Study plan

Name of study plan: Bachelor Specialization Management Informatics, in Czech, 2024

Garantor of the si Program of study Type of study: Ba Required credits: Elective courses Sum of credits in Note on the plan: akademického ro	juaranteed by the department: Welcome page tudy branch: : Informatika chelor full-time 153 credits: 27					chtela,
	k: Compulsory courses in the program of credits of the block: 106 ock: PP					
2021 Requirement creat Requirement court Credits in the gro Note on the lf group: lr B E or in p	p: Compulsory Courses of Bachelor Study Program dits in the group: In this group you have to gain 100 rses in the group: In this group you have to comple up: 106 you plan to profile the specialization Information Security, Ma ternet, Computer Systems and Virtualization, Software Engin I-PSI.21 in your 2nd semester of study. If you plan to profile to ngineering, Computer Science, or Artificial Intelligence, enror f study. If you plan to profile yourself in the Artificial Intelligence your 3rd semester of study. Otherwise, enroll in the course lan to profile the specialization Artificial Intelligence or Web I	6 credits ete 20 cou anagement I neering, or V he specializa oll in the cou icce specializ BI-PSI.21 in Engineering,	rSeS nformati Veb Engi ation Co rse BI-P ation, en your 5tl enroll ir	cs, Com neering, mputer (SI.21 in iroll in th n semes n the cou	puter Netw enroll in th Graphics, C your 4th se e course E ter of study urse BI-AA	vorks and ne course Computer emester BI-PST.21 y. If you
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members)	Completion				Role
BI-AG1.21	Tutors, authors and guarantors (gar.) Algorithms and Graphs 1 Dušan Knop, Michal Opler, Ond ej Suchý, Tomáš Valla, Radek Hušek Dušan Knop Dušan Knop (Gar.)	Z,ZK	5	2P+2C	z	PP
BI-AAG.21	Automata and Grammars Jan Holub, Jan Janoušek Jan Holub Jan Holub (Gar.)	Z,ZK	5	2P+2C	Z	PP
BI-BAP.21	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BI-BPR.21	Bachelor project Zden k Muziká Zden k Muziká (Gar.)	Z	1	0P+0C	Z,L	PP
BI-DBS.21	Database Systems Michal Valenta, Jan Blizni enko, Ji í Hunka, Monika Borkovcová, Jan Matoušek, Pavel K íž, Št pán Pechman, Dominik Roudný, Jan Bittner, Ji í Hunka Michal Valenta (Gar.)	Z,ZK	5	2P+2R+1L	. L	PP
BI-DML.21	Discrete Mathematics and Logic Ji ina Scholtzová, Daniel Dombek, Jan Sp vák Daniel Dombek Jan Sp vák (Gar.)	Z,ZK	5	2P+1R+1C	z	PP
BI-KAB.21	Cryptography and Security Ji í Bu ek, Filip Kodýtek, Róbert Lórencz, Jaroslav K íž, David Pokorný, Martin Šutovský, František Ková, Ivana Trummová, Jakub Tetera Róbert Lórencz Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	L	РР
BI-LA1.21	Linear Algebra 1 Lud k Kleprlík, Jakub Krásenský, Karel Klouda Lud k Kleprlík Karel Klouda (Gar.)	Z,ZK	5	2P+1R+1C	z	PP

BI-MA1.21	Mathematical Analysis 1 Pavel Hrabák, Tomáš Kalvoda, Ivo Petr, Petr Olšák, Pavel Paták Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	5	2P+1R+1C	L	PP
BI-MA2.21	Mathematical Analysis 2 Pavel Hrabák, Tomáš Kalvoda, Ivo Petr, Petr Olšák, Pavel Paták Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	3P+2C	Z	PP
BI-OSY.21	Operating Systems Ji í Kašpar, Michal Štepanovský, Jan Trdli ka, Pavel Tvrdík, Ladislav Vagner, Petr Zemánek Pavel Tvrdík Michal Štepanovský (Gar.)	Z,ZK	5	2P+1R+1L	L	PP
BI-PSI.21	Computer Networks Viktor erný, Michal Hažlinský, Vladimír Smotlacha, Yelena Trofimova, Jan Fesl, Josef Koumar, Petr Hoda , Josef Zápotocký, Michal Polák, Jan Fesl Jan Fesl (Gar.)	Z,ZK	5	2P+1R+1C	L	PP
BI-PST.21	Probability and Statistics Kamil Dedecius, Pavel Hrabák, Jitka Hrabáková, Petr Novák, Jana Vacková Pavel Hrabák Pavel Hrabák (Gar.)	Z,ZK	5	2P+2C	Z	PP
BI-PA1.21	Programming and Algorithmics 1 Radek Hušek, Jan Trávní ek, Miroslav Balík, Josef Vogel, Ladislav Vagner Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	2P+2R+2C	Z	PP
BI-PA2.21	Programming and Algorithmics 2 Radek Hušek, Jan Trávní ek, Josef Vogel, Ladislav Vagner Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	2P+1R+2C	L	PP
BI-SAP.21	Computer Structure and Architecture Hana Kubátová, Jaroslav Borecký, Petr Fišer, Martin Kohlík Hana Kubátová Hana Kubátová (Gar.)	Z,ZK	5	2P+1R+2C	L	PP
BI-TZP.21	Technological Fundamentals of Computers Jan ezní ek, Jaroslav Borecký, Robert Hülle, Martin Kohlík, Vojt ch Miškovský, Martin Novotný, Matúš Olekšák Martin Novotný Martin Novotný (Gar.)	Z,ZK	5	2P+2C	Z	PP
BI-GIT.21	SW Development Technologies Petr Pulc, Robin Ob rka Robin Ob rka Petr Pulc (Gar.)	Z	3	2P	Z	PP
BI-TDP.21	Documentation and Presentation Ond ej Guth, Petra Pavlí ková, Dana Vynikarová, Alena Libánská, Tomáš Nová ek Dana Vynikarová Dana Vynikarová (Gar.)	KZ	3	2P+2C	Z,L	PP
BI-UOS.21	Unix-like Operating Systems Zden k Muziká, Dana ermáková, Viktor erný, Michal Hažlinský, Jakub Jan i ka, Miroslav Prágl, Michal Šoch, Jan Trdli ka, Yelena Trofimova, Zden k Muziká Zden k Muziká (Gar.)	ΚZ	5	2P+2C	Z	PP

Characteristics of the courses of this group of Study Plan: Code=BI-PP.21 Name=Compulsory Courses of Bachelor Study Program Informatics, presented in Czech, version 2021

BI-AG1.21	Algorithms and Graphs 1	Z,ZK	5
The course covers the b	pasics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing c	urriculum. It links a	and partially
develops the knowledge	from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the	ne time and space	complexity of
algorithms. The course	also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic nota	tion.	
BI-AAG.21	Automata and Grammars	Z,ZK	5
Students are introduced	to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of fini	ite automata, regu	lar expressions,
	context-free grammars, construction and use of pushdown automata, and translation grammars and transducers. They know		rmal languages
and they understand the	e relationships between formal languages and automata. They are introduced to the Turing machine and complexity classes I	P and NP.	
BI-BAP.21	Bachelor Thesis	Z	14
BI-BPR.21	Bachelor project	Z	1
1. At the beginning of th	e semester, the student reserves the topic of the bachelor's thesis and connects with the supervisor. He / she will arrange the	e partial tasks tha	t he / she will
perform during the sem	ester to process the assignment. If he completes these tasks, the supervisor will award him a credit from the subject BI-BPR	at the end of the	emester. 2. The
external supervisor ente	rs the information on granting the credit using the form "Granting credit from the external supervisor of the final thesis" (http://fit.	cvut.cz/student/stu	ıdijni/formulare).
The completed and sigr	ed form must be delivered in person or by email to the SZZ coordinator, who will arrange for the credit to be granted. 3. If the	topic of the work	that the student
has reserved is formulat	ed more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuning the a	ssignment so that	the assignment
can be supplemented a	nd approved at the end of the semester.		
BI-DBS.21	Database Systems	Z,ZK	5
Students are introduced	to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lea	irn to design smal	databases
(including integrity cons	traints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with	the SQL language	, as well as with
its theoretical foundation	- the relational database model. They learn the principles of normalizing a relational database schema. They understand the fu	ndamental concep	ts of transaction
processing, controlling	parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduce	ed to special ways	of storing data
in relational databases	with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of da	atabase systems,	debugging and
optimizing database ap	plications, distributed database systems, data stores.		
BI-DML.21	Discrete Mathematics and Logic	Z,ZK	5
Students will get acquai	nted with the basic concepts of propositional logic and predicate logic and learn to work with their laws. Necessary concepts	from set theory w	ill be explained.
Special attention is paid	to relations, their general properties, and their types, especially functional relations, equivalences, and partial orders. The co	ourse also lays do	wn the basics of
combinatorics and num	per theory, with emphasis on modular arithmetics.		
BI-KAB.21	Cryptography and Security	Z,ZK	5
Students will understand	d the mathematical foundations of cryptography and gain an overview of current cryptographic algorithms. They will be able t	o use cryptograph	ic keys and
certificates in systems b	ased on them and learn the basics of safe use of symmetric and asymmetric cryptographic systems and hash functions in a	pplications. Withir	labs, students
will gain practical skills i	n using standard cryptographic methods with an emphasis on security and will also get acquainted with the basic procedure:	s of cryptanalysis.	
BI-LA1.21	Linear Algebra 1	Z,ZK	5
We will introduce studer	nts to the basic concepts of linear algebra, such as vectors, matrices, vector spaces. We will define vector spaces over the fie	eld of real and con	plex numbers
and also over finite field	s. We will present the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian elir	mination method (GEM) and show
the connection with line	ar manifolds. We define the regularity of matrices and learn to find their inversions using GEM. We will also learn to find eiger	nvalues and eigen	vectors of a
matrix. We will also dem	ionstrate some applications of these concepts in computer science.		

BI-MA1.21 Mathematical Analysis 1	Z,ZK	5
We begin the course by introducing students to the set of real numbers and its properties, and we note its differences with the set of machine number	ers. Then we study	real sequences
and real functions of a real variable. We gradually introduce the notions of limits of sequences and functions, continuous functions, and derivatives of fu	inctions. This theor	etical foundation
is then applied to root-finding problems (iterative method of bisection and Newton's method), construction of cubic interpolation (spline), and formulation	and solution of sin	nple optimization
problems (i.e., the issue of finding extrema of functions). The course is closed with the Landau's asymptotic notation and methods of mathematical des	cription of complex	ity of algorithms.
BI-MA2.21 Mathematical Analysis 2	Z,ZK	6
The course completes the theme of analysis of real functions of a real variable initiated in BI-MA1 by introducing the Riemann integral. Students will	-	
use the substitution method. The next part of the course is devoted to number series, and Taylor polynomials and series. We apply Taylor's theorem		-
functions with a prescribed accuracy. Then we study the linear recurrence equations with constant coefficients, the complexity of recursive algorithms		
theorem. Finally, we introduce the student to the theory of multivariate functions. After establishing basic concepts of partial derivative, gradient, and		-
analytical method of localization of local extrema of multivariate functions as well as the numerical descent method. We conclude the course with the i		
BI-OSY.21 Operating Systems	Z,ZK	5
In this course that is a follow-up of the Unix-like operating systems course students deepen their knowledge in areas of OS kernels, process and thread	-	
critical regions, thread scheduling, shared resource allocation and deadlocks, management of virtual memory and data storages, file systems, OS r	nonitoring. They ar	re able to design
and implement simple multithreaded applications. General principles are illustrated on operating systems Solaris, Linux, or MS Windows.		
BI-PSI.21 Computer Networks	Z,ZK	5
The course introduces students to the principles of computer networking. It covers basic technologies, protocols, and services commonly used in lo		
well. The lectures will be amended by proseminars that introduce students into network programming and demonstrate the abilities of advanced net	-	. Students
practically verify configurations and management of network devices in the lab within the environment of the operating systems Linux and Cisco IOS		-
BI-PST.21 Probability and Statistics	Z,ZK	5
Students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable		,
models of random variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction	-	-
estimations of unknown distributional parameters from random sample characteristics. They will also be introduced to the methods for testing statist	lical hypotheses ar	na aetermining
the statistical dependence of two or more random variables.	7 71/	7
BI-PA1.21 Programming and Algorithmics 1	Z,ZK	7
Students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, s		<i>,</i>
statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for sear with linked lists and trees.	ching, sorting, and	a manipulating
	771	7
BI-PA2.21 Programming and Algorithmics 2	Z,ZK	7
Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack,		-
table). They learn these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming copying/moving of objects, operator overloading, inheritance, polymorphism).	(e.g., template pro	gramming,
	774	5
BI-SAP.21 Computer Structure and Architecture Students will get acquainted with the basic architecture and units of a digital computer, understand the structure, function, and implementation of ar	Z,ZK	-
memory, I/O communication, methods of data transfers between the units. The logic design and the implementation of a program-controlled simple pi	-	
in the labs using programmable circuits (FPGA), a single-chip microcomputer, and modern design (EDA) tools.		
BI-TZP.21 Technological Fundamentals of Computers	Z,ZK	5
Students get acquainted with the fundamentals of digital and analog circuits, as well as basic methods of analyzing them. Students learn how computers	1 1	-
level. They are introduced to the function of a transistor. They will understand why processors generate heat, why cooling is necessary, and how to r		
limits to the maximum operating frequency are and how to raise them; why a computer bus needs to be terminated, what happens if it is not; how a		-
(in principle). In the labs, students model the behavior of basic electrical circuits in SW Mathematica.		
BI-GIT.21 SW Development Technologies	Z	3
This course is aimed at one of the rudimental team software development technology - version control. To be more specific, we will introduce studer		
from hell, as Linus Torvalds nicknamed it, and provide a comprehensive guide into its depths, as well as for day-to-day use.		
BI-TDP.21 Documentation and Presentation	KZ	3
The course is focused on the basics of creating electronic documentation with emphasis on the creation of technical reports of a larger scope, typical	1 1	-
learn to create text of a technical report in the LaTeX system, process an electronic presentation using the LaTeX Beamer system, and practically p		
the teacher. The course is intended primarily for those students who have chosen the topic of their bachelor's thesis or will choose it within the first		
exercises of the course, an active approach to the creation of individual parts of the bachelor's thesis is assumed.	,	0
BI-UOS.21 Unix-like Operating Systems	KZ	5
Unix-like operating systems represent a large family mostly open-source codes that kept bringing during the history of computers efficient innovative	1 1	-
systems for computers and their networks and clusters. The most popular OS today, Android, has a unix kernel. Students get overview of basic prop		
processes and threads, access rights and user identity, filters, or handling files in a file system. They learn to use practically these systems at the le	vel of advanced us	sers who are not
only able to utilize powerful system tools that are available to users, but are also able to automatize routine agenda using the unix scripting interface	e, called shell.	
Name of the block: Compulsory courses in the specialization		
Minimal number of credits of the block: 45		
The role of the block: PS		
Code of the group: BI-PS-MI.21		

Name of the group: Compulsory Courses of Specialization Management Informatics, version 2021 Requirement credits in the group: In this group you have to gain 45 credits Requirement courses in the group: In this group you have to complete 9 courses Credits in the group: 45 Note on the group: Guarantor: Ing. David Buchtela, Ph.D., email: David.Buchtela@fit.cvut.cz

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-EPP.21	Economic Business Processes David Buchtela David Buchtela Tomáš Evan (Gar.)	Z,ZK	5	2P+2C	L,Z	PS
BI-FBI.21	Financial Business Intelligence David Buchtela David Buchtela Petra Pavlí ková (Gar.)	Z,ZK	5	2P+2C	Z,L	PS
BI-KOM.21	Conceptual Modelling Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	PS
BI-PAI.21	Law and Informatics Zden k Ku era, Št pánka Havlíková, Dominik Vítek, Martin Samek, Ji í Maršál Št pánka Havlíková Zden k Ku era (Gar.)	ZK	5	2P+2C	L	PS
BI-PRR.21	Project management David Pešek David Pešek Petra Pavlí ková (Gar.)	Z,ZK	5	2P+2C	Z,L	PS
BI-SWI.21	Software Engineering Michal Valenta, Ji í Mlejnek, Zden k Rybola Zden k Rybola Michal Valenta (Gar.)	Z,ZK	5	2P+1C	L	PS
BI-SP1.21	Team Software Project 1 Michal Valenta, Ji í Chludil, Ji í Mlejnek, Ji í Hunka, Zden k Rybola, Ji í Borský, Jan Matoušek, Radek Richtr, Marek Suchánek, Zden k Rybola Ji í Mlejnek (Gar.)	кz	5	2C	L	PS
BI-TIS.21	Information Systems Pavel Náplava Pavel Náplava Pavel Náplava (Gar.)	Z,ZK	5	2P+2C	Z	PS
BI-FEM.21	Fundamentals of Economics Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	5	2P+2C	Z	PS
Informatics, ver		Compulsory C	ourses o	-		-
BI-EPP.21	Economic Business Processes			4	Z,ZK	5

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The aim of the course is to present typical processes related to the usual life cycle of a company. The course focuses mainly on the basic economic	-	
in the market environment of the Czech Republic and the basics of management. In the course, students are acquainted with the typical phases of the	ie company's life o	cycle, from the
establishment of the company, through the management of property and capital structure, financing of the company, determining the cost function of	the company and	labor costs, to
evaluating the financial health of the company and its eventual rehabilitation or termination.		
BI-FBI.21 Financial Business Intelligence	Z,ZK	5
The aim of the course is to acquaint students primarily with financial accounting as a tool for recording business operations and documents for business	ss analysis, deter	mining its value
and other indicators for comparison with other companies and management decision process at the tactical and strategic level. The second view is n	nanagement accor	unting as a tool
for financial management and prediction of business development. Management accounting allows monitoring of the financial status and performance	of business activit	ies over several
accounting periods, enables a multidimensional view of business data, enables to control effectively factors affecting the return on invested capital and	nd to use value inf	ormation to
assess options related to future business decisions. The principles of management accounting, described in this course, are the basis of Business Ir	telligence module	s in business
information systems, decision support systems, and other knowledge-oriented systems.		
BI-KOM.21 Conceptual Modelling	Z,ZK	5
The course is focused on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key	terms in a domain	n, the ability to
categorize and specify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological st	ructural modeling	in the OntoUML
notation. Next, they learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represented and represented at the term of term o	entation in the Inte	ernet. They also
learn the foundations of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEM	O method and the	BPMN notation
will be taught. The course is designed with the respect to continuation in software implementations. Recommended optional follow-up course: BI-ZPI		
BI-PAI.21 Law and Informatics	ZK	5
The aim of the course is to introduce students into the basic legal instruments that they will encounter in their practice. Students will gain knowledge	1	in the Czech
Republic and will be alerted to the pitfalls that await them in business from the point of view of law. They will understand the process of concluding or	•	
environment, will know their responsibilities in working with the Internet, will be familiar with the institutes of intellectual property law, and will be able		
and open-source licenses. Emphasis will also be put on the legal protection of data on the Internet, the registration of Internet domains and protection		
will also be alerted to such behaviour in the field of IT that can be classified as criminal under the Czech law. The course will also include analyses of	•	
	Z.ZK	5
BI-PRR.21 Project management The aim of the course is to introduce students into the basic concepts and principles of project management, i.e. methods of planning, teamwork, and	,	-
project, communication, argumentation and meeting management. Students will practice project management techniques (e.g. SWOT analysis, risk		• I
Gantt charts, resource schedule, resource balancing, network graphs) and creation of project documentation. The course is designed especially for s		•
deepening their knowledge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in I		
also suitable for all those who will develop software or hardware in the form of team projects.	arge companies. I	The course is
	7 71/	<i></i>
BI-SWI.21 Software Engineering	Z,ZK	5
Students get acquainted with methods of analysis and design of larger software projects that are typically designed and implemented in teams. They		
their knowledge during the analysis and design of larger software systems that will be developed in the concurrent course BIE-SP1. Students get han		
using the visual language UML for modeling and solving software problems. Students learn the basics of object-oriented analysis, architecture desig		nin the course,
students also gain a theoretical basis in the field of project management, estimation of costs of software projects, and methods of their development	· · · · · · · · · · · · · · · · · · ·	
BI-SP1.21 Team Software Project 1	KZ	5
Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in th		
concurrently and that teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The tea	acher, in the role o	f the team and
project leader, regularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software	artefact will be fur	ther developed
and finished in the BIE-SP2 course.		
BI-TIS.21 Information Systems	Z,ZK	5
The goal of this course is to familiarise students with the information systems topic and information systems implementation principles. During the or	urse, students are	e introduced to
"on the market" existing types of systems and their usage in specific industry segments. Students are familiarised with the CRM, ERP, MRP and other	r types of informa	tion systems.
The fundamental part of the course is the introduction to key ideas of an information system selection, evaluation of information system benefits, wa	s of information s	ystems
implementation and information system implementation based on the project management principles. The emphasis is on the initial customer analys	is, customer insigl	nt and ability to
decide whether it is better to implement any existing information system or to develop a new one from scratch. These factors determine the information	system implemer	ntation success.
At the end of the course information systems security, operation, support, maintenance, legislation impacts, and government information systems to	bics are discussed	l

Name of the block: Povinná zkouška z angli tiny Minimal number of credits of the block: 2 The role of the block: PJ

Code of the grou	p: BI-ZKA.21					
Name of the grou	ıp: English Language Exam					
Requirement cree	dits in the group: In this group you have to gain at I	east 2 cre	dits (at	most 4	L)	
•	rses in the group: In this group you have to comple		•		,	
Credits in the gro						
Note on the	Note on the BI-ANG, ending with an exam for two credits, is enrolled by students who have completed preparator English					•
	is enrolled by students who prepared for the exam independ		•			
	students must complete a credit paper before their own exar					
	be recognized for the course BI-ANGS (Independent prepara	•	-			
	 > The BIE-ECC course can be recognized for any activ	e semester a	after the	submiss	sion of a e	xternal
	certificate at the level of at least B2 according to the Commo	n European	Framew	ork of R	eference.	
	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their					
Code	members)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
BI-ANG1	English Language Examination without Preparatory Courses Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.)	Z,ZK	2		L	PJ
BIE-EEC	English language external certificate Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	4		L	PJ
BI-ANG	English Language, Internal Certificate Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.)	ZK	2		Z,L	PJ

Characteristics of the courses of this group of Study Plan: Code=BI-ZKA.21 Name=English Language Exam

BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2				
BIE-EEC	English language external certificate	Z	4				
The BIE-ECC course ca	The BIE-ECC course can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English comparable to or exceeding						
the B2 level of the Com	mon European Framework of Reference for Languages.						
BI-ANG	English Language, Internal Certificate	ZK	2				
Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG							

Name of the block: Povinná t lesná výchova, sportovní kurzy Minimal number of credits of the block: 0 The role of the block: PT

Code of the group: BI-PT.24 Name of the group: Physical Education, version 2024

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses (at most 7) Credits in the group: 0

Note on the group:

The student is obliged to successfully complete two courses of this group. Guarantor: prof. Ing. Róbert Lórencz, CSc., email: robert.lorencz@fit.cvut.cz

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
TV1	Physical Education	Z	0	0+2	Z	PT
TVV	Physical education	Z	0	0+2	Z,L	PT
TVK1	Physical Education Luboš Neuman Ji í Drnek (Gar.)	Z	1		L,Z	PT
TVV0	Physical education	Z	0	0+2	Z,L	PT
TV2	Physical Education	Z	0	0+2	L	PT
TVKZV	Physical Education Course	Z	0	7dní	Z	PT
TVKLV	Physical Education Course	Z	0	7dní	L	PT

Characteristics of the courses of this group of Study Plan: Code=BI-PT.24 Name=Physical Education, version 2024

TV1	Physical Education	Z	0
TVV	Physical education	Z	0
TVK1	Physical Education	Z	1
TVV0	Physical education	Z	0
TV2	Physical Education	Z	0
TVKZV	Physical Education Course	Z	0
TVKLV	Physical Education Course	Z	0

Name of the block: Elective courses Minimal number of credits of the block: 0 The role of the block: V

Code of the group: BI-V.2021

Name of the group: Purely Elective Courses of Bachelor Programme Informatics, version from 2021/22 till 2024/25

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

BI-HMI

Note on the group: Guarantor: prof. Ing. Róbert Lórencz, CSc., email: robert.lorencz@fit.cvut.cz Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Semester Code Completion Credits Scope Role members) Tutors, authors and guarantors (gar.) Windows Administration BI-ADW.1 2P+1C Ζ Z,ZK 4 V Ji í Kašpar, Miroslav Prágl Miroslav Prágl Miroslav Prágl (Gar.) Algebra and Logic **BI-ALO** 2P+1C Z,ZK 4 Т V Jan Starý Jan Starý Jan Starý (Gar.) Algorithms visually BI-AVI.21 Z,ZK 4 2P+1C L v Lud k Ku era Lud k Ku era Lud k Ku era (Gar.) English language, preparation for the B2 level exam BI-A2L Ζ 2 2C L v Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.) **Aplication Programming in Java BI-APJ** Ζ Z,ZK 4 2P+1R+1C V . JiíDan ek Applied Functional Programming NI-AFP 5 2P+1C L ΚZ Robert Pergl, Marek Suchánek, Daniel N mec Robert Pergl Robert Pergl v (Gar.) Artificial Intelligence Fundamentals **BIE-ZUM** Z,ZK 4 2P+2C L V Pavel Surynek Blender **BI-BLE** Z.ZK 4 2P+2C L V Lukáš Ba inka Lukáš Ba inka Lukáš Ba inka (Gar.) Database Systems in Practes Tomáš Vichta Tomáš Vichta (Gar.) NI-DSP 2P+1C Z,ZK 4 L v **BI-STO** L.Z Z.ZK 2P+2C 4 v Storage and Filesystems **Public Services Design** NI-PSD K7 4 1P+2C v David Pešek, Ond ej Brém David Pešek Ond ej Brém (Gar.) **Differential equations BIE-DIF** Z.ZK 5 2P+2C L v Antonella Marchesiello, Jan Valdman, Ond ej Bouchala Tomáš Kalvoda Ond ej Bouchala (Gar.) NI-DZO Z,ZK 4 2P+1C L v **Digital Image Processing** NI-DDM ΚZ 3C 4 L **Distributed Data Mining** V Effective programming 1 **BI-EP1.24** ΚZ 4 2P+2C Ζ V Martin Ka er Martin Ka er Martin Ka er (Gar.) **Efficient Programming 2** BI-EP2 ΚZ 4 2P+2C L V Martin Ka er Martin Ka er Martin Ka er (Gar.) English language, contact preparation for the B2 level exam **BI-ANGK** Ζ 2 2C Z,L V Kate ina Valentová Kate ina Valentová (Gar.) Enterprise Java **BI-EJA** Z,ZK 4 2P+2C L v Jií Dan ek **Enterprise Java and Kotlin BI-EJK** Z,ZK 4 2P+2C L V Jií Dan ek **Jií Dan ek** Jií Dan ek (Gar.) **Financial and Management Accounting BI-FMU** Ζ Z.ZK 5 2P+2C v David Buchtela HW accelerated network traffic monitoring **BI-HAM** ΚZ 4 2P+1C L v ejka (Gar.) Tomáš ejka, Karel Hynek Tomáš ejka Tomáš

Z,ZK

3

2P+1C

L

v

History of Mathematics and Informatics

Alena Šolcová **Alena Šolcová** Alena Šolcová(Gar.)

BI-ARD	Interactive applications on Arduino Jan ezní ek, Ji í Cvr ek, Robert Hülle, Vojt ch Miškovský Robert Hülle	KZ	4	3C	L	v
NI-IAM	Robert Hülle (Gar.) Internet and Multimedia Ji í Melnikov	Z,ZK	4	2P+1C	L	v
BIE-CSI	Introduction to Computer Science	Z	2	2C	Z	v
BIE-IMA2	Christoph Kirsch Christoph Kirsch Christoph Kirsch (Gar.) Introduction to Mathematics 2	Z	2	1C	Z	V
BI-CS2	Karel Klouda C# language and data access Pavel Št pán Pavel Št pán (Gar.)	KZ	4	0P+3C	Z	V
BI-CS3	Language C# - design of web applications Pavel Št pán Pavel Št pán Pavel Št pán	KZ	4	3C	Z	V
BI-SQL.1	Language SQL, advanced Michal Valenta Michal Valenta Michal Valenta (Gar.)	KZ	4	3C	L	V
BI-QAP	Quantum algorithms and programming Tomáš Kalvoda, Ivo Petr Ivo Petr Ivo Petr (Gar.)	KZ	5	1P+2C	Z	V
NI-LSM	Statistical Modelling Lab Kamil Dedecius Kamil Dedecius (Gar.)	KZ	5	3C	L	V
BI-HAS	Human Aspects in Cryptography and Security Ivana Trummová Ivana Trummová Ivana Trummová (Gar.)	Z,ZK	5	2P+1C	Z	V
NI-MPL	Managerial Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P	Z,L	V
NI-MSI	Mathematical Structures in Computer Science Jan Starý	Z,ZK	4	2P+1C	L	V
BI-MPP.21	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	Z	v
BI-MIT	Mikrotik technologies Jan Fesl Jan Fesl Jan Fesl (Gar.)	KZ	3	1P+2C	Z	v
NI-MOP	Modern Object-Oriented Programming in Pharo Jan Blizni enko Robert Pergl Robert Pergl (Gar.)	KZ	4	3C	Z	v
BI-MVT.21	Modern Visualisation Technologies Ji í Chludil, Petr Pauš Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	v
BI-MMP	Multimedia team project Zde ka echová Zde ka echová Zde ka echová (Gar.)	KZ	4	3C	Z,L	v
BI-ORL	Operations Research and Linear Programming Dušan Knop, Radek Hušek Dušan Knop Dušan Knop (Gar.)	KZ	5	1P+2C	L	V
NI-OLI	Linux Drivers Miroslav Skrbek, Jaroslav Borecký Jaroslav Borecký Miroslav Skrbek (Gar.)	Z,ZK	4	2P+2C	L	v
BI-ACM	Programming Practices 1 Tomáš Valla	KZ	5	4C	L	v
BI-ACM2	Programming Practices 2 Ond ej Suchý, Tomáš Valla Tomáš Valla (Gar.)	KZ	5	4C	Z	V
BI-ACM3	Programming Practices 3 Ond ej Suchý, Tomáš Valla Tomáš Valla (Gar.)	KZ	5	4C	L	V
BI-ACM4	Programming Practices 4 Ond ej Suchý, Tomáš Valla Tomáš Valla Ond ej Suchý (Gar.)	KZ	5	4C	Z	v
BI-AND.21	Programming for the Android Operating System Jan Mottl, Jan Vep ek, Marek Kodr Jan Mottl Marek Kodr (Gar.)	KZ	4	3C	L	V
BI-CS1	Programming in C# Pavel Št pán, Helena Wallenfelsová Helena Wallenfelsová Pavel Št pán (Gar.)	KZ	4	3C	L,Z	v
BI-PJV	Programming in Java Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	v
BI-PJS.1	JavaScript Programming Old ich Malec	KZ	4	3C	L	v
BI-KOT	Programing in Kotlin Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
NI-PSL	Programming in Scala Jií Dan ek Jií Dan ek Jií Dan ek (Gar.)	Z,ZK	4	2P+1C	Z	V
BI-PMA	Programming in Mathematica Zden k Buk Zden k Buk Zden k Buk (Gar.)	Z,ZK	4	2P+2C	Z,L	V
BI-PHP.1	Programing in PHP	KZ	4	3C	Z	V
BI-PS2	Programming in shell 2 Lukáš Ba inka	Z,ZK	4	2P+2C	L	V
NI-PDD	Data Preprocessing Marcel Ji ina Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-PKM	Introduction to mathematics Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z	4		Z	V
NI-REV	Reverse Engineering Josef Kokeš Josef Kokeš (Gar.)	Z,ZK	5	1P+2C	Z	V
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SCE2	Computer Engineering Seminar II Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	v

BI-ST1	Network Technology 1 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	v
BI-ST2	Network Technology 2	Z	3	3C	L	v
BI-ST3	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 3	Z	3	2C	Z	V
BI-ST4	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 4	Z	3	2C	L	V
BI-SKJ.21	Alexandru Moucha Álexandru Moucha (Gar.) Scripting Languages	Z,ZK	4	2+2	L	v
BI-SOJ	Lukáš Ba inka, Jan Žárek Lukáš Ba inka Jan Žárek (Gar.) Machine Oriented Languages	Z,ZK	4	2P+2C		v
NI-SYP	Parsing and Compilers	Z,ZK	5	2P+1C	Z	v
	Jan Janoušek Jan Janoušek Jan Janoušek (Gar.) Version control system GIT			-		
BI-GIT	Petr Pulc	KZ	2	16P	Z,L	V
BIE-SEG	Systems Engineering Christoph Kirsch Christoph Kirsch (Gar.)	Z	0	2C	Z	V
TVK1	Physical Education Luboš Neuman Ji í Drnek (Gar.)	Z	1		L,Z	V
TVV	Physical education	Z	0	0+2	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2	Physical Education	Z	0	0+2	L	V
TV2K1	Physical Education 2	Z	1		L,Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
BI-TS1	Theoretical Seminar I Dušan Knop, Ond ej Suchý, Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	V
BI-TS2	Theoretical Seminar II Dušan Knop, Ond ej Suchý, Tomáš Valla Tomáš Valla Ond ej Suchý (Gar.)	Z	4	2C	L	V
BI-TS3	Theoretical Seminar III Ond ej Suchý, Tomáš Valla Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	V
BI-TS4	Theoretical Seminar IV Ond ej Suchý, Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	L	V
BI-TDA	Test driven architecture Marek Hakala	ΚZ	4	2P+1C	Z,L	V
NI-TSP	Testing and Reliability Petr Fišer Martin Da hel Petr Fišer (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-QUA	Quality Assurance Marek Kodr, Martin Pilný, Kate ina Kalášková Kate ina Kalášková Marek Kodr (Gar.)	KZ	4	3C	Z	V
BI-CCN	Compiler Construction Christoph Kirsch Christoph Kirsch (Gar.)	Z,ZK	5	3P	L	V
BI-TEX	TeX and Typography Petr Olšák Petr Olšák Petr Olšák (Gar.)	Z,ZK	4	2P+1C	L	V
BI-KSA	Cultural and Social Anthropology Tomáš Houdek, Alena Libánská, Jakub Šenovský Jakub Šenovský Alena Libánská (Gar.)	ZK	2	2P	Z,L	V
BI-ULI	Introduction to Linux Zden k Muziká , Dana ermáková, Jan Ž árek, Petr Zemánek Zden k Muziká Zden k Muziká (Gar.)	Z	2	4D	Z	V
BI-OPT	Introduction to Optical Networks Pavel Tvrdík	Z,ZK	4	2P+1C	Z	V
NI-VCC	Virtualization and Cloud Computing Tomáš Vondra, Jan Fesl Tomáš Vondra Tomáš Vondra (Gar.)	Z,ZK	5	2P+1C	L	V
BI-VHS	Virtual game worlds Radek Richtr	ZK	4	2P+2C	Z	V
BI-VR1	Virtual reality l Petr Pauš, Petr Klán Petr Klán Petr Klán (Gar.)	KZ	4	2P+2C	L,Z	V
BI-VR2	Virtual reality II Petr Klán Petr Klán (Gar.)	KZ	3	1P+2C	L	V
BI-VAK.21	Selected Applications of Combinatorics Tomáš Valla Michal Opler Michal Opler (Gar.)	Z	3	2R	L	V
BI-VMM	Selected Mathematical Methods Marzieh Forough Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	4	2P+2C	L	V
NI-VYC	Computability Jan Starý Jan Starý (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ZS10	Bachelor internship abroad for 10 credits Zden k Muziká Zden k Muziká (Gar.)	Z	10		Z,L	V
BI-ZS20	Bachelor internship abroad for 20 credits	Z	20		Z,L	v
DI-2320	Zden k Muziká Zden k Muziká (Gar.)	_			,	

BI-ZIVS	Intelligent Embedded System Fundamentals Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	KZ	4	1P+3C	Z	V
BI-ZPI	Process engineering Robert Pergl Robert Pergl (Gar.)	KZ	4	1P+2C	L	V
BI-ZNF	PHP Framework Nette - basics Ji í Chludil	KZ	3	2P+1C	L	V
BI-ZRS	Basics of System Control Kate ina Hyniová	Z,ZK	4	2P+2C	Z	V
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad Rostislav Babá ek, Igor Rosocha Martin P Ipitel Martin P Ipitel (Gar.)	KZ	4	2C	Z	V
BI-ZWU	Introduction to Web and User Interfaces Lukáš Ba inka Lukáš Ba inka Jakub Klímek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-3DT.1	3D Printing Miroslav Hron ok, Tomáš Sýkora Tomáš Sýkora Miroslav Hron ok (Gar.)	KZ	4	3C	L	V

Characteristics of the courses of this group of Study Plan: Code=BI-V.2021 Name=Purely Elective Courses of Bachelor Programme Informatics, version from 2021/22 till 2024/25

	ersion from 2021/22 till 2024/25		
TV1	Physical Education	Z	0
TVV	Physical education	Z	0
TVK1	Physical Education	Z	1
TVV0	Physical education	Z	0
TV2	Physical Education	Z	0
TVKZV	Physical Education Course	Z	0
TVKLV	Physical Education Course	Z	0
BI-ADW.1	•	Z,ZK	4
	Windows Administration sented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZR	4
BI-ALO		7 71/	4
-	Algebra and Logic	Z,ZK	4
	ds and deepens the study of topics touched upon in the basic course in logic.	771	4
BI-AVI.21	Algorithms visually	Z,ZK	4
	ements other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the comp		-
	ted in BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision tanding the principles of algorithms easy.	n.org⁢nttp://www.aig	jovision.orgægi;
		7	2
BI-A2L	English language, preparation for the B2 level exam	Z	2
active part in the la	e course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achieve anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in b cess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified	oth the midterm and	the final term
class of the term.			Ū
BI-APJ	Aplication Programming in Java	Z,ZK	4
-	sented in Czech. Advanced technologies in Java.		
NI-AFP	Applied Functional Programming	KZ	5
	Applica Functional Frogramming	1 1	-
	sented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and povel functional	ional programming la	nduades are or
This course is pres	sented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functi and the functional paradium becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, m		
This course is pres the rise nowadays	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, m		
This course is pres the rise nowadays necessary compet	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, meterce of a software engineer: the theory and especially the practice.	nastering this paradig	m becomes a
This course is pres the rise nowadays necessary compet BIE-ZUM	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, management tence of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals	Anastering this paradig	m becomes a
This course is pres the rise nowadays necessary compet BIE-ZUM Students are introd	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, marked of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the other solving.	Aastering this paradig	um becomes a 4 ne areas of state
This course is pres the rise nowadays necessary compet BIE-ZUM Students are introc space search, mul	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, many tence of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the original systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm.	Aastering this paradig	m becomes a 4 ne areas of state
This course is pres the rise nowadays necessary compet BIE-ZUM Students are introo space search, mul be presented as w	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, materice of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algored.	Z,ZK	m becomes a 4 ne areas of state ral networks, wil
This course is pres the rise nowadays necessary compet BIE-ZUM Students are introo space search, mul be presented as w BI-BLE	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, matches of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algored. Blender	Z,ZK	m becomes a 4 ne areas of state ral networks, wil 4
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This course is pres the rise nowadays necessary compet BIE-ZUM Students are introc space search, mul be presented as w BI-BLE The course extend animation. It offers	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, methods of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the generative systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm of the set of the problems of the problems of the problems in the Artificial Intelligence and Graphics Applications) course. It is intended for the set omplete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphete and practically oriented introduction to Blender environment) and the statement of the sta	Z,ZK classical tasks from th porithms and the neur Z,ZK ose interested in 3D phics applications) co	m becomes a 4 ne areas of state ral networks, wil 4 graphics and purse.
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This course is pret the rise nowadays necessary compet BIE-ZUM Students are introc space search, mul be presented as w BI-BLE The course extend animation. It offers NI-DSP This course is pret	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, methods of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the of the agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algo the agent systems are theory and the advection of the advection of the section of the advection of the advect	A stering this paradig	m becomes a 4 ne areas of state ral networks, wil 4 graphics and purse. 4
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NI-DDM Distributed Data Mining		
	KZ	4
Course focuses on state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain han	ds on experience	with large scale
data processing framework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementation	ns and will be capa	able to propose
approaches to parallelize other algorithms. The course is prezented in czech language.		
BI-EP1.24 Effective programming 1	KZ	4
The course is taught in Czech.		
BI-EP2 Efficient Programming 2	KZ	4
Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving ind	1	-
with the aim to choose the best one and avoid implementation errors.		····,
BI-ANGK English language, contact preparation for the B2 level exam	Z	2
The content of the course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achieveni		
active part in the language instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both		
tests with the success rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by		
class of the term.		s during the mat
	7 71/	4
BI-EJA Enterprise Java	Z,ZK	4
The course is on advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information	systems which ar	e connected to
a database and are accessed through the web interface.	1	
BI-EJK Enterprise Java and Kotlin	Z,ZK	4
The course is on advanced technologies in the Java and Kotlin programming languages. The focus is on technologies for developing enterprise info	rmation systems w	ith microservice
architecture, that can be deployed to the cloud.		
BI-FMU Financial and Management Accounting	Z,ZK	5
The aim of the course is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the	e particular accour	nting operations,
operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modific	ation of bookkeep	ing, description
of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of management	gement accounting	g are base of
Business Inteligence moduls in Business information systems.	-	-
BI-HAM HW accelerated network traffic monitoring	KZ	4
This course introduces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring.	1	-
network traffic are mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as	-	-
for analysis). The goals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network	lianic on a natuwa	are and soltware
level and to develop their practical abilities in this field.		2
BI-HMI History of Mathematics and Informatics	Z,ZK	3
This course is presented in Czech.		
BI-ARD Interactive applications on Arduino	KZ	4
The subject is designed for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple app	lications for moder	n programmable
kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedde	d systems, i.e. to s	see the results
not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefor	re is suitable even	for Web and
Software Engineering students.		
NI-IAM Internet and Multimedia	Z,ZK	4
The NI-IAM course is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes a		
	cauisition of AV si	anals (input).
		• • • • •
presentation of AV signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practi	cal use case scena	arios of real-time
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BI-QAP	Quantum algorithms and programming	KZ	5
Course aims at giving	students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanic	s, on which quant	um technologies
	mms showing advantages and limitations of quantum computing. During tutorials students work in open-source software devel	•	
	nowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VI	MM and experience	e with Python
might be an advantage	e. No previous knowledge of physics is assumed.		
NI-LSM	Statistical Modelling Lab	KZ	5
The subject is oriented	l on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is	s put on the effect	ive use of the
	nd its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms,	and analyses of t	heir properties.
At this point, the subje	ct is on the border of own research and may result in the topic of final work (diploma or bachelor thesis).		
BI-HAS	Human Aspects in Cryptography and Security	Z,ZK	5
	ents interested not only in technical scope of computer science, but also in making products usable - for users and for develop	pers. Students of t	his course can
	edge to design, plan and analyse their own projects in the context of human-centered security.		·
NI-MPL	Managerial Psychology	ZK	2
NI-MSI	Mathematical Structures in Computer Science	Z,ZK	4
Mathematical semantic	es of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Sco	tt model of lambd	a calculus.
Introduction to categor	y theory.		
BI-MPP.21	Methods of interfacing peripheral devices	Z,ZK	5
The course is focused	on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Univ	ersal serial bus (L	ISB). The course
	and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of l	JSB devices, Linu	x and Windows
drivers, simple applica	tion development, and APIs of selected devices.		
BI-MIT	Mikrotik technologies	KZ	3
The main motivation of	the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are of	commonly used b	y the small and
middle internet service	providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the	e metallic, optical	or wireless links
and how to administrat	e and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary compute	er networks conce	pts like protocols
and technologies of the	e data-link, network and transport layer of the OSI model.		
NI-MOP	Modern Object-Oriented Programming in Pharo	KZ	4
Object-oriented progra	mming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, wh	ere its ability to na	atural abstraction
is used to build comple	x modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the s	skills of design and	d implementation
of object systems in m	odern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their developmen	t needs and areas	s of interest. In
addition to deepening	object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to wo	ork on interesting r	projects and OO
technologies in terms	of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involv	vement in the Pha	ro Consortium.
BI-MVT.21	Modern Visualisation Technologies	Z,ZK	5
	is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and au	1 1	visualization on
high resolution displays	s (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the ment	ioned technologie	s, namely fractal
and procedural visualiz	zation, scientific data visualization, and 3D model scanning.		
BI-MMP	Multimedia team project	KZ	4
This course is present		1	
BI-ORL	Operations Research and Linear Programming	KZ	5
The subject aims to inf	roduce students to the issues of operational research and primarily to the practical application of linear programming as a fur	damental optimiz	ation technique.
Operational research p	primarily focuses on the use of engineering methods (with a mathematical background) to solve practical problems (such as m	nanagement).	
NI-OLI	Linux Drivers	Z,ZK	4
The Linux operating sy	stem is an important operating system for personal computer and also for embedded systems. Systems on chip and combining	1 '	sors and FPGAs
	of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver developm		
course provides knowl	edge of Linux operating system architecture, principles of development of various types drivers, including practical experience).	
BI-ACM	Programming Practices 1	KZ	5
This course is present			, C
BI-ACM2	Programming Practices 2	KZ	5
This course is present			
BI-ACM3	Programming Practices 3	KZ	5
This course is present		I IV	1 5
		1/7	
BI-ACM4	Programming Practices 4	KZ	5
This course is present			
BI-AND.21	Programming for the Android Operating System	KZ	4
This course is present			
BI-CS1	Programming in C#	KZ	4
The goal of the course	is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamenta	al construction, typ	oes of variables,
	s, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class de		-
	, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugg	ing and exception	processing, as
well as work with files	are emphasized.		
BI-PJV	Programming in Java	Z,ZK	4
This course is presented	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-PJS.1	JavaScript Programming	KZ	4
Main goal of the cours	e is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases developmer	nt in Javascript. Th	ne course is
recommended for stud	ents of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register f	or this course in th	eir 4th semester
of study.			
BI-KOT	Programing in Kotlin	Z,ZK	4
-	tically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of adv	1 '	constructions.
	ava compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of		
	-plate code Last but not least. Kotlin is suitable for designing of DSLs (Domain-Specific Languages)	-	

	Ì	
NI-PSL Programming in Scala	Z,ZK	4
The course introduces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language		-
advance standard library. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful fram	eworks and libraries e.g.	Play, Cassandra,
Scalaz, etc.		
BI-PMA Programming in Mathematica	Z,ZK	4
Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional	l programming, rule-base	ed programming,
etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.		
BI-PHP.1 Programing in PHP	KZ	4
The course is taught in Czech. Main goal of the course is an introduction to PHP - language and technology. Students will learn also best pra	actices and will use tool t	hat eases
development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to r	egister for BIE-TWA.1.T	hey should
register for this course in their 3rd semester of study.		
BI-PS2 Programming in shell 2	Z,ZK	4
Students gain a general overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and con	s. In addition, they gain a	deeper insight
into shell and some other particular scripting languages and will get practical experience with shell script programming.		
NI-PDD Data Preprocessing	Z,ZK	5
Students learn to prepare raw data for further processing and analysis. They learn what algorithms can be used to extract information from var		as images, texts,
time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of cl	haracteristics from image	es or from web
pages.		
BI-PKM Introduction to mathematics	Z	4
This course is presented in Czech.	I	I
NI-REV Reverse Engineering	Z,ZK	5
Students will get acquainted with the essentials of reverse engineering of computer software. They will learn how processes start and what ha	· · ·	-
is called. Students will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the cours		
applications written in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will al		0 0
debuggers and debugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the		
the course is on the seminars, where students will solve practically oriented tasks from the real world.		
BI-SCE1 Computer Engineering Seminar I	Z	4
The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and re	-	
are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor.		
articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the semi		
semester.		
BI-SCE2 Computer Engineering Seminar II	Z	4
The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and re		· ·
are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor.		
articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the semi	-	
l semester.		
Semester. BLST1 Network Technology 1	7	3
BI-ST1 Network Technology 1	Z	3 on Netacad -
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BI-TS1 Theoretical Seminar I	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a cla	assical reading gro	up. The students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course	is a work with scie	ntific papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS2 Theoretical Seminar II	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a cla	ssical reading gro	up. The students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course	is a work with scie	ntific papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS3 Theoretical Seminar III	7	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a cla	– – Assical reading gro	-
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course in		
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.	S a work with Sole	
	7	4
	· –	
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a cla		•
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is the structure of the course is the structure of the str	is a work with scie	ntific papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		r
BI-TDA Test driven architecture	KZ	4
The course is focused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that	are well known in	the DevOps
world. This course has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occur	in the semester p	roject.
NI-TSP Testing and Reliability	Z,ZK	5
Students will gain knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to	prepare a test set	with the help of
the intuitive path sensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with	h built-in-self-test	equipment. They
will be able to compute, analyze, and control the reliability and availability of the designed circuits.		
BI-QUA Quality Assurance	KZ	4
This course introduces students to the fundamentals of testing and quality management. Students will learn what the role of a tester is in the context of th		
development and will experience hands-on application testing using both manual and automated testing. At the end of the semester, the student sh		
analysis, design a set of test scenarios, prepare test data, automate an appropriate portion of the scenarios, and prepare a report on the bugs foun		-
		1
BI-CCN Compiler Construction	Z,ZK	5
This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principle		students to
understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching them	1	
BI-TEX TeX and Typography	Z,ZK	4
This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of	the course focuse	s on typographic
rules.		
BI-KSA Cultural and Social Anthropology	ZK	2
The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the div	ersity of the world	- examples from
anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, h	-	-
shown. The course is presented in Czech.	, ,,	, ,
BI-ULI Introduction to Linux	Z	2
Students become familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become		
and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal).		Sic commands
	7 71/	4
BI-OPT Introduction to Optical Networks	Z,ZK	
Students get basic overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on practical utilization in Internet and in network infrastructures.		
of optical network technology and on their solutions. The course will include the history of optical communications, an overview of passive compone		
dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission sy	, ,	
the most up-to-date topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such		,
ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameter	s. Students will so	olve real tasks
from practice.		
NI-VCC Virtualization and Cloud Computing	Z,ZK	5
Students will gain knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies ar	nd organizations. T	hey will get
acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to ef	ficiently operate an	nd optimize the
performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effect	tive technology to	day for the
management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical sk	ills in the use of mo	odern integration
and development tools (Continuous integration and development).		
BI-VHS Virtual game worlds	ZK	4
The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current	1	1
complemented by the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world		•
the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devices.		,
	KZ	4
	1	-
Introduction to Virtual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirement		
The course focuses on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves of	computational thin	king, empatny
and shared social activities.		-
BI-VR2 Virtual reality II	KZ	3
Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The	objective is to deve	elop applications
for computer science and gamification in various social metaverse and desktop engines.		
BI-VAK.21 Selected Applications of Combinatorics	Z	3
The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the	ne basic courses,	we approach the
issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic knowledge needed to design and analyze algorithms and introduce some basic knowledge needed to design and analyze algorithms and introduce some basic knowledge needed to design and analyze algorithms and introduce some basic knowledge needed to design and analyze algorithms and introduce some basic knowledge needed to design and analyze algorithms and introduce some basic knowledge	basic data structur	es. Furthermore,
with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical)	informatics. Areas	s from which we
will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optin	nization and more.	Students will
also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		

BI-VMM	Selected Mathematical Methods	Z,ZK	4
The lecture begins with a	an introduction to the analysis of complex functions of a complex variable. Next, we present the Lebesgue integral. We then a	address Fourier s	eries and their
properties. Further, we in	troduce and study the properties of the Discrete Fourier Transform (DFT) and its fast implementation (FFT). We discuss the	wavelet transform	n. We examine
the linear programming p	roblem in more detail and its solution using the Simplex algorithm. Each topic is demonstrated with interesting examples.		
NI-VYC	Computability	Z,ZK	4
Classical theory of recurs	sive functions and effective computability.		
BI-ZS10	Bachelor internship abroad for 10 credits	Z	10
Each student can once w	vithin his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or	research institutio	n. Before the
internship the Dean of the	e FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profess	sional content and	extent of the
internship. Auxiliary cours	ses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits	correspond to 4 w	eeks of full-time
employment with a foreig	n institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided	l into two subjects	if the internship
exceeds the academic ye	ear's dead-line.		
BI-ZS20	Bachelor internship abroad for 20 credits	Z	20
	vithin his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or	research institutio	n. Before the
internship the Dean of the	e FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profess	sional content and	l extent of the
internship. Auxiliary cours	ses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits	correspond to 4 w	eeks of full-time
employment with a foreig	n institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided	l into two subjects	if the internship
exceeds the academic ye	ear's dead-line.		
BI-ZS30	Bachelor internship abroad for 30 credits	Z	30
	vithin his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or	research institutio	
internship the Dean of the	e FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profess	sional content and	l extent of the
	ses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits		
employment with a foreig	n institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided	l into two subjects	if the internship
exceeds the academic ye			
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
	tem fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim	1	teach students
	control and development of applications in a graphical development environment. Lectures provide fundamentals of motion of		
	on and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to ge		
technologies.			
BI-ZPI	Process engineering	KZ	4
	mentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles (1	ing and they will
	notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of b		
	process engineering for information systems development is discussed as well as its importance in the overall context of info		
an enterprise.			0,
	PHP Framework Nette - basics	KZ	3
	sics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech	1	-
-	for the efficient creation of a web backend in PHP language.		g
-	Basics of System Control	Z,ZK	4
	j oduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will foc		-
-	d physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, descripti		-
• •	tems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of cr		
	ynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also give		-
	tability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industr		
and digital controllers and			
	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
This course is presented			+
		7 71/	A
	Introduction to Web and User Interfaces	Z,ZK	4
This course is presented			
BI-3DT.1	3D Printing	KZ	4

Code of the group: BI-MI-VO.21

Name of the group: Elective vocational Courses for a Bachelor Specialization BI-MI.21, version 2021 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Guarantor: Ing. David Buchtela, Ph.D., email: David.Buchtela@fit.cvut.cz

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ADU.21	Unix Administration Zden k Muziká , Miroslav Prágl Zden k Muziká Zden k Muziká (Gar.)	Z,ZK	5	2P+2C	L	V
BI-AWD.21	Web and Database Server Administration Michal Valenta, Lukáš Ba inka Lukáš Ba inka Michal Valenta (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-AG2.21	Algorithms and Graphs 2 Dušan Knop, Michal Opler, Ond ej Suchý, Tomáš Valla, Radek Hušek Ond ej Suchý Ond ej Suchý (Gar.)	Z,ZK	5	2P+2C	L	V
BI-ASB.21	Applied Network Security Yelena Trofimova, Ji í Dostál, Martin Šutovský, Jakub Tetera, Michal Polák, Martin Mandík Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V

BI-APS.21	Architectures of Computer Systems	Z,ZK	5	2P+2C	Z	v
BI-BEK.21	Michal Štepanovský, Pavel Tvrdík Michal Štepanovský Pavel Tvrdík (Gar.) Secure Code	Z,ZK	5	2P+2C	L	V
BI-BIG.21	Josef Kokeš Josef Kokeš Josef Kokeš (Gar.) DB Technologies for Big Data	KZ	5	2P+2C	Z,L	V
BI-EHA.21	Monika Borkovcová Monika Borkovcová Monika Borkovcová (Gar.) Ethical Hacking Ji í Dostál, Martin Kolárik, Martin Šutovský, Tomáš Kiezler Ji í Dostál Ji í	Z,ZK	5	2P+2C	L	v
BI-HWB.21	Dostál (Gar.) Hardware Security	Z,ZK	5	2P+2C	Z	V
BI-IOT.21	Ji í Bu ek Ji í Bu ek Ji í Bu ek (Gar.) Internet of Things Jan Jane ek, Lenka Kosková Tísková Jan Jane ek Jan Jane ek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-JPO.21	Computer Units	Z,ZK	5	2P+2C	Z	V
BI-LA2.21	Pavel Kubalík Pavel Kubalík Pavel Kubalík (Gar.) Linear Algebra 2 Daniel Dombek, Lud k Kleprlík, Karel Klouda, Marta Nollová, Jakub Šístek Lud k Kleprlík Karel Klouda (Gar.)	Z,ZK	5	2P+2C	L	v
BI-LOG.21	Mathematical Logic Kate ina Trilfajová Kate ina Trlifajová (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MPP.21	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MDF.21	Modern Data Formats Petr Pauš Petr Pauš Petr Pauš (Gar.)	KZ	3	1P+1C	Z	V
BI-MVT.21	Modern Visualisation Technologies Ji î Chludil, Petr Pauš Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MGA.21	Multimedia and Graphics Applications Ji í Chludil, Lukáš Ba inka, Jan Buriánek Lukáš Ba inka Ji í Chludil (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-OOP.21	Object-Oriented Programming Filip K ikava, Petr Máj, Filip Íha Filip K ikava Filip K ikava (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-PGR.21	Computer graphics programming Petr Felkel, Jaroslav Sloup Jaroslav Sloup Petr Felkel (Gar.)	Z,ZK	5	2P+2C	L	V
BI-PRS.21	Practical Statistics Kamil Dedecius, Petr Novák Petr Novák Petr Novák (Gar.)	KZ	5	1P+2C	L	V
BI-PNO.21	Practical Digital Design Martin Novotný Martin Novotný Martin Novotný (Gar.)	KZ	5	2P+2C	Z	V
BI-PJP.21	Programming Languages and Compilers Jan Janoušek, Tomáš Pecka, Št pán Plachý Jan Janoušek (Gar.)	Z,ZK	5	2P+1C	L	V
BI-PPA.21	Jan Janoušek, Tomáš Pecka, Petr Máj, Tomáš Jakl Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	2P+2R	Z	v
BI-PGA.21	Programming of Graphic Applications Ji f Chludil, Radek Richtr Radek Richtr (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-PJS.21	JavaScript Programming Old ich Malec, Nikita Mironov Monika Borkovcová Monika Borkovcová (Gar.)	KZ	5	3C	L	v
BI-PYT.21	Python Programming Martin Šlapák, Ji í Hanuš, Ond ej Bouchala, Mohamed Bettaz, Adam Skluzá ek, Jan Šafa ík Martin Šlapák Martin Šlapák (Gar.)	KZ	5	3C	Z,L	v
BI-SIP.21	Network Programming Jan Fesl Jan Fesl Jan Fesl (Gar.)	Z	5	2P+2C	Z	V
BI-SP2.21	Team Software Project 2 Ji í Mlejnek Ji í Mlejnek Ji í Mlejnek (Gar.)	KZ	5	2C	Z	V
BI-SPS.21	Administration of Computer Networks and Services Jan Kubr, Libor Dostálek Pavel Tvrdík Pavel Tvrdík (Gar.)	Z,ZK	5	2P+2S	Z	V
BI-ML1.21	Machine Learning 1 Karel Klouda, Daniel Vašata Daniel Vašata (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-ML2.21	Machine Learning 2 Daniel Vašata Daniel Vašata (Gar.)	Z,ZK	5	2P+2C	L	V
BI-SVZ.21	Machine vision and image processing Marcel Ji ina, Jakub Novák, David Kramný, Justýna Frommová Jakub Novák Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	L,Z	v
BI-SRC.21	Real-time systems Hana Kubátová, Ji í Vysko il Jaroslav Borecký Hana Kubátová (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-TAB.21	Applications of Security in Technology Ji í Dostál, Martin Pozd na Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	L	V
BI-TJV.21	Java Technology Stanislav Kuznetsov, Jan Blizni enko, Ji í Dan ek Ji í Dan ek	Z,ZK	5	2P+2C	Z	V
BI-TPS.21	Computer Networks Technologies Vladimír Smotlacha, Josef Koumar Vladimír Smotlacha Vladimír Smotlacha (Gar.)	Z,ZK	5	2P+2S	Z	v
BI-TUR.21	User Interface Design Jan Schmidt Jan Schmidt Jan Schmidt (Gar.)	Z,ZK	5	2P+2C	L	V
BI-TWA.21	Design of Web Applications David Bernhauer David Bernhauer (Gar.)	Z,ZK	5	2P+2C	Z	V

BI-IDO.21	Introduction to DevOps Michal Valenta, Ji í Mlejnek, Tomáš Vondra, Zden k Rybola Tomáš Vondra Ji í Mlejnek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-UKB.21	Introduction to Cybersecurity Jan B lohoubek, David Pokorný, František Ková, Ivana Trummová, Jakub Tetera, Martin Mandík, Tomáš Lu ák David Pokorný Jan B lohoubek (Gar.)	Z,ZK	5	3P+1C	Z	v
BI-VES.21	Embedded Systems Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	L	v
BI-VDC.21	Virtualization and Data Centers Ji í Kašpar Ji í Kašpar Ji í Kašpar (Gar.)	Z,ZK	5	2P+2C	L	V
BI-VIZ.21	Data Visualization Magda Friedjungová Magda Friedjungová (Gar.)	KZ	5	3P	Z	V
BI-VPS.21	Selected Topics in Computer Networking Alexandru Moucha, Mohamed Bettaz Pavel Tvrdík Mohamed Bettaz (Gar.)	Z,ZK	5	2P+2C	L	v
BI-VWM.21	Ji í Novák, Tomáš Skopal Ji í Novák Tomáš Skopal (Gar.)	Z,ZK	5	2P+1C	L	v
BI-ZRS.21	Basics of System Control Kate ina Hyniová Kate ina Hyniová (Gar.)	Z,ZK	5	2P+2C	Z	v
BI-ZSB.21	Basics of System Security Marián Svetlík, Dominik Novák, Ladislav Marko Simona Forn sek Simona Forn sek (Gar.)	Z,ZK	5	2P+2C	Z	v
BI-ZUM.21	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	5	2P+2C	L	v
			1			
	courses of this group of Study Plan: Code=BI-MI-VO.21 Name	Elective vo	cational	Courses	for a Bach	nelor
Specialization BI-MI.2	·				71/	
	thods of interfacing peripheral devices thods for interfacing of peripheral devices. Interfacing of real peripheral devices is focus	ed on technique	s based on		,ZK	5
	eripheral devices side. Labs are practically oriented. Students gain experience with imp					
	evelopment, and APIs of selected devices.		siorain pai			
	dern Visualisation Technologies			7	,ZK	5
	give an overview of modern visualization technologies and their principles, namely tech	nologies related	to virtual a	1	·	-
	, SAGE and video mapping) and their applications in practice. Several lectures deal with	-		-	-	
	scientific data visualization, and 3D model scanning.					•
BI-ADU.21 Un	ix Administration			Z	,ZK	5
Students will learn the internation	al structure of the UNIX operating system, with the administration of its basic subsystems	and with the sec	urity princip	les. They will	understand th	e differences
	tor roles. They will get theoretical and practical knowledge of user management and ac			•	•	
	services and remote access, and in the areas of system deployment and virtualization	n. In the labs, the	y will verify	the knowled	ge from the le	ctures on
specific examples from pract						
	b and Database Server Administration			1	"ZK	5
	with the administration of database and web servers and services. They will be able to	-	-			latabase and
	inciples will be demonstrated on the PostgreSQL relational database engine and Apac	ne will be used a	s an exam			
	jorithms and Graphs 2	straduction divor	in the corr		,ZK	5 It further
	ech, introduces basic algorithms and concepts of graph theory as a follow=up on the in ructures and amortized complexity analysis. It also includes a very light introduction to	-				
BIE-AG2.21.		approximation a	igonunns. i			00136 366
	plied Network Security			7	,ZK	5
	troduce selected topics from computer networks in terms of cybersecurity. These topic	s extend the bas	ic knowled			
	public key infrastructure, encrypted network protocols, link and network layer security					
knowledge of security applic	ations in computer networks.					
BI-APS.21 Arc	chitectures of Computer Systems			Z	,ZK	5
Students will learn the const	ruction principles of internal architecture of computers with universal processors at the	level of machine	instruction	s. Special en	phasis is give	en on the
	ing and on the memory hierarchy. Students will understand the basic concepts of RISC					1 0
	by but also in superscalar processors that can execute multiple instructions in one cycle	-			-	
	elaborates the principles and architectures of shared memory multiprocessor and mult	icore systems ar	id the mem	ory conerend	e and consis	tency in such
systems. BI-BEK.21 Se	cure Code				"ZK	5
	cure Code o assess security risks and how to take them into account in the design phase of their ov	wn code and solu	tions After			
	al experience with running programs with reduced privileges and methods of specifying					
	gers inherent in buffer overflows will be practically demonstrated. Students will be intro			,		
security and database system	ns, web, remote procedure calls, and sockets in general. The module concludes with D	Denial of Service	attacks and	d the defense	against them	ı
BI-BIG.21 DB	Technologies for Big Data		-		KZ	5
	nto the field of Big Data processing where nonrelational (NoSQL) database engines are	e typically used to	oday. The c	ourse is focus	ed practically	so that after
-	were able to choose suitable tools (mostly open source) and techniques, design and ir	-	-		-	
-	gregation, presentation). Students get acquainted with various architectures for process	sing and storing	big data. A	theoretical fo	undation and	presentation
	I be supplemented with specific examples from practice.			1		
	nical Hacking				,ZK	5
	ntroduce students to the field of penetration testing and ethical hacking. The course de					
	vorks, web applications, wireless networks, operating systems, and others like the Inter e following process of penetration test documentation.	met or i nings or	cioua. The	iocus is on h	anus-on expe	nence with

BI-HWB.21 Hardware Security

The course deals with hardware resources used to ensure security of computer systems including embedded ones. Students become familiar with the operating principles of cryptographic modules, security features of modern processors, and storage media protection through encryption. They will gain knowledge about vulnerabilities of HW resources, including side-channel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card technology including applications and related topics for multi-factor authentication (biometrics). Students will understand methods of efficient implementations of ciphers.

Z,ZK

5

BI-IOT.21 Internet of Things	Z,ZK	5
The course focuses on an overview of technologies and development tools used in the field of the Internet of Things (IoT). Lectures are devoted to an		
wireless communication technologies designed primarily for this area, and appropriate programming methods. They include an overview of IoT arch		
areas. Within the computer labs, students will gain practical experience with developing simple IoT systems using common development environme	nts (hardware - AF	RM, ESP, STM;
software - Arduino, Raspberry Pi OS).		
BI-JPO.21 Computer Units	Z,ZK	5
Students deepen their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in deta		
organization of computer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using app	•	•
of multiplication. The organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, inclu	•	
correction for parallel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of co		-
the environment and the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational micr	oprogrammed pro	cessor simulator
and programmable hardware design kits (FPGA).		
BI-LA2.21 Linear Algebra 2	Z,ZK	5
Studenti si v tomto p edm tu rozší í znalosti z p edm tu BI-LA1, kde se pracovalo pouze s vektory ve form n-tic ísel. Zde si zavedeme vektorový		
Seznámíme se také s pojmem skalární sou in a lineární zobrazení, což nám dovolí ukázat souvislost s lineární algebrou, geometrií a po íta ovou g		
bude numerická lineární algebra, kde si ukážeme potíže s ešením soustav lineárních rovnic na po íta i a možnosti, jak se s tímto problémem vypo	ádat s d razem na	i rozklady matic.
Ukážeme si také aplikace lineární algebry v r zných oborech.		
BI-LOG.21 Mathematical Logic	Z,ZK	5
The course focuses on the basics of propositional and predicate logic. It starts from the semantic point of view. Based on the notion of truth, satisfial		
logical consequence of formulas are defined. Methods for determining the satisfiability of formulas, some of which are used for automated proving, a	-	
vs. NP problem and Boolean functions in propositional logic. In predicate logic, the course further deals with formal theories, such as arithmetics, and		e syntactic
approach to mathematical logic is demonstrated on the axiomatic system of propositional logic and its properties. Gödel's incompleteness theorems		
BI-MDF.21 Modern Data Formats	KZ	3
The goal of the course is to give an overview of commonly used data formats for typical types of data. There will be a description of each data type a		ats used for that
data type along with tools available to work with such data. After finishing the course, the students should know how to work with common data, e.g.	on the Web.	
BI-MGA.21 Multimedia and Graphics Applications	Z,ZK	5
Students get acquainted with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for w	orking with image:	s, videos, 3D
graphics and animation will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to	graphic formats, a	nd compression
technologies. They learn to use multimedia transmission and representation systems, including real-time multimedia processing. They understand the	ne principle of ope	ration and use
of graphics processing cards. They gain a number of practical skills, such as vectorizing raster images, retouching photos, or creating 3D models.		
BI-OOP.21 Object-Oriented Programming	Z,ZK	5
Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togeth		-
course students get acquainted with the main principles of object-oriented programming and design, used in modern programming languages. The e	mphasis is on prac	ctical techniques
for developing software, which includes testing, error handing, refactoring, and application of design pattern.		
BI-PGR.21 Computer graphics programming	Z,ZK	5
After attending this curse, students can program a simple interactive 3D graphical application like a computer game or scientific visualization, design		-
geometric details and materials (like wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and	d terms used in co	nputer graphics,
such as graphical pipeline, geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics and represent	-	
professional development, e.g., GPU programming and animations. They get used to techniques utilized in geometric modeling, modeling curves and su	urfaces, and scient	ific visualization.
BI-PRS.21 Practical Statistics	KZ	5
The students will be introduced to methods of applied statistics. They will learn how to work with various types of data, perform analyses, and choose	models fitting the	data. The course
will encompass regression and correlation analysis, analysis of variance and non-parametric methods. Students will learn to use the statistical softw	are R and will app	ly the studied
methods on data from real problems.		
BI-PNO.21 Practical Digital Design	KZ	5
Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand	the basics of the V	HDL language
and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the course project using modern	industry-standard	CAD design
tools.		
BI-PJP.21 Programming Languages and Compilers	Z,ZK	5
Students learn basic compiling methods of programming languages. They are introduced to intermediate representations used in current compilers	GNU and LLVM. T	hey learn to
create a specification of a translation of a text that conforms a given syntax, to a target code and also to create a compiler based on the specificatio	n. The compiler ca	n translate not
only a programming language but any text in a language generated by a given LL input grammar.		
BI-PPA.21 Programming Paradigms	Z,ZK	5
The course deals with basic paradigms of high-level programming languages, including their basic execution models, benefits, and disadvantages of	particular approa	ches. Functional
programming paradigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming	g. The principles a	re demonstrated
on lambda calculus and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern main	nstream programm	ning languages
such as C++ and Java.		
BI-PGA.21 Programming of Graphic Applications	Z,ZK	5
The course will present the possibilities of current professional open-source tools for image editing, video editing, 3D animation (GIMP, Blender) and t	heir use for visuali	zation of specific
data (3D scenes, mathematical data). Emphasis will be placed on the possibilities of further enhancement of the presented software tools, both usir	g built-in scripting	languages and
by implementation of plugins.		
BI-PJS.21 JavaScript Programming	KZ	5
The course is an introduction to Javascript programming. Students will also learn best practices and get acquai nted with tools that make code deve	lopment in Javasc	ript easier.
BI-PYT.21 Python Programming	KZ	5
The aim of the course is to get acquainted with basic efficient control and data structures of the Python programming language for text and binary d		
between philosophy of programming in Python and in other programming languages will be explained. Each topic is prepared for students in the for		
enables greater accent to individual student work. Before each lab, students pass a short test on the last week topic. Four homeworks plus a semes		
the semester.		-
BI-SIP.21 Network Programming	Z	5
The course covers fundamental topics of programming network applications. It consists of 4 parts. The introductory part is focused on low-level programming network applications.	. – .	-
second part is devoted to designing communication protocols and their verification. The third part introduces the principles and applications of middle		
introduces basic modern models of distributed computing - P2P and blockchain. All topics will be first explained theoretically and then practices in c	0	-
	omputer labs using	g a chosen
programming language environment.	omputer labs using	g a chosen

BI-SP2.21 Te	eam Software Project 2	KZ	5
	perience with the iterative development process while working on a large-scale software project. The first iteration is the re	1 1	-
-	the functionality, testing, and documentation of the software system being developed will be emphasized. Students will we		
	eam and project leader, regularly consults with the team (at the seminars) the formal as well as material aspects of their s		
BI-SPS.21 A	dministration of Computer Networks and Services	Z,ZK	5
	deepen the theoretical knowledge of network technologies and protocols in the environment of network servers administ		1
	purse syllabus requires the knowledge at the level of courses BIE-PSI, BIE-VPS, and BIE-OSY. Practical skills will be gained		
with real network infrastruc		,	
	lachine Learning 1	Z,ZK	5
	o introduce students to the basic methods of machine learning. They get theoretical understanding and practical working	1 1	-
-	e supervised learning scenario and clustering models in the unsupervised scenario. Students will be aware of the relations		
	damentals of assessing model quality. Moreover, they learn the basic techniques of data preprocessing and multidimensi	-	
	nd scikit libraries in Python will be used.		
	lachine Learning 2	Z,ZK	5
	o introduce students to the selected advanced methods of machine learning. In the supervised learning scenario, they, in	1 ' 1	-
-	e unsupervised learning scenario students learn the principal component analysis and other dimensionality reduction met	-	
	ement learning and natural language processing.		tudonto got tito
	lachine vision and image processing	Z,ZK	5
	ming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluat	1 1	-
	rent types of camera systems and a variety of methods for image and video processing. The course is focused on practical		
	re graduates may encounter.	use of camera sys	sterns for solving
		771	
	eal-time systems	Z,ZK	5
	knowledge in the real-time (RT) system theory and in the design methods for RT systems including the dependability issu		-
-	ally verified in computer labs. The course is mainly focused on embedded RT systems, therefore the design kits in the lab) are the same as	IN THE BIE-VES
course.			
	pplications of Security in Technology	Z,ZK	5
-	p introduce students to selected topics from cybersecurity technical applications that are utilized in different industries. Stu	udents get a broad	ler overview of
	and extend their knowledge from the cryptology, the secure code, and system, network, and hardware security.		1
	ava Technology	Z,ZK	5
	rledge and skills for developing information systems and applications through concepts used in software development and	experience with life	braries and tools
from Java language ecosys	stem. At the course end, the students are able to develop software systems in Java platform.		
BI-TPS.21 C	omputer Networks Technologies	Z,ZK	5
The course introduces stud	dents with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical structure of the stru	sical layer with the	overlap to the
link layer. The lectures prov	vide theoretical foundations of these technologies and explain relevant physical principles. In the labs, the respective tech	nologies will be de	emonstrated and
with the most important on	es students will get hands-on experience. Thematically, the course covers both local and long-range optical networks, Eth	nernet, modern wir	reless networks,
always with focus on high-s	speed networks.		
BI-TUR.21 U	ser Interface Design	Z,ZK	5
Students gain a basic over	view of methods for designing and testing common user interfaces. They get experience to solve the problems where sof	tware and other pr	roducts do not
communicate with the user	r optimally, since the needs and characteristics of users are not taken into account during product development. Students	gain an overview	of methods that
bring users into the develop	pment process to ensure optimal interface for them.		
BI-TWA.21 D	esign of Web Applications	Z,ZK	5
The basic course of web ap	pplication development. Initially, the students become familiar with HTTP and its possibilities and partly with some proper	ties of language d	escribing the
structure (HTML) and pres	entation of document on the Web (CSS). These skills provide the necessary basis for the development of Web application	ns, which will be de	emonstrated in
modern libraries facilitate th	he development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Sym	fony 2, Doctrine 2.	. Developments
on the client side will be de	emonstrated using a JavaScript language with library jQuery and possibly MV* framework React.		
BI-IDO.21 In	troduction to DevOps	Z,ZK	5
	topic of DevOps and prepares future developers and administrators for a modern culture of development and operation of	1 1	-
	software development, testing and compilation. It also focuses on tools for automating infrastructure management and bi	-	
	ion to technologies that will then be discussed in more detail in related follow-up courses. The student will also get acqua	• • • •	•
used in practice.			0
	troduction to Cybersecurity	Z,ZK	5
	p provide students with the introduction of basic concepts in modern approach to cybersecurity. Students will get a basic	1 1	
	ecurity mechanisms in networks, operating systems and applications, as well as of basic cyberspace regulations.	Sverview of threats	s in cyberspace
		774	F
	mbedded Systems	Z,ZK	5
-	nbedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and emb	eaaea processors	s, their integrated
	nming methods, and applications. They get practical skills with development kits and tools.	7 71/	
	irtualization and Data Centers	Z,ZK	5
	familiarize students with technology basis of cloud computer systems. It shows principles and techniques used in design		
	ous kinds of virtualization and high availability of servers, storages, and software layers. The course guides through data	-	-
	. Student learn current trends in the architecture of IT infrastructure and its configuration for classic and cloud application		
	ration of complex infrastructures for modern applications with respect to scalability and protection against overloads, out	-	
	ata Visualization	KZ	5
	iew of the types and characteristics of data as well as suitable visualization methods. This will aid the students in understa	-	
	is data mining and machine learning. Within the course, students will be introduced to exploratory data analysis, preproce		-
	as text, social networks, time series or basic image data processing. Students will get hands-on experience in applications	s of selected metho	oas to real-world
examples in the Python pro		<u> </u>	
	elected Topics in Computer Networking	Z,ZK	5
	Computer Networks course (BI-PSI), obligatory for the program. Students will learn in detail principles, protocols, and tech	-	
	etworks up to Internet, with focus on switching, routing, security, and virtualization. The emphasis will be on gaining pract	-	th real network
devices in the lab and learn	ning important methods of local area and wide area networks from the viewpoint of functionality, performance, and securi	itV.	

BI-VWM.21	Searching the Web and Multimedia Databases	Z,ZK	5		
Students get basic overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storage of documents. In particular,					
students acquire inform	ation about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from	m web pages. The	ey get detailed		
knowledge of similarity s	earch in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web	search engines f	or the mentioned		
data types (documents)					
BI-ZRS.21	Basics of System Control	Z,ZK	5		
The course gives an inter	oduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will for	cus our attention	particularly on		
control of engineering a	nd physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, descript	ion methods of sy	stem models,		
basic linear dynamic sys	stems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of cr	eating a descripti	on of the system		
model, the basic linear	dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also give	n to sensors and	actuators in		
control loops, issues of	stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industr	ial implementatio	n of continuous		
and digital controllers a	nd PLC control.				
BI-ZSB.21	Basics of System Security	Z,ZK	5		
The goal of the course i	s to provide introduction to basic concepts in security of computer systems. Further, the course introduces the basics of fore	nsic analysis and	related topics		
such as malware analys	is or incident response. After finishing the course student will get both theoretical and practical knowledge in the area of mod	dern operating sys	stems security,		
as well as skills needed	as well as skills needed for independent work in the area of operating system security incident analysis.				
BI-ZUM.21	Artificial Intelligence Fundamentals	Z,ZK	5		
Basic course on introdu	ction to artificial intelligence with emphasis on symbolic techniques. The design of an intelligent agent and the techniques nee	eded to create it w	vill be discussed,		
especially at the decision	n-making level. The intelligent agent in the context of the course can be represented for example by a physical robot, but also	o by a non-physic	al entity, such		
as a virtual assistant or	a character in a computer game. We will not only introduce the basics, but also show the current state-of-the-art during the c	ourse.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
BI-3DT.1	3D Printing	KZ	4
BI-A2L	English language, preparation for the B2 level exam	Z	2
The content of the	course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achievement	- students are due	to: -Take ar
active part in the la	anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both	the midterm and the	e final term
tests with the succe	ss rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by inc	dividual teachers du	iring the firs
	class of the term.		
BI-AAG.21	Automata and Grammars	Z,ZK	5
Students are introdu	uced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite	automata, regular e	expressions
and regular gramma	ars, context-free grammars, construction and use of pushdown automata, and translation grammars and transducers. They know th	e hierarchy of forma	al language
and the	y understand the relationships between formal languages and automata. They are introduced to the Turing machine and complexity	classes P and NP.	
BI-ACM	Programming Practices 1	KZ	5
I	This course is presented in Czech.	1	1
BI-ACM2	Programming Practices 2	KZ	5
	This course is presented in Czech.	1	
BI-ACM3	Programming Practices 3	KZ	5
Britenio	This course is presented in Czech.	112	
BI-ACM4	Programming Practices 4	KZ	5
	This course is presented in Czech		
	This course is presented in Czech.	7.7%	5
BI-ADU.21	Unix Administration	Z,ZK	5
Students will learn th	Unix Administration he internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. The	y will understand the	e difference
Students will learn the between user and a	Unix Administration he internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. The Idministrator roles. They will get theoretical and practical knowledge of user management and administration, of users access rights	y will understand the	e difference: subsystems
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BI-ANGK	English language, contact preparation for the B2 level exam	Z	2
	course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achievement -		
-	anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both th ess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by indi		
tests with the succe	class of the term.	vidual teachers du	ing the mat
BI-APJ	Aplication Programming in Java	Z,ZK	4
2.7.0	This course is presented in Czech. Advanced technologies in Java.	_,	•
BI-APS.21	Architectures of Computer Systems	Z,ZK	5
	n the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec		en on the
pipelined instruction	n processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the princ	ciples of instruction	processing
-	processors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of		
program. The cours	e further elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory cohe	rence and consiste	ency in such
BI-ARD	systems. Interactive applications on Arduino	ΚZ	4
	ned for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple application		-
	ried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded s		-
not only on displa	y of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore	is suitable even for	Web and
	Software Engineering students.		
BI-ASB.21	Applied Network Security	Z,ZK	5
	rse is to introduce selected topics from computer networks in terms of cybersecurity. These topics extend the basic knowledge gaine		
security applicati	ons like the public key infrastructure, encrypted network protocols, link and network layer security or wireless networks. After finishing	g the course stude	nt will get
BI-AVI.21	knowledge of security applications in computer networks. Algorithms visually	Z,ZK	4
	ments other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer sc	,	-
-	ed in BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision.org&l		-
	that make understanding the principles of algorithms easy.		
BI-AWD.21	Web and Database Server Administration	Z,ZK	5
-	quainted with the administration of database and web servers and services. They will be able to install, configure, operate, test, and be		
	ice systems. The principles will be demonstrated on the PostgreSQL relational database engine and Apache will be used as an exam		
BI-BAP.21	Bachelor Thesis	Z	14
BI-BEK.21	Secure Code	Z,ZK	5
	arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fa gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		-
-	leges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing		
	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and th		
BI-BIG.21	DB Technologies for Big Data	KZ	5
	roduced into the field of Big Data processing where nonrelational (NoSQL) database engines are typically used today. The course is for		
	e students were able to choose suitable tools (mostly open source) and techniques, design and implement a simplest reproducible me		
collection, transform	nation/aggregation, presentation). Students get acquainted with various architectures for processing and storing big data. A theoretica of individual technologies will be supplemented with specific examples from practice.	al foundation and p	presentation
BI-BLE	Blender	Z,ZK	4
	ds knowledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those in	,	-
	iffers a complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graph	-	-
BI-BPR.21	Bachelor project	Z	1
	g of the semester, the student reserves the topic of the bachelor's thesis and connects with the supervisor. He / she will arrange the	partial tasks that he	e / she will
	semester to process the assignment. If he completes these tasks, the supervisor will award him a credit from the subject BI-BPR at the		
	enters the information on granting the credit using the form "Granting credit from the external supervisor of the final thesis" (http://fit.cvut		,
	signed form must be delivered in person or by email to the SZZ coordinator, who will arrange for the credit to be granted. 3. If the top		the student
	nulated more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuning the assig		assignment
	nulated more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuning the assig can be supplemented and approved at the end of the semester.		assignment
BI-CCN	can be supplemented and approved at the end of the semester.	nment so that the	
BI-CCN This is an introdu		nment so that the Z,ZK	5
This is an introdu	can be supplemented and approved at the end of the semester. Compiler Construction uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching	nment so that the Z,ZK of compilers for st	5 udents to
This is an introdu understa BI-CS1	can be supplemented and approved at the end of the semester. Compiler Construction actory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching Programming in C#	nment so that the Z,ZK of compilers for st theme of the class KZ	5 udents to s. 4
This is an introdu understa BI-CS1 The goal of the cou	can be supplemented and approved at the end of the semester. Compiler Construction actory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching Programming in C# arse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental compiler is to introduce and interval and an article and article	nment so that the Z,ZK of compilers for st theme of the class KZ onstruction, types c	5 udents to s. 4 of variables,
This is an introdu understa BI-CS1 The goal of the cou operators, arrays	can be supplemented and approved at the end of the semester. Compiler Construction uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching Programming in C# urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental cc s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class definitions	nment so that the Z,ZK of compilers for st theme of the class KZ onstruction, types c inition and class in	5 udents to s. 4 of variables, stancing,
This is an introdu understa BI-CS1 The goal of the cou operators, arrays	can be supplemented and approved at the end of the semester. Compiler Construction uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching Programming in C# urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental cc s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class defi ods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging	nment so that the Z,ZK of compilers for st theme of the class KZ onstruction, types c inition and class in	5 udents to s. 4 of variables, stancing,
This is an introdu understa BI-CS1 The goal of the cou operators, arrays constructors, meth	can be supplemented and approved at the end of the semester. Compiler Construction uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching Programming in C# urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental cc s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class defi ods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging well as work with files are emphasized.	nment so that the Z,ZK of compilers for st theme of the class KZ onstruction, types c inition and class in and exception pro	5 udents to s. 4 of variables, stancing, cessing, as
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processing, controlling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to special ways of storing data in relational databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of database systems, debugging and

	optimizing database applications, distributed database systems, data stores.		
BI-DML.21	Discrete Mathematics and Logic	Z,ZK	5
•	quainted with the basic concepts of propositional logic and predicate logic and learn to work with their laws. Necessary concepts from	•	•
Special attention is	paid to relations, their general properties, and their types, especially functional relations, equivalences, and partial orders. The cours	e also lays down th	ne basics of
	combinatorics and number theory, with emphasis on modular arithmetics.	7 71/	-
BI-EHA.21	Ethical Hacking purse is to introduce students to the field of penetration testing and ethical hacking. The course deals with cybersecurity threats, vuln	Z,ZK	5 r possiblo
-	puter networks, web applications, wireless networks, operating systems, and others like the Internet of Things or cloud. The focus is		
exploitation in com	vulnerabilities testing and the following process of penetration test documentation.		
BI-EJA	Enterprise Java	Z,ZK	4
1	dvanced technologies in the Java programming language. The focus is on technologies for development of enterprise information system	,	-
	a database and are accessed through the web interface.		
BI-EJK	Enterprise Java and Kotlin	Z,ZK	4
The course is on ac	lvanced technologies in the Java and Kotlin programming languages. The focus is on technologies for developing enterprise informat	ion systems with m	nicroservice
	architecture, that can be deployed to the cloud.		
BI-EP1.24	Effective programming 1	KZ	4
	The course is taught in Czech.		
BI-EP2	Efficient Programming 2	KZ	4
Continuation of Eff	icient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi- with the aim to choose the best one and avoid implementation errors.	dual problems are	discussed,
		7 71/	
BI-EPP.21	Economic Business Processes se is to present typical processes related to the usual life cycle of a company. The course focuses mainly on the basic economic and	Z,ZK	5 of business
	onment of the Czech Republic and the basics of management. In the course, students are acquainted with the typical phases of the		
	e company, through the management of property and capital structure, financing of the company, determining the cost function of the		
	evaluating the financial health of the company and its eventual rehabilitation or termination.	. ,	
BI-FBI.21	Financial Business Intelligence	Z,ZK	5
The aim of the cour	se is to acquaint students primarily with financial accounting as a tool for recording business operations and documents for business	analysis, determini	ng its value
and other indicators	s for comparison with other companies and management decision process at the tactical and strategic level. The second view is man	agement accountir	ng as a tool
•	ement and prediction of business development. Management accounting allows monitoring of the financial status and performance of t		
	Is, enables a multidimensional view of business data, enables to control effectively factors affecting the return on invested capital and		
assess options rel	ated to future business decisions. The principles of management accounting, described in this course, are the basis of Business Inte information systems, decision support systems, and other knowledge-oriented systems.	lligence modules in	1 DUSINESS
BI-FEM.21	Fundamentals of Economics	Z.ZK	5
1	the students to discover basics of economic theory, which will then be used in subsequent courses of economics and management.	, ,	-
	of fundamental microeconomic and macroeconomic topics.	it containe a gener	
BI-FMU	Financial and Management Accounting	7 71/	
		Z.ZN	5
The aim of the cour	se is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pa	Z,ZK rticular accounting	5 operations,
		rticular accounting	operations,
operations in accou	se is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pain Ints and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification ations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manager	rticular accounting n of bookkeeping,	operations, description
operations in account of economic operations	se is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the par unts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modificatio ations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manager Business Intelligence moduls in Business information systems.	rticular accounting n of bookkeeping, ment accounting ar	operations, description re base of
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BI-IOT.21	Internet of Things	Z,ZK	5
	s on an overview of technologies and development tools used in the field of the Internet of Things (IoT). Lectures are devoted to an over		
	ication technologies designed primarily for this area, and appropriate programming methods. They include an overview of IoT architec computer labs, students will gain practical experience with developing simple IoT systems using common development environments		
	software - Arduino, Raspberry Pi OS).	(naraware 7 main,	LOI, OTIN,
BI-JPO.21	Computer Units	Z,ZK	5
	their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail v		1
	nputer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using approp		
of multiplication. The	ne organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, including	g codes for error d	etection and
correction for para	llel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of comm	unication of the pro	ocessor with
the environment a	nd the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational micropro	ogrammed process	sor simulator
	and programmable hardware design kits (FPGA).		
BI-KAB.21	Cryptography and Security	Z,ZK	5
	derstand the mathematical foundations of cryptography and gain an overview of current cryptographic algorithms. They will be able to		-
-	ems based on them and learn the basics of safe use of symmetric and asymmetric cryptographic systems and hash functions in app ractical skills in using standard cryptographic methods with an emphasis on security and will also get acquainted with the basic proce		
BI-KOM.21	Conceptual Modelling	Z,ZK	5
	used on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te	· · ·	1
	ecify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struc		-
notation. Next, the	y learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent	tation in the Interne	et. They also
learn the foundation	ns of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO r	nethod and the BP	MN notation
	ill be taught. The course is designed with the respect to continuation in software implementations. Recommended optional follow-up c	ourse: BI-ZPI.	
BI-KOT	Programing in Kotlin	Z,ZK	4
	n, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advar		
The language is f	ully Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a lost but pet lost. Ketlin is suitable for designing of DSLs (Demoin Specific Leagueges)		nctional way
BI-KSA	with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages) Cultural and Social Anthropology	ZK	2
	currur and Social Antimopology		1
	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, healt		•
	shown. The course is presented in Czech.	.,,	
BI-LA1.21	Linear Algebra 1	Z,ZK	5
	students to the basic concepts of linear algebra, such as vectors, matrices, vector spaces. We will define vector spaces over the field		-
and also over finite	e fields. We will present the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian elimination of the Gaussian elimination eliminatio	ation method (GE	M) and show
the connection v	vith linear manifolds. We define the regularity of matrices and learn to find their inversions using GEM. We will also learn to find eigen	values and eigenve	ectors of a
	matrix. We will also demonstrate some applications of these concepts in computer science.		1
BI-LA2.21	Linear Algebra 2	Z,ZK	5
			-
	p edm tu rozší í znalosti z p edm tu BI-LA1, kde se pracovalo pouze s vektory ve form n-tic ísel. Zde si zavedeme vektorový pros	stor v abstraktní ob	ecné form .
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variance, and know the fundamentals of assessing model quality. Moreover, they learn the basic techniques of data preprocessing and multidimensional data visualization. In practical demonstrations, pandas and scikit libraries in Python will be used.

BI-ML2.21	demonstrations, pandas and scikit libraries in Python will be used.		
	Machine Learning 2	Z,ZK	5
-	purse is to introduce students to the selected advanced methods of machine learning. In the supervised learning scenario, they, in particularly in the supervised learning scenario, they, in particularly in the supervised learning scenario.		
and neural networl	ks. In the unsupervised learning scenario students learn the principal component analysis and other dimensionality reduction method basic principles of reinforcement learning and natural language processing.	ls. Moreover, stude	nts get the
BI-MMP	Multimedia team project	KZ	4
	This course is presented in Czech.		-
BI-MPP.21	Methods of interfacing peripheral devices	Z,ZK	5
	ed on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universa		
includes both PC s	ide and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices.	3 devices, Linux an	d Windows
BI-MVT.21	Modern Visualisation Technologies	Z,ZK	5
	urse is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augm		
-	lays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentione	-	
	and procedural visualization, scientific data visualization, and 3D model scanning.		
BI-OOP.21	Object-Oriented Programming	Z,ZK	5
	rogramming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together		-
course students ge	t acquainted with the main principles of object-oriented programming and design, used in modern programming languages. The emph for developing software, which includes testing, error handing, refactoring, and application of design pattern.	asis is on practical	techniques
BI-OPT	Introduction to Optical Networks	Z,ZK	4
	overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on possi	· · ·	
-	technology and on their solutions. The course will include the history of optical communications, an overview of passive components	-	
	sators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission system	,	
•	e topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such as		
ultrastable freque	ncy transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters. from practice.	Students will solve	real tasks
BI-ORL	Operations Research and Linear Programming	KZ	5
	p introduce students to the issues of operational research and primarily to the practical application of linear programming as a fundar		
-	nal research primarily focuses on the use of engineering methods (with a mathematical background) to solve practical problems (suc	-	-
BI-OSY.21	Operating Systems	Z,ZK	5
	a follow-up of the Unix-like operating systems course students deepen their knowledge in areas of OS kernels, process and thread imp		
critical regions, thre	ead scheduling, shared resource allocation and deadlocks, management of virtual memory and data storages, file systems, OS monit	o ,	e to design
	and implement simple multithreaded applications. General principles are illustrated on operating systems Solaris, Linux, or MS W		7
BI-PA1.21	Programming and Algorithmics 1 ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, struc	Z,ZK	7
-	ons, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searchi		
,,	with linked lists and trees.		
BI-PA2.21	Programming and Algorithmics 2	Z,ZK	7
		<u>∠,∠r</u>	7
	instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, que	eue, enlargeable ari	ay, list, set,
	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e	eue, enlargeable ari	ay, list, set,
table). They lear	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism).	eue, enlargeable an e.g., template progr	ay, list, set, amming,
table). They learn	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism). Law and Informatics	eue, enlargeable an e.g., template progr ZK	ay, list, set, amming, 5
table). They learn BI-PAI.21 The aim of the co	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism). Law and Informatics urse is to introduce students into the basic legal instruments that they will encounter in their practice. Students will gain knowledge of	eue, enlargeable an e.g., template progr ZK doing business in	ay, list, set, amming, 5 the Czech
table). They learn BI-PAI.21 The aim of the con Republic and wi	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism). Law and Informatics	ue, enlargeable an e.g., template progr ZK doing business in portracts in real and	ay, list, set, amming, 5 the Czech Internet
table). They learn BI-PAI.21 The aim of the con Republic and wi environment, will k	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism). Law and Informatics urse is to introduce students into the basic legal instruments that they will encounter in their practice. Students will gain knowledge of Il be alerted to the pitfalls that await them in business from the point of view of law. They will understand the process of concluding co	ue, enlargeable an a.g., template progr ZK doing business in pntracts in real and use commercial lic	ay, list, set, amming, 5 the Czech Internet ense types
table). They learn BI-PAI.21 The aim of the cou Republic and wi environment, will k and open-source li	n these skills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e copying/moving of objects, operator overloading, inheritance, polymorphism). Law and Informatics urse is to introduce students into the basic legal instruments that they will encounter in their practice. Students will gain knowledge of ill be alerted to the pitfalls that await them in business from the point of view of law. They will understand the process of concluding con now their responsibilities in working with the Internet, will be familiar with the institutes of intellectual property law, and will be able to	ue, enlargeable an a.g., template progr ZK doing business in pntracts in real and use commercial lic against their misuse	ay, list, set, amming, 5 the Czech Internet ense types b. Students
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Genet charts, rescurse schedule, resource balance, network graphs) and reaction of project documentation. The course is designed specially for students who are interested in despecting their knowledge outside IT. Considers starting their own company, or yhne anablacts to work in middle or starting companyies. The course is also suitable for all those who will develop software or hardware in the form of team projects. KZ 5 The students will be introduced to methods of applied statatics. They will learn how to work with various types of data, perform analyses, and/sois of warking schedules. Students will learn to use the statistical software R and will apply the studed methods on data from rear problem. KZ 4 BL-PS2 Programming in shell 2 ZZK 4 Students will be introduced to methods of applied statation. The optimal problem is the statation of an approximation method provide in the statation of an approximation method provide in the statation of the provide reaction applies of ompanying and demonstrate the provide reaction is performed analysis. The state schedules in the state schedules in the principles of ompanying and demonstrate the abilities of advanced releases will be schedule applies and analysis. The outcome state schedules in the schedule is the environment of the operating systems Linux and Ciaco Distribution applies and analysis and will get the environment of the operating systems in the applies of applies of applies of applies appli				
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This course introduces students to the fundamentals of testing and quality management. Students will learn what the role of a tester is in the context of different types of software development and will experience hands-on application testing using both manual and automated testing. At the end of the semester, the student should be prepared to perform a test analysis, design a set of test scenarios, prepare test data, automate an appropriate portion of the scenarios, and prepare a report on the bugs found in the product under test. BI-SAP.21 Computer Structure and Architecture Z,ZK 5 Students will get acquainted with the basic architecture and units of a digital computer, understand the structure, function, and implementation of arithmetic-logic unit, controllers, memory, I/O communication, methods of data transfers between the units. The logic design and the implementation of a program-controlled simple processor is practically implemented in the labs using programmable circuits (FPGA), a single-chip microcomputer, and modern design (EDA) tools. Z 4 The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. BI-SCE2 Computer Engineering Seminar I Z 4 The Seminar of Computer En	BI-QUA		K7	4
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programming language environment.	-		-	-
		programming language environment.		

BI-SKJ.21	Scripting Languages	Z,ZK	4
Students gain a g	eneral overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In additi into shell and some other particular scripting languages and will get practical experience with shell script programming.	ion, they gain a de	eper insight
BI-SOJ	Machine Oriented Languages	Z,ZK	4
Students of the co	urse will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal us	se of microprocess	
and efficient coope	eration of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view li	nked to higher leve	el languages.
	This knowledge will be used during reverse engineering, optimization, and evaluation of code security.	1/7	
BI-SP1.21 Students gain h	Team Software Project 1 nands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in th	e BIE-SWI course	5
-	hat teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teach		
-	ularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software art		
	and finished in the BIE-SP2 course.	1	1
BI-SP2.21	Team Software Project 2	KZ	5
-	ds-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result follow-up, the functionality, testing, and documentation of the software system being developed will be emphasized. Students will work		
	er, in the role of the team and project leader, regularly consults with the team (at the seminars) the formal as well as material aspects		
BI-SPS.21	Administration of Computer Networks and Services	Z,ZK	5
	rse is to deepen the theoretical knowledge of network technologies and protocols in the environment of network servers administrate		
Linux and Windows	s. The course syllabus requires the knowledge at the level of courses BIE-PSI, BIE-VPS, and BIE-OSY. Practical skills will be gained by	practical hands-or	n experience
	with real network infrastructure. Language SQL, advanced	KZ	4
BI-SQL.1 Module is based or	h knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In pa	1	
	queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point		-
structures like inc	lexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan ar	nd possibilities of it	ts. changes
will be discusse	ed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS.	acle DBMS and pa	artially on
BI-SRC.21	PostgreSQL.	Z,ZK	5
	Real-time systems he basic knowledge in the real-time (RT) system theory and in the design methods for RT systems including the dependability issues		
	perimentally verified in computer labs. The course is mainly focused on embedded RT systems, therefore the design kits in the lab ar		0
	course.		
BI-ST1	Network Technology 1	Z	3
The subject is o	riented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	d under the Cisco	Netacad -
BI-ST2	CCNA1 - R&S Introduction to Networks.	7	2
DI-312	Network Technology 2 This course is presented in Czech.	Z	3
BI-ST3	Network Technology 3	7	2
		Z	3
	er enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during E	BI-ST1 and BI-ST2	courses will
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BI-TIS.21 Information Systems	Z,ZK	5
The goal of this course is to familiarise students with the information systems topic and information systems implementation principles. During the course		
"on the market" existing types of systems and their usage in specific industry segments. Students are familiarised with the CRM, ERP, MRP and other t		-
The fundamental part of the course is the introduction to key ideas of an information system selection, evaluation of information system benefits, wa	-	-
implementation and information system implementation based on the project management principles. The emphasis is on the initial customer analysis,	•	
decide whether it is better to implement any existing information system or to develop a new one from scratch. These factors determine the information sy	•	
At the end of the course information systems security, operation, support, maintenance, legislation impacts, and government information systems	-	
BI-TJV.21 Java Technology	Z,ZK	5
The goal is to provide knowledge and skills for developing information systems and applications through concepts used in software development and exp	erience with librarie	es and tools
from Java language ecosystem. At the course end, the students are able to develop software systems in Java platform.	7 71/	
BI-TPS.21 Computer Networks Technologies	Z,ZK	5
The course introduces students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physica link layer. The lectures provide theoretical foundations of these technologies and explain relevant physical principles. In the labs, the respective technologies are explain relevant physical principles.	-	
with the most important ones students will get hands-on experience. Thematically, the course covers both local and long-range optical networks, Ethern	-	
always with focus on high-speed networks.	et, modern wireles.	s networks,
BI-TS1 Theoretical Seminar I	7	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	- 1	
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a v		
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS2 Theoretical Seminar II	7	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	- 1	
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a		
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS3 Theoretical Seminar III	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	al reading group. Tl	he students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a v	work with scientific	papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS4 Theoretical Seminar IV	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	al reading group. T	he students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a w	work with scientific	papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TUR.21 User Interface Design	Z,ZK	5
Students gain a basic overview of methods for designing and testing common user interfaces. They get experience to solve the problems where software	are and other produ	icts do not
	an overview of m	ethods that
communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain		
communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain bring users into the development process to ensure optimal interface for them.		
BI-TWA.21 Design of Web Applications	Z,ZK	5
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BI-VHS	Virtual game worlds	ZK	4
The course leads stud	dents to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current stud	lents knowledge is fu	urthermore
complemented by th	ne theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world. T		ollowed by
	the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devi	· · · · ·	
BI-VIZ.21	Data Visualization	KZ	5
	overview of the types and characteristics of data as well as suitable visualization methods. This will aid the students in understandi	0,	
	s such as data mining and machine learning. Within the course, students will be introduced to exploratory data analysis, preproces		-
different kinds of data	a such as text, social networks, time series or basic image data processing. Students will get hands-on experience in applications of	selected methods to	real-world
	examples in the Python programming language.		
BI-VMM	Selected Mathematical Methods	Z,ZK	4
•	with an introduction to the analysis of complex functions of a complex variable. Next, we present the Lebesgue integral. We then ad		
	we introduce and study the properties of the Discrete Fourier Transform (DFT) and its fast implementation (FFT). We discuss the w Inear programming problem in more detail and its solution using the Simplex algorithm. Each topic is demonstrated with interesting		e examine
			F
BI-VPS.21	Selected Topics in Computer Networking on the Computer Networks course (BI-PSI), obligatory for the program. Students will learn in detail principles, protocols, and technology	Z,ZK	5
	area networks up to Internet, with focus on switching, routing, security, and virtualization. The emphasis will be on gaining practica	•	
	es in the lab and learning important methods of local area and wide area networks from the viewpoint of functionality, performance	-	
BI-VR1	Virtual reality I	KZ	4
1	I Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of	1 1	-
	on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves cor		
	and shared social activities.		
BI-VR2	Virtual reality II	KZ	3
1 1	ourse Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The obje	1 1	-
	for computer science and gamification in various social metaverse and desktop engines.		
BI-VWM.21	Searching the Web and Multimedia Databases	Z,ZK	5
1	overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storag	1 · · · · ·	-
students acquire inf	ormation about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from	web pages. They ge	et detailed
knowledge of similari	ty search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web se	arch engines for the	mentioned
	data types (documents).		
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
-	system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of		
	bot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion cont	-	
interfaces, robot navi	igation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get p	ractical experience	with these
	technologies.		-
BI-ZNF	PHP Framework Nette - basics	KZ	3
Students will gain the	basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech po	pular framework. Th	ne resulting
	knowledge should serve for the efficient creation of a web backend in PHP language.	1/7	4
BI-ZPI	Process engineering ndamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of p		4 nd they will
	sed notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of bus	•	-
	of process engineering for information systems development is discussed as well as its importance in the overall context of inform		
	an enterprise.		
BI-ZRS	Basics of System Control	Z,ZK	4
1	n introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focu		
control of engineering	ng and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, descriptio	n methods of system	n models,
basic linear dynamic	systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creat	ing a description of t	the system
	near dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also giver		
control loops, issues	of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial	implementation of c	continuous
	and digital controllers and PLC control.		
BI-ZRS.21	Basics of System Control	Z,ZK	5
-	n introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focu	-	-
-	ng and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, descriptio		
-	systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creat near dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also giver		-
	s of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial		
	and digital controllers and PLC control.		Jonanaous
BI-ZS10	Bachelor internship abroad for 10 credits	Z	10
	nce within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re	1 1	
	of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.		
	ourses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits cor		
employment with a fo	reign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided in	two subjects if the	e internship
	exceeds the academic year's dead-line.		
BI-ZS20	Bachelor internship abroad for 20 credits	Z	20
	nce within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re		
	of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.		
	courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits cor		
employment with a fo	preign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided in	o two subjects if the	e internship
1			
	exceeds the academic year's dead-line.		
BI-ZS30	Bachelor internship abroad for 30 credits	Z	30
Each student can o	Bachelor internship abroad for 30 credits nce within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re	esearch institution. B	sefore the
Each student can o internship the Dean	Bachelor internship abroad for 30 credits	esearch institution. B	Before the tent of the

employment with a	a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided int	o two subjects if the	e internship
DI 70D 01	exceeds the academic year's dead-line.	7.71	
BI-ZSB.21	Basics of System Security ourse is to provide introduction to basic concepts in security of computer systems. Further, the course introduces the basics of forens	Z,ZK	5 ted topics
-	analysis or incident response. After finishing the course student will get both theoretical and practical knowledge in the area of moder	-	-
	as well as skills needed for independent work in the area of operating system security incident analysis.		, , ,
BI-ZUM.21	Artificial Intelligence Fundamentals	Z,ZK	5
Basic course on ir	troduction to artificial intelligence with emphasis on symbolic techniques. The design of an intelligent agent and the techniques needed	to create it will be	discussed,
especially at the	decision-making level. The intelligent agent in the context of the course can be represented for example by a physical robot, but also be	y a non-physical e	ntity, such
	virtual assistant or a character in a computer game. We will not only introduce the basics, but also show the current state-of-the-art di	uring the course.	
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
	This course is presented in Czech.		
BIE-CSI	Introduction to Computer Science	Z	2
	tory class on Elementary Computer Science for broad audiences: bachelor students in computer science, students majoring in other file		-
-	iool students, anybody with a background in basic math and the desire to understand the absolute basics of computer science. The go		
	principles of computer science for students to understand, early on, what computer science is, why things such as high-level program		
	y are, and even how, on a basic yet representative and practically relevant level. After taking the class, students are able to answer no questions about themselves such as which courses to take next and which books to follow up with, ideally realizing if they are interest	, ,	
	than expected, or even less than before.		
BIE-DIF	Differential equations	Z,ZK	5
	es a foundational overview of differential equations, starting with basic motivation and examples of ODEs and progressing to essential so	· · ·	
	theorems on existence and uniqueness establish when solutions can be guaranteed. Linear and system-based ODEs are covered with		•
	ysis, followed by examples of non-linear models such as predator-prey and epidemiological models to showcase real-world application		
partial differentia	I equations (PDEs) extends these concepts to multi-variable contexts. The course will also cover numerical methods for solving ODEs	and PDEs, includi	ng implicit
	and explicit Euler methods, Runge-Kutta methods, and finite element methods for both ODEs and PDEs.		
BIE-EEC	English language external certificate	Z	4
The BIE-ECC cou	rse can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in Engli	sh comparable to o	rexceeding
	the B2 level of the Common European Framework of Reference for Languages.		
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh a	and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a	ble to apply them i	n particular
	examples.	_	
BIE-SEG	Systems Engineering	Z	0
	tory class on systems engineering for bachelor students in computer science. The goal of the class is to introduce basic principles of a cessor and memory virtualization. Seeing and actually understanding virtualization is the overarching theme of the class. After taking		
•	difference between processes and threads as well as emulation and virtualization, what virtual memory is and how it works, what cor		
	parallelism, and how processes and threads synchronize efficiently to overcome concurrency for communication.		
BIE-ZUM	Artificial Intelligence Fundamentals	Z.ZK	4
-	duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classic	, ,	-
space search, mu	ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm	s and the neural ne	tworks, will
	be presented as well.		
NI-AFP	Applied Functional Programming	KZ	5
	sented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional p		-
the rise nowaday	s and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, master	ing this paradigm b	ecomes a
	necessary competence of a software engineer: the theory and especially the practice.	1/7	
NI-DDM	Distributed Data Mining	KZ	4
	n state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands o ramework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations a	-	-
data processing i	approaches to parallelize other algorithms. The course is prezented in czech language.	nd will be capable	to propose
NI-DSP	Database Systems in Practes	Z,ZK	4
	This course is presented in Czech.	2,21	-
NI-DZO	Digital Image Processing	Z,ZK	4
	ents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical alg		
	e an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is also		-
of digital image	processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDR	compression, de-b	lurring in
frequency domain	, abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray conv	ersion context enh	ancement,
			matting.
NI-IAM	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ac		
	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ad Internet and Multimedia	lding depth, alpha	4
	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, an Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq	Iding depth, alpha Z,ZK uisition of AV signa	ls (input),
presentation of AV	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ad Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios	ls (input), of real-time
presentation of AV audiovisual trans	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ad Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u missions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effective	ding depth, alpha Z,ZK uisition of AV signa se case scenarios act of various comp	ls (input), of real-time onents on
presentation of AV audiovisual trans	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, as Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical umissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe	ding depth, alpha Z,ZK uisition of AV signa se case scenarios act of various comp	ls (input), of real-time onents on
presentation of AV audiovisual trans the quality and late	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, as Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical umissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the efficiency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the for audience.	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios ect of various comp e scene up to the p	ls (input), of real-time oonents on resentation
presentation of AV audiovisual trans the quality and late NI-LSM	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, as Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical umissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios ect of various comp e scene up to the p KZ	ls (input), of real-time conents on resentation 5
presentation of AV audiovisual trans the quality and late NI-LSM The subject is on	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, an Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u missions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe ency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording th for audience. Statistical Modelling Lab	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios ect of various comp e scene up to the p KZ ut on the effective	ls (input), of real-time onents on resentation 5 use of the
presentation of AV audiovisual trans the quality and late NI-LSM The subject is on	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ar Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u missions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe ency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording th for audience. Statistical Modelling Lab iented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is p	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios ect of various comp e scene up to the p KZ ut on the effective d analyses of their	ls (input), of real-time onents on resentation 5 use of the
presentation of AV audiovisual trans the quality and late NI-LSM The subject is on	igid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, an Internet and Multimedia se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical unissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the efferency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the for audience. Statistical Modelling Lab iented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is prior and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms, and the semester is focused on the design of methods and algorithms and the semester is focused on the design of methods and algorithms and th	Iding depth, alpha Z,ZK uisition of AV signa se case scenarios ect of various comp e scene up to the p KZ ut on the effective d analyses of their	ls (input), of real-time onents on resentation 5 use of the
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NI-MPL	Managerial Psychology	ZK	2
NI-MSI	Mathematical Structures in Computer Science	Z,ZK	4
Mathematical se	mantics of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Scott	t model of lambda	calculus.
	Introduction to category theory.		
NI-OLI	Linux Drivers	Z,ZK	4
The Linux operating	system is an important operating system for personal computer and also for embedded systems. Systems on chip and combining po	werful processors	and FPGAs
	ability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development		lents. The
	urse provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practical	al experience.	
NI-PDD	Data Preprocessing	Z,ZK	5
	repare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various data s		•
time series, etc., a	and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characteris	tics from images o	r from web
	pages.		
NI-PSD	Public Services Design	KZ	4
	oduce students to specifics of UX, Service design and development for public sector. We will look into the design and development p	•	
suppliers (devs a	nd designesr) as well as clients. In small teams students will work on projects from partner organizations and will try out collaboration Course is aimed at students-designers as well as clients.	n with client repres	entatives.
NI-PSL		Z,ZK	4
	Programming in Scala uces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language feature	· ·	-
	brary. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks and		-
	Scalaz, etc.	instance e.g.t lay,	ouccurrara,
NI-REV	Reverse Engineering	Z,ZK	5
	equainted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens before	· ·	-
-	will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dedicated and how they interact with 3rd party libraries.		
applications writ	ten in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be de	edicated to debugg	gers: how
debuggers and de	bugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the computer	malware scene. T	he focus of
	the course is on the seminars, where students will solve practically oriented tasks from the real world.		
NI-SYP	Parsing and Compilers	Z,ZK	5
The module builds u	upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va	arious variants and	applications
	of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing.		
NI-TSP	Testing and Reliability	Z,ZK	5
-	knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre		
the intuitive path se	ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu	ilt-in-self-test equip	oment. They
	will be able to compute, analyze, and control the reliability and availability of the designed circuits.	7 71/	-
NI-VCC	Virtualization and Cloud Computing	Z,ZK	5
-	n knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and rtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficie	-	
	rameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effecti		
	nplex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills in		
	and development tools (Continuous integration and development).		
NI-VYC	Computability	Z,ZK	4
	Classical theory of recursive functions and effective computability.	_,	I -
TV1	Physical Education	Z	0
TV2	Physical Education		0
TV2K1	Physical Education 2	Z Z	1
TVK1	Physical Education 2	Z	1
TVKI	· · · · · · · · · · · · · · · · · · ·	Z	
	Physical Education Course		0
	Physical Education Course	Z	0
TVV	Physical education	Z	0
TVV0	Physical education	Z	0

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-11-21, time 12:46.