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.

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: 435

A	B	C	D	E	FX
36.09	22.3	14.94	9.89	5.75	11.03

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/ HASP/24	**Course name:** Administration of SAP HANA database

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.

Prerequisities: ÚINF/ASSP/16

Conditions for course completion:
Final evaluation conditions:
Final test (practical)
Conditions for successful completion of the course:
1. Active participation in classes in accordance with the study schedule and according to the teacher's instructions.
2. Completion of the conditions of the final assessment with at least 80%.

Learning outcomes:
During the course and especially during the final assessment, the student demonstrates adequate mastery of the content standard of the subject, which is defined by the subject outline, and demonstrates mastery of the performance standard, within which, after completing the subject, the student has an overview of the database (architecture, connection, management tools), knows the report premises, handles practical tasks for backup, restoration and recovery of the database.

Brief outline of the course:
1.-2. Database overview: database architecture, database connection, database management tools, administration of HANA instances.
3.-4. Administration of the HANA database, reorganization of tables, housekeeping and troubleshooting.
5.-6. Database backup, restore and recovery.
7. Individual work for practice.

Recommended literature:
SAP Electronic Resources and User Guides. Available on the Internet: http://www.sap.com.

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 0

abs	n
0.0	0.0

Provides: RNDr. Peter Matta, PhD.

Date of last modification: 25.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ 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: 4., 6.	
Course level: I.	
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/ 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: 4.

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: KOPaHP/ UdPIaKT/22	**Course name:** An Introduction to Information Technology Law

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

Number of ECTS credits: 4

Recommended semester/trimester of the course: 3., 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: 16

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

Provides: doc. JUDr. Regina Hučková, PhD., doc. JUDr. Diana Treščáková, PhD., doc. RNDr. JUDr. Pavol Sokol, PhD. et PhD., JUDr. Laura Bachňáková Rózenfeldová, PhD.

Date of last modification: 17.01.2022

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/AIB/24	**Course name:** Applied 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/ASU1/15 and ((ÚINF/PMO1/15 and ÚINF/SWI1b/15) or ÚINF/MSW/25)

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: 19.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ 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: 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%).
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: 303

A	B	C	D	E	FX
45.21	21.12	17.49	7.59	5.94	2.64

Provides: Mgr. Barbara Mitríková, Mgr. Viktória Mária Slovenská

Date of last modification: 06.02.2025
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.
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: 08.02.2025

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: 58

A	B	C	D	E	FX
62.07	10.34	8.62	3.45	8.62	6.9

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: 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: 316

A	B	C	D	E	FX
10.76	8.54	19.62	19.94	30.06	11.08

Provides: RNDr. Peter Gurský, 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: 115

A	B	C	D	E	FX
38.26	27.83	18.26	13.04	2.61	0.0

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/ 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.

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., RNDr. Juraj Šebej, 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/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: 136

A	B	C	D	E	FX
14.71	8.82	13.97	16.18	31.62	14.71

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: 983

A	B	C	D	E	FX
11.5	10.78	19.33	21.87	30.11	6.41

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/VMA/24	**Course name:** Development of mobile applications

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: 5

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

Course level: I.

Prerequisities:

Conditions for course completion:
Design and implementation of an Android application along with oral defense of this application.

Learning outcomes:
The student will acquire the ability to independently develop mobile applications on the Android platform and will also gain knowledge of the Kotlin programming language.

Brief outline of the course:
1. Introduction to Android. Creating layouts using Views. Resources. Activity and its lifecycle.
2. Introduction to Kotlin. Rewriting Java code into Kotlin. Classes, functions, properties, and other selected concepts.
3. RecyclerView. Application with multiple activities and transitioning between them. Swipe gestures.
4. Room DB. MVVM design pattern. Using local SQLite database to store data. LiveData, coroutines, and asynchronous calls.
5. Dependency injection. Hilt, Dagger. Communication with server using REST API.
6. Preferences. Lambda expressions. Collections in Kotlin. Menu in Android.
7. Fragments and navigation between them. Layouts for different configurations.
8. Content provider and content resolver. Permissions.
9. Jetpack Compose as a modern approach to creating user interfaces. Basics, layout creation, state management. Lazy Column.
10. Retrieving data from sensors. Working with camera and media.
11. Services for long-running background tasks.
12. Individual consultations on selected technologies used in final projects.

Recommended literature:
1. Official documentation for Android and materials for Android developers. Available online: https://developer.android.com/
2. Official documentation for the Kotlin language. Available online: https://kotlinlang.org/

Course language:
Slovak and English

Notes:

Course assessment
Total number of assessed students: 27

A	B	C	D	E	FX
55.56	7.41	7.41	7.41	11.11	11.11

Provides: RNDr. Miroslav Opiela, PhD.

Date of last modification: 14.05.2024

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: 792

A	B	C	D	E	FX
13.26	13.13	16.54	19.95	30.3	6.82

Provides: RNDr. Alfréd Onderko, PhD., Mgr. Diana Švecová

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: 3246

A	B	C	D	E	FX
38.63	26.31	16.3	9.52	7.18	2.06

Provides: Mgr. Viktória Mária Slovenská

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.

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: 3., 5.

Course level: I.

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: 42	
abs	n
92.86	7.14
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.

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: 119

abs	n	neabs
96.64	1.68	1.68

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.

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/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: 104

A	B	C	D	E	FX
45.19	12.5	16.35	14.42	11.54	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: 414

A	B	C	D	E	FX
27.54	27.05	27.29	12.8	5.31	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/ZIV/24	**Course name:** Internet of Things

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: Per study period: 5d
Course method: present

Number of ECTS credits: 3

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

Course level: I.

Prerequisities: ÚINF/PAZ1a/15

Conditions for course completion:
Design, implementation, and documentation of the final project.

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, revisiting high school physics curriculum on direct current, voltage dividers. Arduino, programming in Arduino IDE, sensors and actuators, connection of basic components (button, LED, potentiometer, photoresistor).
2. Serial communication, UART, interactive connection of turtle graphics (Java) with sensors and actuators (Arduino). Digital synchronous and asynchronous communication, SPI, I2C protocol, 7-segment display, I2C expander, buzzer and melody creation. Sensor data, overview of sensor modules, sensors in smartphones, filtering of measured data.
3. Application protocols (MQTT, CoAP), overview of protocols used in IoT. Node-RED, processing of open data, IoT dashboard, connection with Arduino. Overview of other selected aspects of IoT solutions - Raspberry Pi. Cloud computing.
4. Overview of existing solutions in selected areas of IoT. Case study analysis. Design and implementation of solution prototypes based on real-world problems.
5. Design and development of the final project. Consultations on the project and final defense.

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
4. Official websites and documentation for individual technologies (Arduino, MQTT, Node-RED, etc.).

Course language:

Slovak and English

Notes:

Course assessment
Total number of assessed students: 28

A	B	C	D	E	FX
67.86	7.14	10.71	14.29	0.0	0.0

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

Date of last modification: 14.05.2024

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: 2369	

abs	n
90.12	9.88

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/ UKN/24	**Course name:** Introduction to cognitive and neural sciences
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., 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: 9

A	B	C	D	E	FX
44.44	0.0	11.11	0.0	44.44	0.0

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

Date of last modification: 19.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/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: ÚMV/ UAD/10	**Course name:** Introduction to data analysis

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: 1.

Course level: I.

Prerequisities:

Conditions for course completion:
Test (40p) and individual project work (20p).
Oral presentation of the individual project work (5p).
At least 50% must be obtained from each part.
Final evaluation: ≥90% A; ≥80% B; ≥70% C; ≥60% D; ≥50% E; <50% FX.

Learning outcomes:
To know the basic purpose of statistical data analysis, its methods and statistical thinking and understand its importance for science and practical life.
To understand elementary statistical concepts.
To gain experience in handling real data using spreadsheet Excel and statistical software R.

Brief outline of the course:
1. Introduction (the basic philosophy and aim of statistical data analysis, descriptive and inductive statistics)
2. Collecting Data (types of data, random sample, randomized experiment)
3. Handling Data (visualization, summarizing – measures of center, measures of variability, skewness and kurtosis, empirical rule) - 5 weeks
4. Relationships in data (introduction to regression and correlation) - 4 weeks
5. Statistical inference (elementary view into estimation and testing hypothesis) - 2 weeks

Recommended literature:
1. Rossman, A.J. et al.: Workshop Statistics: Discovery with Data, 4th ed. Wiley, 2011
2. Utts, J.M.: Seeing Through Statistics, 5th ed., Cengage Learning, 2024
3. Utts, J.M., Heckard R.F.: Mind on Statistics, 6th ed.. Cengage Learning, 2021
4. Anděl, J.: Statistické metody, Matfyzpress, 5. vydanie, Praha, 2019 (in Czech)

Course language:
Slovak

Notes:

Course assessment
Total number of assessed students: 520

A	B	C	D	E	FX
38.08	23.08	23.46	10.96	0.96	3.46

Provides: doc. RNDr. Martina Hančová, PhD., RNDr. Andrej Gajdoš, PhD., Mgr. Patrik Štein

Date of last modification: 21.11.2024

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.	
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: 180

A	B	C	D	E	FX
44.44	25.0	19.44	6.11	2.22	2.78

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: 535

A	B	C	D	E	FX
24.11	17.01	20.19	16.45	18.69	3.55

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: 414

A	B	C	D	E	FX
38.16	20.29	13.04	3.86	1.69	22.95

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/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: 240

A	B	C	D	E	FX
41.25	21.67	18.75	6.25	5.83	6.25

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/ 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: 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: 270

A	B	C	D	E	FX
2.59	8.15	10.0	23.33	44.44	11.48

Provides: RNDr. Andrej Gajdoš, PhD., RNDr. Stanislav Basarik, 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: 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.

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/ 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 - installation, components, *ngFor, @for 4, Angular - *ngIf, @if, services, Observable, HttpClient, simple material table, introduction to Router, material components button, input, icon, card, introduction to login component 5, Angular - Template driven forms, HTTP post, login via Login component, universal catching of HTTP client error states, Material snackbar and toolbar, MaterialModule as a wrapper for multiple modules from the Material library 6, Angular - localStorage, routerLink, routerLinkActive, logout, navigation bar with Login/Logout status display, logout with inactive token, complex columns in Material Table, custom Observable 7, Angular - template-driven validation, reactive forms, user registration component, custom validator for sufficient password strength, Zxcvbn-ts library 8, Angular - custom validator for password matching and asynchronous validator for server conflicts, completion registrations, deleting users, material dialog, 9, Angular - URL parameters obtained via router, editing users, slide and checkbox, FormArray, reusing the editing component to add a user, 10, Angular - MatTableDataSource, MatPaginator, MatSort, table filtering feature module, hierarchical routing 11, Angular - communication with child components via input and output signals, routing guards - CanActivate, CanDeactivate, Resolver, canMatch guard, preloading and on-demand loading modules,	

12, Angular - using headers in Http to send tokens, server-side pagination, filtering and sorting, HttpParams
13, Websockets, chat application

Recommended literature:

1. Angular framework homepage. Available online: https://angular.dev/
2. Material design Angularu extension homepage. Available online: https://material.angular.io/
3. RXJS Library homepage. Available online: https://rxjs.dev/
4. 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: 56

A	B	C	D	E	FX
62.5	5.36	10.71	12.5	7.14	1.79

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 07.02.2025

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: 191

A	B	C	D	E	FX
13.09	16.23	23.04	23.56	20.42	3.66

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/OSY/24	**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: ÚINF/PRP2/15

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: 93

A	B	C	D	E	FX
22.58	15.05	24.73	21.51	15.05	1.08

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

Date of last modification: 19.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ 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: RNDr. Miroslav Opiela, PhD., RNDr. Dávid Varga

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/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: 35

abs	n
97.14	2.86

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/JAC/24	**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: 3.

Course level: I.

Prerequisities: ÚINF/PRP2/15

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: 205

A	B	C	D	E	FX
29.76	20.0	19.02	20.0	8.29	2.93

Provides: RNDr. PhDr. Peter Pisarčík

Date of last modification: 19.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/ PJP/25	**Course name:** Programming language Python

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

Number of ECTS credits: 4

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

Course level: I., 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 test and the final exam practical test

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, 2011. Ponořme se do Pythonu(u) 3 [online]. Praha: CZ.NIC, z. s. p. o. ISBN 978-80-904248-2-1. Available at: https://www.nic.cz/files/edice/python_3.pdf

PIRNAT, Mike, 2015. How to Make Mistakes in Python [online]. Boston: O'Reilly Media. ISBN 978-1-4919-3447-0. Available at: https://www.dbooks.org/how-to-make-mistakes-in-python-1491934476/
STACK OVERFLOW CONTRIBUTORS, 2018. Python® Notes for Professionals [online]. B.m.: GoalKicker. Available at: https://books.goalkicker.com/PythonBook/PythonNotesForProfessionals.pdf
ROSEMAN, Mark, 2024. Modern Tk Best Practices [online]. 2024. Available at: https://tkdocs.com/

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

Notes:

Course assessment
Total number of assessed students: 1

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

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

Date of last modification: 08.03.2025

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/PWS/25	**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: 200

A	B	C	D	E	FX
9.5	8.5	9.5	9.0	22.5	41.0

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

Date of last modification: 02.03.2025

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: 961

A	B	C	D	E	FX
16.86	8.64	12.28	18.73	13.94	29.55

Provides: RNDr. Juraj Šebej, PhD., RNDr. Miroslav Opiela, PhD., RNDr. Viktor Pristaš, RNDr. Richard Staňa, Mgr. Viktor Olejár, Mgr. Dominika Kotlárová, doc. RNDr. Ľubomír Šnajder, 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/ 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, Mgr. Dominika Kotlárová, doc. RNDr. Ľubomír Šnajder, 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: 186

A	B	C	D	E	FX
22.58	10.22	13.98	26.34	23.12	3.76

Provides: 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/25	**Course name:** Project I.

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 **Per study period:** 28 / 26s
Course method: present

Number of ECTS credits: 4

Recommended semester/trimester of the course: 4.

Course level: I.

Prerequisities: ÚINF/PAZ1c/17

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: 126					
A	B	C	D	E	FX
63.49	13.49	6.35	9.52	5.56	1.59
Provides: RNDr. Peter Gurský, PhD., RNDr. Viliam Kačala, PhD., Mgr. Peter Kál					
Date of last modification: 08.04.2025					
Approved: doc. RNDr. Jozef Jirásek, PhD.					

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PRO1b/25	**Course name:** Project II.

Course type, scope and the method:
Course type: Practice
Recommended course-load (hours):
Per week: Per study period: 52s
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: 102

A	B	C	D	E	FX
61.76	16.67	8.82	5.88	2.94	3.92

Provides: RNDr. Peter Gurský, PhD.

Date of last modification: 08.04.2025

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚINF/PRM/24	**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.

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: 143

A	B	C	D	E	FX
30.07	32.17	18.18	9.79	2.1	7.69

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

Date of last modification: 19.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.

COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice	
Faculty: Faculty of Science	
Course ID: ÚINF/ 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.

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: 166

abs	n	neabs
95.78	0.0	4.22

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/ 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.

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: 156

abs	n
99.36	0.64

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/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: 111

A	B	C	D	E	FX
66.67	23.42	2.7	1.8	0.0	5.41

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/MSW/25	**Course name:** Software Systems Modelling

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: 5.

Course level: I., N

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

Conditions for course completion:

Learning outcomes:

Brief outline of the course:

Recommended literature:

Course language:

Notes:

Course assessment
Total number of assessed students: 235

A	B	C	D	E	FX
49.79	23.4	13.62	6.81	3.83	2.55

Provides: prof. RNDr. Gabriel Semanišin, PhD.

Date of last modification:

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/ TES1/25	**Course name:** Software testing 1
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 and ÚINF/SWI1a/15	
Conditions for course completion: - Activity during course - Work on tasks/assignments - Final exam - 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: Motivation, defects, definition of testing, 7 principles of testing 2. Testing within the Software Development Lifecycle: Testing levels, test types, fundamental testing process 3. Test Design: Test specification process, testing techniques, test implementation 4. Test Implementation: Test execution, reporting, and logging 5. Test Management and Defect Management: Test management tools, roles in software testing 6. Introduction to Test Automation: Purpose of test automation, success factors, automation strategy, preparation for automation 7. Test Automation Architecture: Developing a test automation solution, test automation framework 8. Transition from ‘manual’ to test automation: Automation criteria, test automation pyramid, designing automated tests 9. Introduction to GUI Testing and Test Automation (Web): Approach, testing strategy, tool overview, design patterns 10. Test Automation for Web Services (REST): Approach, testing strategy, tool overview, design patterns 11. Testing and Automation in Agile Development and DevOps: Integration into CI/CD, exploratory testing 12. Behavior-Driven Development (BDD), Test-Driven Development (TDD), and Acceptance Test-Driven Development (ATDD)	

13. Final Test, Review, and Practical Demonstrations

Recommended literature:
- ISTQB CTFL Syllabus, <https://www.istqb.org/certification-path-root/foundation-level-2018.html>
- ISTQB ATAE Syllabus, < https://www.istqb.org/certification-path-root/test-automation-engineer.html >
- Myers, G. (2011), The Art of Software Testing
- Lisa Crispin and Janet Gregory (2008), Agile Testing: A Practical Guide for Testers and Agile Teams,"
- Mark Fewster, Dorothy Graham(1999), Software Test Automation: Effective use of test execution tools
- Mark Fewster, Dorothy Graham(2012), Experiences of Test Automation: Case Studies of Software Test Automation
- Katarina Clokie (2017),A Practical Guid to Testing in DevOps" <https://leanpub.com/testingindevops>

Course language:
Slovak, English

Notes:

Course assessment
Total number of assessed students: 34

A	B	C	D	E	FX
29.41	8.82	8.82	8.82	32.35	11.76

Provides: Mgr. Maroš Dzuriš

Date of last modification: 08.04.2025

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: 195

abs	n	neabs
98.97	1.03	0.0

Provides: RNDr. Miroslav Opiela, PhD., RNDr. Dávid Varga

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: 171

abs	n	neabs
98.83	1.17	0.0

Provides: RNDr. Miroslav Opiela, PhD., RNDr. Dávid Varga

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: 77

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: 74

abs	n
97.3	2.7

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., P

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: 15781

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.74	0.06	0.0	0.0	0.0	0.04	9.0	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., Mgr. Ferdinand Salonna, 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., P

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: 13802

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
83.85	0.49	0.01	0.0	0.0	0.04	11.17	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., Mgr. Ferdinand Salonna, 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: 9334

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
87.96	0.06	0.01	0.0	0.0	0.02	4.92	7.03

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., Mgr. Ferdinand Salonna, 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: 5846

abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
82.54	0.27	0.03	0.0	0.0	0.0	8.24	8.91

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., Mgr. Ferdinand Salonna, 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/ 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.

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: 182

A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	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: 245

A	B	C	D	E	FX
76.33	5.31	2.86	0.0	14.69	0.82

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., P

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., P

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: 461

abs	n
46.2	53.8

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/ TSD/19	**Course name:** Technologies of big data processing

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., N

Prerequisities:

Conditions for course completion:
Active participation, written test, class project.

Learning outcomes:
Practical experience with modern Big Data processing and storage systems. Introduction to their architecture and implementation.

Brief outline of the course:
1. Introduction to Big Data processing. Freely accessible datasets.
2. Cloud environment.
3. Distributed file systems, object storage. Data formats.
4. Scalability, hashing, data sharding.
5. Distributed databases, consistency trade-offs. NoSQL.
6. Batch data processing: MapReduce
7. Batch data processing: Spark I
8. Batch data processing: Spark II
9. Stream data processing: Kafka
10. Stream data processing: Beam
11. Distributed neural network training.

Recommended literature:
1. KLEPPMANN, Martin. Designing data-intensive applications: the big ideas behind reliable, scalable, and maintainable systems. Beijing: O'Reilly, 2017. ISBN 978-1-449-37332-0.
2. WHITE, Tom. Hadoop: the definitive guide. 3rd ed. Sebastopol: O'Reilly, 2012. ISBN 978-1-449-31152-0.
3. MARZ, Nathan a James WARREN. Big data: principles and best practices of scalable real-time data systems. Shelter Island, NY: Manning, [2015]. ISBN 978-1-617290-34-3.
4. PENTREATH, Nick. Machine Learning with Spark; Packt Publishing, [2015]. ISBN 978-1-783288-51-9.

Course language:
Slovak or English

Notes:

Content prerequisities: database basics, Python programming

Course assessment
Total number of assessed students: 13

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

Provides: Bc. Marián Dvorský, doc. RNDr. Ľubomír Antoni, 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/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: 42

A	B	C	D	E	FX
73.81	11.9	11.9	0.0	2.38	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: 91

A	B	C	D	E	FX
74.73	12.09	7.69	0.0	3.3	2.2

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/24	**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.

Course level: I.

Prerequisities:

Conditions for course completion:
Teaching is carried out only by distance learning.
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: 46

A	B	C	D	E	FX
13.04	10.87	10.87	23.91	30.43	10.87

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

Date of last modification: 26.03.2024

Approved: doc. RNDr. Jozef Jirásek, PhD.