corba, database connection's interfaces. Document Object Model, XML, XSL, dynamic extensions of HTML.
Advanced level of programming is expected.

Recommended literature:
Internet sources and specifications.

Course language:

Notes:

Course assessment
Total number of assessed students: 96

A	B	C	D	E	FX
65.63	20.83	11.46	1.04	1.04	0.0

Provides: RNDr. Rastislav Krivoš-Belluš, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SPG1/15	**Course name:** Seminar on computer graphics

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 4., 6.

Course level: I.

Prerequisities: ÚINF/UGR1/15

Conditions for course completion:

Learning outcomes:

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

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 42

A	B	C	D	E	FX
76.19	11.9	7.14	2.38	0.0	2.38

Provides: RNDr. Rastislav Krivoš-Belluš, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ OSS/15	**Course name:** Seminar to operation 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: 3.	
Course level: I.	
Prerequisities: ÚINF/PAZ1a/15 and ÚINF/ZLI/21	
Conditions for course completion: Develop two final projects: PowerShell script (Windows) or Shellscript (Linux)	
Learning outcomes: To work with shells of Windowsu and GNU/Linux. Scripting in both platforms.	
Brief outline of the course: Powershell 1. introduction, directories, files 2. regular expressions, formatters, processes 3. providers 4. services 5. object management via CIM/WMI 6. multiline scripting 7. object-oriented programming Shell / bash 8. introduction, multiline scripts, conditions, variables 9. bulk processing of strings and files 10. cycles, xargs, functions 11. conditions, implicit values of undefined variables 12. branches, while, strings 13. work with numbers, grouping of commands 14. shellcheck, set command, debugging	
Recommended literature: [1] Bruce Payette, Windows PowerShell in Action, Second Edition, ISBN 9781935182139, Manning 2011 [2] Richard Siddaway, PowerShell in Practice, ISBN: 9781935182009, Manning 2010 [3] Shell Command Language. In: The Open Group Base Specification Issue 6. [online] Available online <http://pubs.opengroup.org/onlinepubs/009695399/utilities/xcu_chap02.html> [4] Steve Parker, Shell Scripting: Expert Recipes for Linux, Bash and more, ISBN: 978-1-1181-6633-8, Wrox 2011	

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 97

A	B	C	D	E	FX
69.07	20.62	2.06	2.06	0.0	6.19

Provides: RNDr. Tomáš Bajtoš, PhD.

Date of last modification: 24.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PRIS/15	**Course name:** Software and information system

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

Number of ECTS credits: 4

Recommended semester/trimester of the course:

Course level: I.

Prerequisities: ÚINF/ASU1/15 and ÚINF/TVP1/21 and ÚINF/PMO1/15 and ÚINF/SWI1b/15

Conditions for course completion:
Appropriate knowledge and competencies from the profile courses of specialisation Programming and information systems, demonstrating the ability to synthesise the acquired knowledge and procedures and apply them to problems from the area of informatics.

Learning outcomes:
Verification of acquired student competencies in accordance with the graduate profile.

Brief outline of the course:
1. Programming techniques, data structures, algorithms and their complexity.
2. Principles of operating systems.
3. Database systems.
4. Principles and methods of software engineering.
5. Principles and methods of business process modelling.

Recommended literature:
Information sources recommended within individual profile courses.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 48

A	B	C	D	E	FX
25.0	18.75	35.42	8.33	12.5	0.0

Provides:

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SWI1a/15	**Course name:** Software engineering

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚINF/DBS1a/15

Conditions for course completion:
The evaluation will be given on the basis of the proper fulfilment of the partial tasks of solving the (group) project during the semester. The minimum prerequisite for passing the subject is obtaining 50% of the total possible number of points. The sub-probation conditions for evaluation are published in the AIS.

Learning outcomes:
By completing the subject, the student:
- acquires basic knowledge of the principles and methods of software engineering,
- get familiar with the individual stages of the software development life cycle,
- familiarizes himself with the modeling of software systems and acquires basic knowledge from the use of relevant SW tools,
- will gain basic experience in working in a team and with project management and presentation.

Brief outline of the course:
1. Introduction to software engineering.
2. Software processes
3. Selected support tools for managing software processes.
4. Requirements engineering.
5. Agile methods.
6. Modeling of systems.
7. Implementation of software systems.
8. Architectures of software systems.
9. Testing.
10. Evolution of systems.
11. Case studies of software systems.

Recommended literature:
1. BERKUN, S. The Art Of Project Management. O Reilly, 2005.
2. BJORNER, D. Software engineering 1,2,3. Springer-Verlag Berlin, 2006.
3. SOMMERVILLE, I. Software Engineering. Addison-Wesley, 2015.

Course language:

Slovak or English

Notes:
Content prerequisities: Database systems, OOP

Course assessment
Total number of assessed students: 372

A	B	C	D	E	FX
19.09	24.46	19.62	16.94	18.55	1.34

Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Dávid Varga

Date of last modification: 25.07.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SWI1b/15	**Course name:** Software engineering

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

Number of ECTS credits: 3

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities: ÚINF/SWI1a/15

Conditions for course completion:
Evaluation of the quality of the processed project, its presentation and defense.

Learning outcomes:
To learn principles and to developed fundamental skills concerning software modelling, development and implementation.

Brief outline of the course:
1. Software Evolution
2. Safety Engineering
3. Security Engineering, Resilience Engineering
4. Software Reuse
5. Distributed Software Engineering
6. Service - oriented Software Engineering
7. Systems of Systems
8. Real - time Software Engineering
9. Project planning
10. Quality management
11: Configuration management

Recommended literature:
1. BERKUN, S. The Art Of Project Management. O Reilly, 2005.
2. BJORNER, D. Software engineering 1,2,3. Springer-Verlag Berlin, 2006.
3. PRINCE2. Dostupné na internete: <http://www.prince2.com>.
4. SOMMERVILLE, I. Software Engineering. Addison-Wesley, 2007.
5. UML. Dostupné na internete: <http://www.uml.org>.

Course language:
Slovak or English

Notes:
content prerequisities: advanced programming

Course assessment
Total number of assessed students: 300

A	B	C	D	E	FX
48.33	19.33	12.33	7.33	11.33	1.33

Provides: prof. RNDr. Gabriel Semanišin, PhD., RNDr. Dávid Varga

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SZPa/22	**Course name:** Special seminar to bachelor thesis

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

Number of ECTS credits: 1

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Update of the bachelor thesis website. Presentation of the current state of knowledge for the topic selected in the bachelor's thesis. Presentation of the first results of bachelor thesis. Preparing of scientific article of 5 pages length in the required structure. Approval of the article by the thesis supervisor.

Learning outcomes:
Basic knowledge about the procedure and writing of the bachelor's thesis, standards and formal aspects of the bachelor's thesis, the creation of bibliographic references and their citations, tools for creating the database of used literature. Basic knowledge of the content and form of presentation of the current state of knowledge for the topic of the bachelor's thesis. Basic knowledge about the preparation of a scientific article.

Brief outline of the course:
1. Procedure for writing the bachelor thesis.
2. Standards and formal aspects of the bachelor thesis.
3. Rules of writing and editing documents STN 01 6910.
4. Documentation, Numbering of sections and subsections of written documents STN ISO 2145.
5. Information and documentation STN ISO 690.
6. Instructions for creating bibliographic references to information sources and their citation.
7. Selected typographic principles.
8. Professional resources on the Internet.
9. Principles of correct citation.
10. Tools for creating your own database of used literature.
11. Annotation of read literature, creation of searches.
12. Presentation of selected topics of bachelor theses.
13. Presentation of selected topics of bachelor theses.

Recommended literature:
1. STN 01 6910. Rules of writing and editing documents. 2011.
2. STN ISO 2145. Documentation. Numbering of sections and subsections of written documents. 1997.

3. STN ISO 690. Information and documentation. Instructions for creating bibliographic references to information sources and their citation. 2012
4. KATUŠČÁK, Dušan. How to write final and qualification theses. Enigma, 2013
5. Scientific literature related to the topic of the final thesis according to the recommendation of the thesis supervisor.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 193

abs	n	neabs
98.96	1.04	0.0

Provides: doc. RNDr. Ľubomír Antoni, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SZPb/22	**Course name:** Special seminar to bachelor thesis

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

Number of ECTS credits: 1

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Update of the bachelor thesis website. Presentation of the obtained results of the bachelor's thesis. Preparation of at least a 10-page scientific article for the topic chosen in the bachelor's thesis in the required structure and its approval by the thesis supervisor. Creating a promotional image (poster) about the results of the bachelor's thesis.

Learning outcomes:
Basic knowledge of the central register of final theses, licenses and copyrights, content and form of presentation of the overall results achieved in the bachelor's thesis. Basic knowledge about the preparation of a scientific article and presentation of the achieved results for popularization purposes.

Brief outline of the course:
1. Central register of final theses.
2. Licenses and Copyrights.
3. Directive on basic requirements for final theses at UPJŠ in Košice.
4. The most common mistakes in writing a final thesis.
5. Evaluation criteria and examples of assessments.
6. Preparation of a presentation for the defense of the final thesis.
7. Preparation of a scientific article.
8. Preparation of a presentation for the defense of the final thesis.
9. Preparation of a scientific article.
10. Procedure for submitting the final thesis.
11. Popularization of bachelor thesis results.
12. Presentations of the results of bachelor theses.
13. Presentations of bachelor thesis results.

Recommended literature:
1. STN 01 6910. Rules of writing and editing documents. 2011.
2. STN ISO 2145. Documentation. Numbering of sections and subsections of written documents. 1997.
3. STN ISO 690. Information and documentation. Instructions for creating bibliographic references to information sources and their citation. 2012

4. KATUŠČÁK, Dušan. How to write final and qualification theses. Enigma, 2013
5. Scientific literature related to the topic of the final thesis according to the recommendation of the thesis supervisor.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 169

abs	n	neabs
98.82	1.18	0.0

Provides: doc. RNDr. Ľubomír Antoni, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SSBa/20	**Course name:** Specialized seminar to bachelor thesis

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: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
Presentation of scientific papers and software solutions in the selected field of computer science.
Active participation in discussions about possible solutions to selected problems.

Learning outcomes:
Student train the ability to study and present the principles and use of new software solutions to colleagues or to study and present the results of scientific results published in journals and conference papers.

Brief outline of the course:
Presentation of scientific papers from a selected field of informatics.
Practical presentation of current software solutions (libraries, frameworks) that are not included in study programs.
Discussions on possible solutions to selected problems in computer science.
The schedule of presentations will be published after the first meeting on the subject's website or other agreed location.

Recommended literature:
1. Scientific books and papers related to the selected field of computer science.
2. Book and online resources describing principles and use of selected software solutions

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 56

abs	n
100.0	0.0

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Juraj Šebej, PhD., RNDr. Peter Gurský, PhD., doc. RNDr. Ľubomír Antoni, PhD.

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/SSBb/20	**Course name:** Specialized seminar to bachelor thesis

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: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Presentation of scientific papers and software solutions in the selected field of computer science.
Active participation in discussions about possible solutions to selected problems.

Learning outcomes:
Student train the ability to study and present the principles and use of new software solutions to colleagues or to study and present the results of scientific results published in journals and conference papers.

Brief outline of the course:
Presentation of scientific papers from a selected field of informatics.
Practical presentation of current software solutions (libraries, frameworks) that are not included in study programs.
Discussions on possible solutions to selected problems in computer science.
The schedule of presentations will be published after the first meeting on the subject's website or other agreed location.

Recommended literature:
1. Scientific books and papers related to the selected field of computer science.
2. Book and online resources describing principles and use of selected software solutions

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 57

abs	n
96.49	3.51

Provides: doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., RNDr. Juraj Šebej, PhD., RNDr. Peter Gurský, PhD., doc. RNDr. Ľubomír Antoni, PhD.

Date of last modification: 17.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVa/11	**Course name:** Sports Activities I.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I., II.

Prerequisities:

Conditions for course completion:
Min. 80% of active participation in classes.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 15203

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
86.07	0.07	0.0	0.0	0.0	0.05	8.67	5.15

Provides: Mgr. Patrik Berta, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Marcel Čurgali, Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVb/11	**Course name:** Sports Activities II.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 2.

Course level: I., II.

Prerequisities:

Conditions for course completion:
active participation in classes - min. 80%.

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 13788

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
83.84	0.49	0.01	0.0	0.0	0.04	11.18	4.43

Provides: Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Marcel Čurgali, Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVc/11	**Course name:** Sports Activities III.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 9104

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.38	0.07	0.01	0.0	0.0	0.02	4.46	7.06

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ TVd/11	**Course name:** Sports Activities IV.

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 4.

Course level: I., II.

Prerequisities:

Conditions for course completion:
min. 80% of active participation in classes

Learning outcomes:
Sports activities in all their forms prepare university students for their professional and personal life. They have a great impact on physical fitness and performance. Specialization in sports activities enables students to strengthen their relationship towards the selected sport in which they also improve.

Brief outline of the course:
Brief outline of the course:
The Institute of physical education and sport at the Pavol Jozef Šafárik University offers 20 sports activities aerobics; aikido, basketball, badminton, body-balance, body form, bouldering, floorball, yoga, power yoga, pilates, swimming, fitness, indoor football, SM system, step aerobics, table tennis, chess, volleyball, tabata, cycling.
Additionally, the Institute of physical education and sport at the Pavol Jozef Šafárik University offers winter courses (ski course, survival) and summer courses (aerobics by the sea, rafting on the Tisza River) with an attractive programme, sports competitions with national and international participation.

Recommended literature:
BENCE, M. et al. 2005. Plávanie. Banská Bystrica: FHV UMB. 198s. ISBN 80-8083-140-8. [online] Dostupné na: https://www.ff.umb.sk/app/cmsFile.php?disposition=a&ID=571
BUZKOVÁ, K. 2006. Fitness jóga, harmonické cvičení těla I duše. Praha: Grada. ISBN 8024715252.
JARKOVSKÁ, H, JARKOVSKÁ, M. 2005. Posilování s vlastním tělem 417 krát jinak. Praha: Grada. ISBN 9788024757308.
KAČÁNI, L. 2002. Futbal:Tréning hrou. Bratislava: Peter Mačura – PEEM. 278s. ISBN 8089197027.
KRESTA, J. 2009. Futsal.Praha: Grada Publishing, a.s. 112s. ISBN 9788024725345.
LAWRENCE, G. 2019. Power jóga nejen pro sportovce. Brno: CPress. ISBN 9788026427902.
SNER, Wolfgang. 2004. Posilování ve fitness. České Budějovice: Kopp. ISBN 8072322141.

STACKEOVÁ, D. 2014. Fitness programy z pohledu kinantropologie. Praha: Galén. ISBN 9788074921155.
VOMÁČKO, S. BOŠTÍKOVÁ, S. 2003. Lezení na umělých stěnách. Praha: Grada. 129s. ISBN 8024721743.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 5839

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.51	0.27	0.03	0.0	0.0	0.0	8.25	8.92

Provides: Mgr. Marcel Čurgali, Mgr. Agata Dorota Horbacz, PhD., Mgr. Dávid Kaško, PhD., Mgr. Patrik Berta, Mgr. Ladislav Kručanica, PhD., Mgr. Richard Melichar, Mgr. Petra Tomková, PhD., Mgr. Alena Buková, PhD., univerzitná docentka, doc. PaedDr. Ivan Uher, MPH, PhD., prof. RNDr. Stanislav Vokál, DrSc., Mgr. Zuzana Küchelová, PhD.

Date of last modification: 07.02.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ MSU/07	**Course name:** Statistical Methods of Data Analysis

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: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
1. Active participation in lectures and excersises
2. 2x test
3. Passing the oral exam
Detailed conditions are updated annually on the electronic bulletin board of the course in AiS2 or within the repository for digital support materials (LMS UPJŠ, MS Teams UPJŠ, etc.)
The teacher justifies the justified non - participation of the student (incapacity for work, family reasons, etc.) a maximum of two lectures during the semester without the need for replacement.
In the event of a longer-term justified absence (for example due to incapacity for work), it shall determine the student an alternative form of mastering the missed study matter.
Credit evaluation of the course takes into account the following student workload: direct teaching and individual consultations (2 credits), self-study (1 credit), evaluation (1 credits). The minimum threshold for completing the course is to obtain at least 51% of the total score, using the following rating scale: A (91-100%), B (81-90%), C (71-80%), D (61- 70%), E (51-60%), F (0-50%).

Learning outcomes:
General introduction to theory of probability, random processes and mathematical statistics.

Brief outline of the course:
1. Random phenomena, random quantities and variables.
2. Interpretations and concept of probability, different definitions of probability.
3. Distribution functions and probability density.
4. Discrete and continuous random variables. Moments of distributions. Covariance and correlation.
5. Distributions: binomial, Poisson, normal, negative binomial, geometric, multinomial.
6. Distributions: uniform, exponential, multivariate, Gaussian, Cauchy distributions. Central limit theorem.
7. Distrbutions: chi-squared, Student and Fisher. Quantiles.
8. Characteristic function.
9. Chebyshev inequality. Chebyshev theorem. Bernoulli theorem.
10. Law of large numbers. The estimates of parameters of theoretical distributions from measured data. The maximum likelihood method. The weighted mean.
11. Statistical and systematic measurement errors. Estimation of errors. Propagation of errors.

12. Hypotheses testing. Null and alternative hypotheses. The least squares method. Linear and non-linear regression. Quality of regression, significance level.

Recommended literature:

1) L. Lyons, Statistics for Nuclear and Particle Physics, CUP, 1989.
2) L. Lyons, A Practical Guide to Data Analysis for Physical Science Students, CUP, 1991.
3) J.R. Taylor, An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements, University Science Books, 1997.

Course language:

Notes:

Course assessment

Total number of assessed students: 115

A	B	C	D	E	FX
23.48	13.04	13.04	10.43	40.0	0.0

Provides: doc. RNDr. Adela Kravčáková, PhD., RNDr. Zuzana Paulínyová, PhD.

Date of last modification: 16.09.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ SXM1/15	**Course name:** Structure formats and representation of data

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 3.

Course level: I.

Prerequisities:

Conditions for course completion:
Evaluation of partial exercises.
Evaluation of multiple assignments corresponding to learning blocks.
Final written test.

Learning outcomes:
Become acknowledged with theoretical concepts and methodologies with structured and semistructured data. Acquire programming skills with implementations of these concepts.

Brief outline of the course:
1. Representation of semi-structured data in XML, valid and well-formed XML document.
2. XML parsers: DOM,
3. SAX parser.
4 StAX parser.
5. Java API of XML parsers.
7. Schemas for XML documents: DTD, XML Schema.
8. Addressing in XML: XPath.
9. Transformations of XML documents: XSLT.
10. Other formats for semistructured data: JSON, YAML.
11. API for data binding in Java: Jackson (JSON), SnakeYAML (YAML), JAXB (XML).

Recommended literature:
1. Eliotte "Rusty" Harold. XML Bible, Gold Edition. Wiley, 2001. ISBN 978-0764548192.
2. Grigoris Antoniou, Frank Van Harmelen. A Semantic Web Primer, Second Edition. MIT Press, 2008. ISBN 978-0262012423.
3. Michaek Kay. XSLT 2.0 Programmer's Reference, 3rd Edition. Wrox, 2004. ISBN: 978-076456909.

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 104

A	B	C	D	E	FX
43.27	20.19	18.27	9.62	7.69	0.96

Provides: RNDr. Zoltán Szoplák

Date of last modification: 23.11.2021

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SVK1/15	**Course name:** Student scientific conference

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I., II.

Prerequisities:

Conditions for course completion:
It is required to be registered for the participation on the Student Scientific Conference (ŠVK) in accordance to the Statute of the Student Scientific Conference at PF UPJŠ and the specific conditions for participation in a given year, which are announced by the dean of the faculty. Within one year of the ŠVK, a student or a research team can register in one track only. It is also possible to apply with a written work that is an integral part of a bachelor's or master's thesis or a result of a student support program. The written work at ŠVK is the result of the student's own work or the work of the research team. It must not show elements of academic fraud and must meet the criteria of good research practice defined in the Rector's Decision no. 21/2021, which lays down the rules for assessing plagiarism at Pavol Jozef Šafárik University in Košice and its components. Fulfillment of the criteria is verified mainly in the process of supervision and in the process of work presentation. Failure to do so is reason for disciplinary action. The condition for the evaluation is a successful presentation and defense of the work in the relevant track headed by a commission appointed by the dean of the faculty. The commission decides on the eligibility of credits and states its decision in the memorandum of the ŠVK.

Learning outcomes:
The student demonstrates mastery of extended theory and professional terminology of the field of study, acquisition of knowledge, skills and competences, the ability to apply them creatively in solving selected field problems, ability to present the results using appropriate presentation methods and tools and ability to actively participate in a professional discussion.

Brief outline of the course:
1. Analysis of the state of the art in the field.
2. Design and implementation of a solution to the researched problem.
3. Evaluation of achieved results.
4. Preparation of work annotation.
5. Processing the written work.
6. Preparation of results presentation.
7. Presentation and defense of the obtained results.

Recommended literature:

The recommended literature is specified individually by the student or research team in agreement with the consultant or the supervisor.

Course language:
Slovak or english

Notes:

Course assessment
Total number of assessed students: 29

abs	n
100.0	0.0

Provides:

Date of last modification: 25.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚFV/ DGS/21	**Course name:** Students` Digital Literacy

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Summary evaluation based on ongoing assessment:
1. Practical ongoing assignments and their defense (at least 50% needed)
3. Active participation during face-to-face contact learning in classical or virtual classroom (3 absences allowed) and during online learning (no absence, uploading all individual ongoing assignments)

Learning outcomes:
The student should obtain and know to apply basic knowledge and skills in working with current digital technologies (mobile phone, tablet, laptop, web technologies):
1. according to the current European framework for the Digital competence DigComp and ECDL
2. for better and more effective learning, work and active life in higher education, later lifelong learning and further career prospects.

Brief outline of the course:
01.-02. Basic digital skills, DigComp framework, ECDL
- modern web browser and its personalization
- security, privacy, responsible use of DT
03.-05. Search, collection and evaluation of digital content
- scanning, audio recording and speech resolution, optical resolution (OCR)
- digital notebooks (Google keep, Evernote, Onenote)
- evaluation of digital resources (Google forms and sections)
06.-08. Editing and creating digital content
- cloud and interactive documents
(text and spreadsheet editors - Google, Microsoft, Jupyter)
- work with pdf documents, e-books and videos
(Kami, Google books, Screencasting)
09. - 10. Organization, protection and sharing of digital content
- modern LMS and cloud storage
(Google Classroom, Microsoft team, Google Drive, Dropbox)
- time management (Google Calendar)
11.-13. Digital communication and cooperation

- collaborative interactive whiteboards (Jamboard, Whiteboard)
- online presentations and online meetings
(Google presentations, Powerpoint, Google meet, Microsoft teams)

Recommended literature:

1. Carretero Gomez, S., Vuorikari, R. and Punie, Y., DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use, Luxembourg, 2017, ISBN 978-92-79-68006-9, https://www.ecdl.sk/
2. Bruff, D. (2019). Intentional Tech: Principles to Guide the Use of Educational Technology in College Teaching (1st edition). Morgantown: West Virginia University Press.
3. Baker, Y. (2020). Microsoft Teams for Education. Amazon Digital Services.
4. Miller, H. (2021). Google Classroom + Google Apps: 2021 Edition. Brentford: Orion Edition Limited.

Course language:
slovak

Notes:

Course assessment
Total number of assessed students: 163

A	B	C	D	E	FX
69.33	4.29	4.29	0.0	22.09	0.0

Provides: doc. RNDr. Jozef Hanč, PhD.

Date of last modification: 26.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚTVŠ/ LKSp/13	**Course name:** Summer Course-Rafting of TISA River

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines
- effective performance of all tasks: carrying a canoe, entering and exiting a canoe, righting a canoe, paddling

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and:
- implement the acquired knowledge in different situations and practice,
- implement basic skills to manipulate a canoe on a waterway,
- determine the right spot for camping,
- prepare a suitable material and equipment for camping.

Brief outline of the course:
Brief outline of the course:
1. Assessment of difficulty of waterways
2. Safety rules for rafting
3. Setting up a crew
4. Practical skills training using an empty canoe
5. Canoe lifting and carrying
6. Putting the canoe in the water without a shore contact
7. Getting in the canoe
8. Exiting the canoe
9. Taking the canoe out of the water
10. Steering
a) The pry stroke (on fast waterways)
b) The draw stroke

11. Capsizing
12. Commands

Recommended literature:
1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: FHPV PU v Prešove. 2002. ISBN 8080680973.
Internetové zdroje:
1. STEJSKAL, T. Vodná turistika. Prešov: PU v Prešove. 1999.
Dostupné na: https://ulozto.sk/tamhle/UkyxQ2lYF8qh/name/Nahrane-7-5-2021-v-14-46-39#!ZGDjBGR2AQtkAzVkAzLkLJWuLwWxZ2ukBRLjnGqSomICMmOyZN==

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 232

abs	n
36.64	63.36

Provides: Mgr. Dávid Kaško, PhD.

Date of last modification: 29.03.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚTVŠ/ KP/12	**Course name:** Survival Course

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

Number of ECTS credits: 2

Recommended semester/trimester of the course:

Course level: I., II.

Prerequisities:

Conditions for course completion:
Completion: passed
Condition for successful course completion:
- active participation in line with the study rule of procedure and course guidelines,
- effective performance of all the tasks defined in the course syllabus

Learning outcomes:
Content standard:
The student demonstrates relevant knowledge and skills in the field, which content is defined in the course syllabus and recommended literature.
Performance standard:
Upon completion of the course students are able to meet the performance standard and should:
- acquire knowledge about safe stay and movement in natural environment,
- obtain theoretical knowledge and practical skills to solve extraordinary and demanding situations connected with survival and minimization of damage to health,
- be able to resist and face situations related to overcoming barriers and obstacles in natural environment,
- be able implement the acquired knowledge as an instructor during summer sport camps for children and youth within recreational sport.

Brief outline of the course:
Brief outline of the course:
1. Principles of conduct and safety in the movement in unfamiliar natural environment
2. Preparation and guidance of a hike tour
3. Objective and subjective danger in the mountains
4. Principles of hygiene and prevention of damage to health in extreme conditions
5. Fire building
6. Movement in the unfamiliar terrain, orientation and navigation
7. Shelters
8. Food preparation and water filtering
9. Rappelling, Tyrolian traverse
10. Transport of an injured person, first aid

Recommended literature:

1. JUNGER, J. et al. Turistika a športy v prírode. Prešov: Fakulta humanitných a prírodných vied PU v Prešove. 2002. 267s. ISBN 80-8068-097-3.
2. PAVLÍČEK, J. Člověk v drsné přírodě. 3. vyd. Praha: Práh. 2002. ISBN 8072520598.
3. WISEMAN, J. SAS: příručka jak přežít. Praha: Svojtka & Co. 2004. 566s. ISBN 8072372807.

Course language:
Slovak language

Notes:

Course assessment
Total number of assessed students: 459

abs	n
45.97	54.03

Provides: Mgr. Ladislav Kručanica, PhD.

Date of last modification: 16.05.2023

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ SLO1a/15	**Course name:** Symbolic logic
Course type, scope and the method: **Course type:** Lecture / Practice **Recommended course-load (hours):** **Per week:** 2 / 1 **Per study period:** 28 / 14 **Course method:** present	
Number of ECTS credits: 5	
Recommended semester/trimester of the course: 4.	
Course level: I.	
Prerequisities:	
Conditions for course completion: Knowledge of studied notions will be evaluated.	
Learning outcomes: To understand basic notions of symbolic logic.	
Brief outline of the course: 1. Mathematical symbols 2. Expressions 3. Interpretation 4. Value of expression 5. Standard interpretation 6. Theories and their models 7. Substitutions 8. Allowed substitutions 9. Proving system 10. Correctness of basic proving system 11. Work with logical connections 12. Work with quantifiers	
Recommended literature: 1. Krajči S., https://ics.upjs.sk/~krajci/skola/vyucba/ucebneTexty/logika-stromy.pdf 2. Goldstern M., Judah H.: The Incompleteness Phenomenon, A New Course in Mathematical Logic, A K Peters, Wellesley, Massachusetts, 1995	
Course language: Slovak	
Notes:	

Course assessment
Total number of assessed students: 447

A	B	C	D	E	FX
29.31	10.96	11.86	10.51	25.06	12.3

Provides: prof. RNDr. Stanislav Krajči, PhD.

Date of last modification: 04.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ TVP1/21	**Course name:** Testing and verification of programs

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities:

Conditions for course completion:
Activity during course, work on tasks/assignments, final evaluation based on collected points

Learning outcomes:
Foundation of software testing principles at the basic level and the importance of its application in practice. The utilization of test automation to streamline the testing process across the software development lifecycle.

Brief outline of the course:
1. Fundamentals of software testing, testing throughout the software development lifecycle, test levels, test types, maintenance testing
2. Static testing techniques, test case design, test techniques, test implementation, test execution
3. Test management, test strategy, defect management, tool support for testing, code review
4. Test automation introduction, purpose of test automation, success factors, test automation strategy, preparing for test automation
5. Generic test automation architecture, test automation solution development, test automation framework
6. Transition from manual tests to automated tests, criteria for automation, test automation pyramid
7. Test automation of Graphical user interface (Web, Desktop, Mobile), various tools overview
8. Web services (REST) test automation, various tools overview
9. Testing and automation in Agile and DevOps, exploratory testing, behavior driven development, test driven development, acceptance test driven development, integration to CICD
10. Non-Functional testing introduction, performance and load testing, security testing, usability testing

Recommended literature:
1. ISTQB CTFL Sylabus, available online <https://www.istqb.org/certification-path-root/foundation-level-2018.html>, <https://castb.org/wp-content/uploads/2020/05/ISTQB_CTFL_Syllabus_SK_2018_3.1-1.pdf>
2. ISTQB ATAE Sylabus, available online < https://www.istqb.org/certification-path-root/test-automation-engineer.html >
3. Myers, G.: The Art of Software Testing, (2011)

4. Lisa Crispin and Janet Gregory: Agile Testing: A Practical Guide for Testers and Agile Teams, 2008
5. Mark Fewster, Dorothy Graham: Software Test Automation: Effective use of test execution tools, 1999
6. Mark Fewster, Dorothy Graham: Experiences of Test Automation: Case Studies of Software Test Automation, 2012
7. Katarina Clokie: A Practical Guid to Testing in DevOps, available online <https://leanpub.com/testingindevops>

Course language:
Slovak or English

Notes:

Course assessment
Total number of assessed students: 67

A	B	C	D	E	FX
16.42	19.4	17.91	11.94	28.36	5.97

Provides: Mgr. Maroš Dzuriš

Date of last modification: 31.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ZPIa/22	**Course name:** Thesis in informatics

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

Number of ECTS credits: 1

Recommended semester/trimester of the course: 5.

Course level: I.

Prerequisities:

Conditions for course completion:
To be awarded the credits, students are required to participate regularly in consultations according to the supervisor's instructions, continuously read the recommended literature and work on own bachelor thesis, the written draft of which will be submitted by a student for final assessment according to the supervisor's instructions.

Learning outcomes:
Students are able to manage preparation and writing of own bachelor thesis in terms of is structure, time schedule and format in line with valid standards. Under supervision of the supervisor students make initial research of sources, research itself and writing of the thesis.

Brief outline of the course:
Bachelor thesis (its place and importance in university education), time schedule of preparation of bachelor thesis, main parts of bachelor thesis, format of bachelor thesis, principles of quotation and bibliography references. The seminar is scheduled in the form of individual consultations between the supervisor and a student, according to the supervisor's instructions. The content of the seminar depends on selected topic of the bachelor thesis, condition of its preparation and individual needs or agreement between the supervisor and a student.

Recommended literature:
The recommended literature is determined individually in accordance with the topic of the bachelor's thesis.

Course language:
Slovak, optionally English

Notes:

Course assessment
Total number of assessed students: 25

A	B	C	D	E	FX
72.0	16.0	12.0	0.0	0.0	0.0

Provides:

Date of last modification: 20.11.2021
Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ZPIb/18	**Course name:** Thesis in informatics

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

Number of ECTS credits: 2

Recommended semester/trimester of the course: 6.

Course level: I.

Prerequisities: ÚINF/ZPIa/22

Conditions for course completion:
To be awarded the credits, students are required to participate regularly in consultations according to the supervisor's instructions, continuously read the recommended literature and work on own bachelor thesis, the written draft of which will be submitted by a student for final assessment according to the supervisor's instructions.

Learning outcomes:
Students are able to manage preparation and writing of own bachelor thesis in terms of is structure, time schedule and format in line with valid standards. Under supervision of the supervisor students make initial research of sources, research itself and writing of the thesis.

Brief outline of the course:
Bachelor thesis (its place and importance in university education), time schedule of preparation of bachelor thesis, main parts of bachelor thesis, format of bachelor thesis, principles of quotation and bibliography references. The seminar is scheduled in the form of individual consultations between the supervisor and a student, according to the supervisor's instructions. The content of the seminar depends on selected topic of the bachelor thesis, condition of its preparation and individual needs or agreement between the supervisor and a student.

Recommended literature:
The recommended literature is determined individually in accordance with the topic of the bachelor's thesis.

Course language:
Slovak, optionally English

Notes:

Course assessment
Total number of assessed students: 89

A	B	C	D	E	FX
74.16	12.36	7.87	0.0	3.37	2.25

Provides:

Date of last modification: 20.11.2021
Approved: doc. RNDr. Jozef Jirásek, PhD.

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: 4., 6.

Course level: I., N

Prerequisities:

Conditions for course completion:
Satisfiable ability to correct mainly mathematical typesetting.

Learning outcomes:
To provide the basic information on principles for typesetting of documents containing mathematical formulas.

Brief outline of the course:
1. Principles for typesetting of documents containing mathematical formulas.
2. Typesetting of a plain text, special text symbols, using of text fonts.3
3. TeX macros.
4. Enumerations in text and footnote command. Parameter setting determining the appearance of the pages.
5. Typesetting of mathematical formulas in text and displays, aligning formulas.
6. Making tables and pictures.
7. Definitions, theorems, and proofs in a mathematical document.
8. Contents, bibliography, sections in a document.
9. Pictures.
10.-12. Project.

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.

Notes:

Course assessment
Total number of assessed students: 264

A	B	C	D	E	FX
50.0	17.05	19.7	6.06	6.44	0.76

Provides: prof. RNDr. Stanislav Krajči, PhD.

Date of last modification: 08.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ WBdi/15	**Course name:** Web and a development of user environment

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

Number of ECTS credits: 3

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

Course level: I.

Prerequisities:

Conditions for course completion:
50% of the grade for intermediate assignments and discussion posts:
- intermediate assignment from part (X)HTML - max 10 points
- intermediate assignment from CSS - max 10 points
- intermediate assignment from the web page layout part - max 10 points
- Intermediate assignment from the web page accessibility part - max 10 points
- Intermediate assignment from the usability section - max 10 points
- active and valuable participation in 12 discussions - max 12 * 2 = 24 points

Learning outcomes:
Create accessible and usable Web Sites, used the standards (X) HTML and CSS.
Apply the rules for the page layout.
Maintain website and use the basic procedures for their promotion.

Brief outline of the course:
1. - Introduction, specifics of distance learning, orientation in LMS Moodle.
2. - (X)HTML - markup language for describing the structure and content of HTML documents.
3. - (X)HTML - markup language for describing the structure and content of HTML documents.
4. - (X)HTML - markup language for describing the structure and content of HTML documents.
5. - CSS - a markup language for describing how (X)HTML documents are displayed.
6. - CSS - a markup language for describing how (X)HTML documents are displayed.
7. - Page layout - the layout of the content of a web page.
8. - Page layout - the layout of the content of a web page.
9. - Web page accessibility.
10. - Web page accessibility.
11. - Usability of web pages.
12. - Usability of web pages.

Recommended literature:
Basic sources for distance courses will be published in LMS Moodle.
TITTEL, Ed a Jeff NOBLE. HTML, XHTML & CSS. 7th ed. Hoboken, NJ: Wiley, c2011, xx, 392 p. --For dummies. ISBN 04-709-1659-1.

LAGRONE, Benjamin. HTML5 and CSS3 responsive Web design cookbook. 1. publ. Birmingham [u.a.]: Packt Publishing, 2013. ISBN 978-184-9695-442.
CONNOR, Joshue O. Pro HTML5 accessibility: building an inclusive web. New York: Distributed to the book trade worldwide by Springer Science Business Media, c2012, xix, 365 p. ISBN 978-1-4302-4195-9.
KRUG, Steve. Nenuťte uživatele přemýšlet!: praktický průvodce testováním a opravou chyb použitelnost webu. Vyd. 1. Brno: Computer Press, 2010, 165 s. ISBN 978-80-251-2923-4.
LEAVITT, Michael O. a Ben SHNEIDERMAN. Research-Based Web Design & Usability Guidelines. Washington, D.C.: U.S. General Services Administration, 2006, xxii, 267 p. ISBN 0-16-076270-7. Dostupné z: https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf
Vyhláška Úradu podpredsedu vlády Slovenskej republiky pre investície a informatizáciu zo 16. marca 2020 o štandardoch pre informačné technológie verejnej správy. In: . Bratislava: Ministerstvo spravodlivosti Slovenskej republiky, 2020, ročník 2020, číslo 78. Dostupné z: https://www.slov-lex.sk/static/pdf/2020/78/ZZ_2020_78_20210623.pdf

Course language:
Slovak language, knowledge of English is required only for reading documentation and web standards.

Notes:
Teaching is realized only by distance learning.

Course assessment
Total number of assessed students: 98

abs	n	neabs	z
76.53	22.45	1.02	0.0

Provides: PaedDr. Ján Guniš, PhD., univerzitný docent

Date of last modification: 26.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.