### Study plan

# Name of study plan: Bachelor branch Web and Software Engineering, spec. Computer Graphics, in Czech, 2015-2020

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Informatics, valid until 2024 Type of study: Bachelor full-time Required credits: 158 Elective courses credits: 22 Sum of credits in the plan: 180 Note on the plan: Tato verze studijního plánu je ur ena pro ro níky, které byl p ijaty ke studiu od akademického roku 2015/2016 do prezen ní formy studia bakalá ského programu.

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 116 The role of the block: PP

Code of the group: BI-PP.2015

Name of the group: Compulsory Courses of Bachelor Study Program Informatics, Presented in Czech, Version 2015

Requirement credits in the group: In this group you have to gain 116 credits

Requirement courses in the group: In this group you have to complete 20 courses

Credits in the group: 116

Note on the group:

Povinný předmět BI-SI1 se studentům bez oboru nezapisuje automaticky. Zapíší si jej individuálně podle pokynů z katedry Softwarového inženýrství.

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-AG1	Algorithms and Graphs 1 Dušan Knop	Z,ZK	6	2P+2C	Z	PP
BI-AAG	Automata and Grammars Jan Janoušek	Z,ZK	6	2P+2C	Z	PP
BI-BAP	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BI-BPR	<b>Bachelor project</b> Zden k Muziká <b>Zden k Muziká</b> Zden k Muziká (Gar.)	Z	2		Z,L	PP
BI-BEZ	Security Ji í Dostál	Z,ZK	6	2P+2C	L	PP
BI-CAO	Digital and Analog Circuits Martin Kohlík	Z,ZK	5	2P+2C	Z	PP
BI-DBS	Database Systems <i>Ji í Hunka</i>	Z,ZK	6	2P+2R+1L	Z,L	PP
BI-DPR	Document., Presentation, Rhetorics Alena Libánská, Ond ej Guth, Petra Pavlí ková, Dana Vynikarová Ond ej Guth Dana Vynikarová (Gar.)	KZ	4	2P+2C	Z,L	PP
BI-LIN	Linear Algebra Daniel Dombek Daniel Dombek (Gar.)	Z,ZK	7	4P+2C	L	PP
BI-MLO	Mathematical Logic Kate ina Trlifajová Kate ina Trlifajová Kate ina Trlifajová (Gar.)	Z,ZK	5	2P+1C	Z	PP
BI-OSY	Operating Systems Ladislav Vagner	Z,ZK	5	2P+1R+1L	. L	PP
BI-PSI	Computer Networks Jan Fesl	Z,ZK	5	2P+1R+1C	; L	PP
BI-PST	Probability and Statistics Petr Novák	Z,ZK	5	2P+1R+1C	Z	PP
BI-PA1	Programming and Algorithmics 1 <i>Ladislav Vagner</i>	Z,ZK	6	2P+2R+2C	Z	PP

BI-PA2	Programming and Algorithmics 2 Ladislav Vagner	Z,ZK	7	2P+1R+2C	L	PP
BI-PS1	Programming in Shell 1 Zden k Muziká	КZ	5	2P+2C	Z	PP
BI-SI1.2	Software Engineering I Ji f Meinek. Zden k Rybola Zden k Rybola Ji f Mleinek (Gar.)	Z,ZK	5	2P+1C	Z,L	PP
BI-SAP	Computer Structure and Architecture Hana Kubátová	Z,ZK	6	2P+1R+2C	L	PP
BI-ZDM	Elements of Discrete Mathematics Ji ina Scholtzová, Jan Legerský <b>Ji ina Scholtzová</b> Josef Kolá (Gar.)	Z,ZK	5	2P+2C	Z	PP
BI-ZMA	Elements of Calculus Ivo Petr Ivo Petr Tomáš Kalvoda (Gar.)	Z,ZK	6	3P+2C	Z	PP
Characteristics of t	the courses of this group of Study Plan: Code=BI-PP.2015 Name=	Compulsorv	Course	s of Bach	elor Stud	dv Program
Informatics, Presen	nted in Czech, Version 2015	,				
BI-AG1	Algorithms and Graphs 1			Z	,ZK	6
The course covers the ba	asics of efficient algorithm design, data structures, and graph theory, belonging to the core	knowledge of ev	ery compu	ting curriculu	n. It links ar	id partially
develops the knowledge f	from the course BI-DML.21, in which students acquire the knowledge and skills in combin	in particular the	/ for evalua	ting the time	and space o	complexity of
	Automata and Grammars	, in particular, the	asymptotic	7 101211011.	7K	6
Students are introduced to	Record and Grammars	and mutual trans	formations	of finite auto	,∠r∖   mata requi	U ar expressions
and regular grammars, tra	anslation finite automata, construction and use of pushdown automata, hierarchy of formal	languages. Relat	ionships be	etween formal	languages	and automata.
Knowledge acquired throu	ugh the module is applicable in designs of algorithms for searching in text, data compress	sion, simple parsi	ng and tran	slation, and o	lesign of dig	ital circuits.
BI-BAP	Bachelor Thesis		-		Z	14
BI-BPR	Bachelor project				7	2
BI-BE7	Security			7	2 7K	6
Students understand the n	nathematical fundamentals of cryptography and have an overview of current cryptographic al	gorithms and app	lications: sv	mmetric and a	svmmetric (	crvptosystems.
and hash functions. They	also learn the fundamentals of secure programming and IT security, the fundamentals of	designing and us	ing moder	n cryptosyste	ms for comp	outer systems.
They are able to use prop	perly and securely cryptographic primitives and systems that are based on these primitive	s.	0	,, ,		,
BI-CAO [	Digital and Analog Circuits			Z	,ZK	5
Students get the fundame	ental understanding of technologies underlying electronic digital systems. They understan	d the basic theore	etical mode	ls and princip	les of functi	onality of
transistors, gates, circuits	s, and conductors. They are able to design simple circuits and evaluate circuit parameters.	They understand	the differe	nces betweer	analog and	l digital modes
of electronic devices.						
BI-DBS	Database Systems			Z	,ZK	6
Students are introduced t	to the database engine architecture and typical user roles. They are briefly introduced to v	arious database	models. Th	ey learn to de	sign small o	latabases
(including integrity constra	aints) using a conceptual model and implement them in a relational database engine. The	y get a hands-on	experience	with the SQL	language,	as well as with
its theoretical foundation -	the relational database model. I hey learn the principles of normalizing a relational databas	e schema. They u	Inderstand	the fundamer	tal concepts	s of transaction
in relational databases wi	atalier user access to a single data source, as well as recovering a database engine non-	a lailuite. They are	ministration	oduceu io sp of database	svetems de	abugging and
optimizing database appli	ications, distributed database systems, data stores.		liniotration		oyotomo, at	bagging and
BI-DPR	Document Presentation Rhetorics				<b>۲</b>	4
This subject is aimed to the	e professional communication and writing of the scientific texts (bachelor's and diploma thes	sis). Students will l	earn to crea	ate and prepa	e interactive	presentations
and presenting before an	audience. Students will also learn to write technical reports and scientific texts.					
BI-LIN I	Linear Algebra			Z	,ZK	7
The course is taught in Ca	zech. Students understand the theoretical foundation of algebra and mathematical princip	les of linear mode	els of syste	ms around us	, where the	dependencies
among components are o	only linear. They know the basic methods for operating with matrices and linear spaces. Th	ey are able to per	form matrix	operations a	nd solve sy	stems of linear
equations. They can apply	y these mathematical principles to solving problems in 2D or 3D analytic geometry. They	understand the er	ror-detecti	ng and error-o	correcting co	odes.
BI-MLO	Mathematical Logic			Z	,ZK	5
The course seminary is ta	aught in Czech.				71/	
BI-OSY	Operating Systems		· 0/ #	_	,ZK	5
Students understand the	classical theory of operating systems (US) in addition to the knowledge gained in the mo	ling resource all	ig in Shell	Iney get a	Solid Knowl	eage of US
management of virtual me	emory principles and architectures of disks. RAID and file systems They are able to desi	an and implemen	t simple mi	Itithreaded a	oplications	
BI-PSI (	Computer Networks	<u></u>		7	7K	5
Students understand the	basic common techniques, protocols, technologies, and algorithms necessary to commun	nicate in compute	r networks.	The topics ar	e primarily f	ocused on the
2nd to 4th layer of the ISC	2nd to 4th laver of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students will be able to write a simple					
network application and configure a simple network.						
BI-PST F	Probability and Statistics			Z	,ZK	5
The students will learn the	e basics of probabilistic thinking, the ability to synthesize prior and posterior information a	nd learn to work	with randor	n variables. T	ney will be a	ble to to apply
basic models of random variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction they will be able to perform						
estimations of unknown d	estimations of unknown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the statistical dependence of two or					
more random variables.						
BI-PA1   Programming and Algorithmics 1   Z,ZK   6						<u> </u>
students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions,						6
statements gain the ability t	Programming and Algorithmics 1 to formulate algorithms for solving basic problems and write them in the C language. They	understand data	types (sim	ple, structure	,ZK	6 expressions,
Students gain the ability to statements, functions, cor	Programming and Algorithmics 1 to formulate algorithms for solving basic problems and write them in the C language. They ncept of recursion. They learn to analyse simple cases of algorithm complexity. They know	v understand data v fundamental alg	types (sim orithms for	ple, structure searching, s	,ZK d, pointers), orting, and r	6 , expressions, manipulating
students gain the ability to statements, functions, con with linked lists.	Programming and Algorithmics 1 to formulate algorithms for solving basic problems and write them in the C language. They ncept of recursion. They learn to analyse simple cases of algorithm complexity. They know	r understand data v fundamental alg	types (sim jorithms for	ple, structure searching, s	,ZK , pointers), orting, and r	6 , expressions, nanipulating 7
students gain the ability to statements, functions, con with linked lists. BI-PA2	Programming and Algorithmics 1 to formulate algorithms for solving basic problems and write them in the C language. They ncept of recursion. They learn to analyse simple cases of algorithm complexity. They know Programming and Algorithmics 2 ments of object-oriented programming and are able to use them for specifying and implem	r understand data v fundamental alg	types (sim orithms for	ple, structure searching, s	,ZK d, pointers), orting, and r ,ZK	6 expressions, nanipulating 7 e array set
Students gain the ability t statements, functions, cor with linked lists. BI-PA2	Programming and Algorithmics 1 to formulate algorithms for solving basic problems and write them in the C language. They ncept of recursion. They learn to analyse simple cases of algorithm complexity. They know Programming and Algorithmics 2 ments of object-oriented programming and are able to use them for specifying and implen nt linked structures. They learn these skills using the programming language C++. Although	r understand data v fundamental alg nenting abstract o this is not a modu	types (sim jorithms for lata types ( ule of progra	Z ple, structure searching, s Z stack, queue amming in C+	,ZK d, pointers), orting, and r ,ZK enlargeable +, students	6 , expressions, manipulating 7 e array, set, are introduced

BI-PS1	Programming in Shell 1	KZ	5			
Students become know	edgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating system	ns (file systems, p	processes and			
threads, access rights,	memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the sh	ell, basic commar	ids, and filters to			
process various text dat	ia.					
BI-SI1.2	Software Engineering I	Z,ZK	5			
Students learn the meth	ods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pra	ctical skill thanks	to applying			
hands-on analysis and	design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CA	ASE tools and UM	L for modelling			
and solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and testing processes.						
BI-SAP	Computer Structure and Architecture	Z,ZK	6			
Students understand ba	sic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, in	, nputs, outputs, da	ta storage and			
transfer. In the labs, stu	dents gain practical experience with the design and implementation of the logic of a simple processor using modern digital d	esign tools. The s	ubject teaches			
basic knowledge of digi	tal computer construction principles, how a computer performs its operations, what is machine code, and what are its connect	ctions to higher pr	ogramming			
languages.						
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5			
Students get both a ma	hematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula	approximation, to	ols for solving			
recurrent equations, and basics of graph theory.						
BI-ZMA	Elements of Calculus	Z,ZK	6			
Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to						
use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and						
sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions.						

#### Name of the block: Povinné p edm ty zam ení Minimal number of credits of the block: 30 The role of the block: PZ

Code of the group: BI-PZ-WSI-PG.2015

Name of the group: Compulsory Courses of Bachelor Specialization Computer graphics, in Czech, Version 2015

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 7 courses

Credits in the group: 30

Note on the group:

0 1						
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-MGA	Multimedia and Graphics Applications <i>Ji í Chludil</i>	Z,ZK	5	2P+2C	Z	PZ
BI-PGR.1	Computer graphics programming	Z,ZK	5	2P+2C	L	PZ
BI-PAI	Law and Informatics Zden k Ku era	ZK	3	2P	Z	PZ
BI-PGA	Programming of graphic applications Radek Richtr, Ji í Chludil Radek Richtr Radek Richtr (Gar.)	Z,ZK	5	2P+2C	Z	PZ
BI-PYT	Python Programming	Z,ZK	4	2P+2C	L	PZ
BI-SP2.1	<b>Team Software Project 2</b> Marek Suchánek, Ji í Chludil, Robert Pergl, Marek Skotnica, Ji í Mlejnek, Ji í Hunka, Zden k Rybola, Ji í Borský <b>Ji í Mlejnek</b> Ji í Mlejnek (Gar.)	KZ	4	2C	Z	PZ
BI-TUR	User Interface Design Jan Schmidt	Z,ZK	4	2P+2C	L	PZ

## Characteristics of the courses of this group of Study Plan: Code=BI-PZ-WSI-PG.2015 Name=Compulsory Courses of Bachelor Specialization Computer graphics, in Czech, Version 2015

BI-MGA	Multimedia and Graphics Applications	Z,ZK	5		
Students get acquainted	I with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for we	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	and compression		
technologies. They learn	to use multimedia transmission and representation systems, including real-time multimedia processing. They understand th	e principle of ope	ration and use		
of graphics processing of	ards. They gain a number of practical skills, such as vectorizing raster images, retouching photos, or creating 3D models.				
BI-PGR.1	Computer graphics programming	Z,ZK	5		
Students are able to pro	gram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add t	extures imitating of	jeometric details		
and materials (like wall	surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in	computer graphic	cs, such as		
graphical pipeline, geom	etric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid	fundamentals for	your professional		
development, e.g. for GI	PU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfa	ces, and scientific	visualisation.		
BI-PAI	Law and Informatics	ZK	3		
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).					
BI-PGA	Programming of graphic applications	Z,ZK	5		
This course is presented in Czech only.					
BI-PYT	Python Programming	Z,ZK	4		
The course is taught in Czech.					

BI-SP2.1	Team Software Project 2	KZ	4			
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).						
BI-TUR	User Interface Design	Z,ZK	4			
Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where software and other products do						
not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of the methods						
that bring users into the development process to ensure optimal communication with a user.						

Name of the block: Compulsory elective economic-management courses Minimal number of credits of the block: 4 The role of the block: VE

Code of the group: BI-PV-EM.2015

Name of the group: Compulsory Elective Economical Courses of Bc. Program Informatics, Presented in Czech, Ver. 2015

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 12) Requirement courses in the group: In this group you have to complete at least 1 course (at most 3) Credits in the group: 4

#### Note on the group:

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-DAN	Taxes for non-Economists Savina Finardi, Tereza Ji íková Tereza Ji íková Savina Finardi (Gar.)	Z,ZK	4	2P+2C	Z	VE
FI-VEZ	economic-managerial course from a study abroad Miroslav Balík	Z	4	0+0	Z,L	VE
BI-FTR.1	Financial Markets Pavla Vozárová	Z,ZK	5	2P+2C	L	VE
BI-MEK	Macroeconomic Context of Domestic and World Economy Ivo Straka Ivo Straka Ivo Straka (Gar.)	Z,ZK	4	2P+2C	Z	VE
BI-PRP	Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.)	Z,ZK	4	2P+1R	L	VE
BI-PRR	Project management David Pešek	KZ	4	2P+2C	Z	VE
BI-SEP	World Economy and Business Tomáš Evan <b>Tomáš Evan</b> Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	L	VE
BI-MIK	Fundamentals of Microeconomics Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	L	VE

### Characteristics of the courses of this group of Study Plan: Code=BI-PV-EM.2015 Name=Compulsory Elective Economical Courses of Bc. Program Informatics, Presented in Czech, Ver. 2015

BI-DAN	Taxes for non-Economists	Z,ZK	4			
Taxes, including social in	nsurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the way how a significa	ant portion of GDF	is redistributed.			
This course concerns w	ho pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals a	and shows how the	ey affect taxation			
of income, consumption	n, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as we	II as information a	bout important			
taxpayers' formal duties	s towards public administration.					
FI-VEZ	economic-managerial course from a study abroad	Z	4			
A "Humanities subject the	hat has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module t	hat is required in	the curriculum.			
The substitution is appre	oved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.					
BI-FTR.1	Financial Markets	Z,ZK	5			
This course is presented	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).					
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4			
This course is presented	d in Czech.					
BI-PRP	Law and business	Z,ZK	4			
This course is presented	d in Czech.					
BI-PRR	Project management	KZ	4			
This course is presented	d in Czech.					
BI-SEP	World Economy and Business	Z,ZK	4			
This course is presented	d in Czech. The course introduces students of technical university to the international business. It does that predominantly by	comparing indivi	dual countries			
and key regions of world	l economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as wel	II as indexes of eco	onomic freedom,			
corruption and economic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of discussions based on individual						
readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite.						
BI-MIK	Fundamentals of Microeconomics	Z,ZK	4			
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).						
<u>L</u>						

Name of the block: Povinné ekonomické Minimal number of credits of the block: 4 The role of the block: PE

### Code of the group: BI-PP-EM.2015 Name of the group: Compulsory Economics and Management Bachelor Courses, in Czech, Version 2015 Requirement credits in the group: In this group you have to gain 4 credits Requirement courses in the group: In this group you have to complete 1 course Credits in the group: 4 Note on the group: Povinný předmět BI-EMP se studentům bez oboru nezapisuje automaticky. Zapíší si jej individuálně podle pokynů z katedry Softwarového inženýrství.

Code	(in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-EMP	Economics and Management Principles David Buchtela, Petra Pavlí ková David Buchtela David Buchtela (Gar.)	KZ	4	2P+2C	Z,L	PE

### Characteristics of the courses of this group of Study Plan: Code=BI-PP-EM.2015 Name=Compulsory Economics and Management Bachelor Courses, in Czech, Version 2015

BI-EMP	Economics and Management Principles	KZ	4		
This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with fields: enterprise foundation,					
enterprise putting into state economic environment (CR), management of property and capital structure, business transaction records keeping during an accounting period, a relation					
between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination.					

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 group: BI-ZKA

Name of the group: English Language, Internal Certifica

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 4)

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 2

Note on the group: Ze skupiny je nutné absolvovat jeden ze dvou předmětů, představujících interní zkoušku z angličtiny. -- Předmět BI-ANG si zapisují studenti, kteří absolvovali přípravné kurzy z angličtiny a mají zápočet z předmětu BI-A2L. -- Předmět BI--ANG1 si zapisují studenti, kteří se na zkoušku připravovali samostatně. Tito studenti musí před vlastní zkouškou absolvovat zápočtovou písemku.

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	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 Name=English Language, Internal Certifica

BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2			
BIE-EEC	English language external certificate	Z	4			
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 Common 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.2015

Name of the group: Compulsory Physical Education of Bachelor Program Informatics, in Czech, Version 2015

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses

#### Credits in the group: 0 Note on the group:

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
TVV0	Physical education	Z	0	0+2	Z,L	PT
TV2	Physical Education	Z	0	0+2	L	PT
TVKLV	Physical Education Course	Z	0	7dní	L	PT
TVKZV	Physical Education Course	Z	0	7dní	Z	PT

Characteristics of the courses of this group of Study Plan: Code=BI-PT.2015 Name=Compulsory Physical Education of Bachelor Program Informatics, in Czech, Version 2015

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

Name of the block: Compulsory elective humanities courses Minimal number of credits of the block: 2 The role of the block: VH

#### Code of the group: BI-PV-HU.2015

Name of the group: Compulsory Elective Humanity Courses of Bachelor Study Program Informatics, in Czech, Version 2015

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6) Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 2 Note on the group:

i toto on the group						
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
FI-FIL	Philosophy Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	ZK	2	2P	Z,L	VH
BI-HMI	History of Mathematics and Informatics Alena Šolcová Alena Šolcová Alena Šolcová (Gar.)	Z,ZK	3	2P+1C	L	VH
FI-HTE	History of Technology and Economics Jan Mikeš, Marcela Efmertová Jan Mikeš Jan Mikeš (Gar.)	ZK	2	2+0	Z,L	VH
FI-HPZ	Humanities subject from a study abroad Miroslav Balík	Z	3	0+0	Z,L	VH
FI-MPL	Managerial Psychology Jan Fiala	ZK	2	2+0	Z,L	VH
BI-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	Z,L	VH
FI-KSA	Cultural and Social Anthropology Jakub Šenovský	ZK	2	2P	L,Z	VH
BI-KSA	Cultural and Social Anthropology Alena Libánská, Tomáš Houdek, Jakub Šenovský Jakub Šenovský Alena Libánská (Gar.)	ZK	2	2P	Z,L	VH
FI-ULI	Introduction to Linguistics for Computer Václav Cvr ek	ZK	2	2P	L	VH
FI-GNO	Introduction to Gnoseology Ivo Janoušek	ZK	2	2+0	L	VH

### Characteristics of the courses of this group of Study Plan: Code=BI-PV-HU.2015 Name=Compulsory Elective Humanity Courses of Bachelor Study Program Informatics, in Czech, Version 2015

FI-FIL	Philosophy	ZK	2
see A0B16			
BI-HMI	History of Mathematics and Informatics	Z,ZK	3
This course is presente	d in Czech.		

FI-HTE	History of Technology and Economics	ZK	2
The course introduces	the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in co	omparison with the	development of
the European region 19	9 to 21 century.		
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities subject	hat has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module	that is required in	the curriculum.
The substitution is app	roved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.		
FI-MPL	Managerial Psychology	ZK	2
BI-EHD	Introduction to European Economic History	Z,ZK	3
This course is presente	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
FI-KSA	Cultural and Social Anthropology	ZK	2
The one-semester cou	se 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 researc	ch from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, h	ealth, history, deat	th, etc) will be
shown. The course is a	n interesting alternative to other humanities, taught at FIT.		
BI-KSA	Cultural and Social Anthropology	ZK	2
The one-semester cou	se 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 researc	ch from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, h	ealth, history, deat	th, etc) will be
shown. The course is p	resented in Czech.		
FI-ULI	Introduction to Linguistics for Computer	ZK	2
This course is presente	d in Czech.		
FI-GNO	Introduction to Gnoseology	ZK	2
P edm t studenty uvád	, i do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v	v dou a um ním. F	Rozborem d jin
modernismu a myšlenk	ových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um	ní odhaleny mech	nanismy tv r ích
proces . V návaznosti r	ia teorii p írodních jazyk 🛛 a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín 🛛 na hlediska	estetického vnímá	ní. Samostatnou
kapitolou jsou modely s	spojitých p írodních soustav a systém, v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozv	voje. P edm t p ed	náší a garantuje
Ing. Ivo Janoušek CSc.			
Name of the b	lock: Elective courses		
Minimal numb	er of credits of the block: 0		
I he role of the	e block: V		

#### Code of the group: BI-V-PRO\_MG

Name of the group: Elective Courses, Suitable for those who intend to apply for Master's program at FIT Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Courses in this group are recommended for students who intend to enroll to master program at FIT.

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-AG2	Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V

# Characteristics of the courses of this group of Study Plan: Code=BI-V-PRO\_MG Name=Elective Courses, Suitable for those who intend to apply for Master's program at FIT

BI-AG2	Algorithms and Graphs 2	Z,ZK	5		
This course, presented in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory course BI-AG1. It further delves					
into advances data stru	ctures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English ve	ersion of the cours	se see BIE-AG2.		

#### Code of the group: BI-V.2017

Name of the group: Purely Elective Courses of Bachelor Programme BI, Version 2017 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Volitelné předměty, které nejsou povinnými v programu ani žádného oboru či zaměření

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-ALO	Algebra and Logic Jan Starý <b>Jan Starý</b> Jan Starý (Gar.)	Z,ZK	4	2P+1C	L	V
BI-AVI.21	Algorithms visually Lud k Ku era Lud k Ku era (Gar.)	Z,ZK	4	2P+1C	L	V

BI-A2L	English language, preparation for the B2 level exam Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.)	Z	2	2C	L	V
BI-APJ	Aplication Programming in Java <i>Ji í Dan ek</i>	Z,ZK	4	2P+1R+1C	Z	V
NI-AFP	Applied Functional Programming Marek Suchánek, Robert Pergl, Daniel N mec Robert Pergl Robert Pergl (Gar.)	KZ	5	2P+1C	L	V
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-BLE	Blender Lukáš Ba inka <b>Lukáš Ba inka</b> Lukáš Ba inka (Gar.)	Z,ZK	4	2P+2C	L	V
NI-DSP	Database Systems in Practes	Z,ZK	4	2P+1C	L	V
BI-STO	Storage and Filesystems	Z,ZK	4	2P+2C	L,Z	V
NI-DZO	Digital Image Processing	Z,ZK	4	2P+1C	L	V
NI-DDM	Distributed Data Mining Tomáš Borovi ka	KZ	4	3C	L	V
BI-EP1	Effective programming 1 Martin Ka er Martin Ka er Martin Ka er (Gar.)	Z	4	2P+2C	Z	V
BI-EP2	Efficient Programming 2 Martin Ka er Martin Ka er Martin Ka er (Gar.)	KZ	4	2P+2C	L	V
BI-EJA	Enterprise Java Jií Dan ek <b>Jií Dan ek</b> Jií Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-FMU	Financial and Management Accounting	Z,ZK	5	2P+2C	Z	V
BI-HAM	HW accelerated network traffic monitoring Karel Hvnek, Tomáš eika <b>Tomáš eika</b> Tomáš eika (Gar.)	KZ	4	2P+1C	L	V
BI-ARD	Interactive applications on Arduino Ji í Cvr ek, Robert Hülle, Vojt ch Miškovský, Jan ezní ek Robert Hülle Robert Hülle (Gar.)	KZ	4	3C	L	V
NI-IAM	Internet and Multimedia Ji í Melnikov	Z,ZK	4	2P+1C	L	V
BIE-IMA2	Introduction to Mathematics 2 Karel Klouda	Z	2	1C	Z	V
BI-CS2	<b>C# language and data access</b> Pavel Št pán <b>Pavel Št pán</b> 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 (Gar.)	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
NI-MPL	<b>Managerial Psychology</b> Jan Fiala <b>Jan Fiala</b> Jan Fiala (Gar.)	ZK	2	2P	Z,L	V
NI-MSI	Mathematical Structures in Computer Science Jan Starý Jan Starý Jan Starý (Gar.)	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	<b>Mikrotik technologies</b> Jan Fesl <b>Jan Fesl</b> Jan Fesl (Gar.)	KZ	3	1P+2C	Z	V
NI-MOP	Modern Object-Oriented Programming in Pharo Marek Skotnica, 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 (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
NI-OLI	Linux Drivers Jaroslav Borecký, Miroslav Skrbek Jaroslav Borecký Miroslav Skrbek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ACM	Programming Practices 1 Tomáš Valla, Ond ej Suchý <b>Tomáš Valla</b> Tomáš Valla (Gar.)	KZ	5	4C	L	V
BI-ACM2	Programming Practices 2 Tomáš Valla, Ond ej Suchý <b>Tomáš Valla</b> Tomáš Valla (Gar.)	KZ	5	4C	Z	V
BI-ACM3	Programming Practices 3 Tomáš Valla, Ond ej Suchý <b>Tomáš Valla</b> Tomáš Valla (Gar.)	KZ	5	4C	L	V
BI-ACM4	Programming Practices 4 Tomáš Valla, Ond ej Suchý 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.)	ΚZ	4	3C	L,Z	V
BI-PJV	<b>Programming in Java</b> Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka <b>Miroslav Balík</b> Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	V

BI-PJS.1	JavaScript Programming Old ich Malec	ΚZ	4	3C	L	V
BI-KOT	Programing in Kotlin Jií Dan ek <b>Jií Dan ek</b> Jií Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
NI-PSL	Programming in Scala Jií Dan ek <b>Jií Dan ek</b> 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	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 Tomáš Kalvoda (Gar.)	Z	4		Z	V
NI-REV	Reverse Engineering Ji í Dostál, Josef Kokeš, Róbert Lórencz <b>Ji í Dostál</b> Ji í Dostál (Gar.)	Z,ZK	5	1P+2C	Z	V
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SCE2	Computer Engineering Seminar II Hana Kubátová 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 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	3C	L	V
BI-ST3	Network Technology 3 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	V
BI-ST4	Network Technology 4 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	L	V
BI-SOJ	Machine Oriented Languages	Z,ZK	4	2P+2C	L	V
BI-SVZ	Machine vision and image processing Lukáš Brchl. Marcel Ji ina. Jakub Novák Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	L,Z	V
NI-SYP	Parsing and Compilers Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-GIT	Version control system GIT Petr Pulc	KZ	2	16P	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV	Physical education	Z	0	0+2	Z,L	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	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
BI-TS1	Dušan Knop, Tomáš Valla, Ond ej Suchý <b>Tomáš Valla</b> Tomáš Valla (Gar.)	Z	4	2C	Z	V
BI-TS2	Theoretical Seminar II Tomáš Valla. Ond ei Suchý Tomáš Valla Ond ei Suchý (Gar.)	Z	4	2C	L	V
BI-TS3	Theoretical Seminar III Tomáš Valla, Ond ei Suchý, Ond ei Guth Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	V
BI-TS4	Theoretical Seminar IV Tomáš Valla, Ond ei Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	L	V
BI-TDA	Test driven architecture Marek Hakala	KZ	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-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-ULI	Introduction to Linux Zden k Muziká, Jan Ž árek, Dana ermáková, Petr Zemánek <b>Zden k</b> 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 <b>Tomáš Vondra</b> Tomáš Vondra (Gar.)	Z,ZK	5	2P+1C	L	V
BI-VHS	Virtual game worlds Radek Richtr Radek Richtr (Gar.)	ZK	4	2P+2C	Z	V
BI-VR1	Virtual reality I Petr Klán, Petr Pauš <b>Petr Klán</b> 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 Tornáš Valla Tomáš Valla (Gar.)	Z	3	2R	L	V
BI-VMM	Selected Mathematical Methods Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	4	2P+2C	L	V
NI-VYC	<b>Computability</b> Jan Starý <b>Jan Starý</b> 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 Zden k Muziká Zden k Muziká (Gar.)	Z	20		Z,L	V
BI-ZS30	Bachelor internship abroad for 30 credits Zden k Muziká Zden k Muziká (Gar.)	Z	30		Z,L	V
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	<b>3D Printing</b> Miroslav Hron ok, Tomáš Sýkora <b>Tomáš Sýkora</b> Miroslav Hron ok (Gar.)	κz	4	3C	L	V

# Characteristics of the courses of this group of Study Plan: Code=BI-V.2017 Name=Purely Elective Courses of Bachelor Programme BI, Version 2017

TV1	Physical Education	Z	0
TVV	Physical education	Z	0
TVV0	Physical education	Z	0
TV2	Physical Education	Z	0
TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0
BI-ALO	Algebra and Logic	Z,ZK	4
The course extends an	d deepens the study of topics touched upon in the basic course in logic.	· · ·	
BI-AVI.21	Algorithms visually	Z,ZK	4
The course complement	ts other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer	r science that exte	end substantially
knowledge presented in	BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision.o	rg <http: td="" www.alg<=""><td>govision.org&gt;)</td></http:>	govision.org>)
that make understandir	g the principles of algorithms easy.		
BI-A2L	English language, preparation for the B2 level exam	Z	2
The content of the cour	se corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achieveme	ent - students are	due to: -Take an
active part in the langua	age instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both	the midterm and	the final term
tests with the success r	ate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by	individual teacher	s during the first
class of the term.			
BI-APJ	Aplication Programming in Java	Z,ZK	4
This course is presente	d in Czech. Advanced technologies in Java.		
NI-AFP	Applied Functional Programming	KZ	5
This course is presente	d in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel function	al programming la	inguages are on
the rise nowadays and	the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, mas	tering this paradig	m becomes a
necessary competence	of a software engineer: the theory and especially the practice.		
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced	to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the class	sical tasks from th	ne areas of state
space search, multi-age	ent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algori	thms and the neur	ral networks, will
be presented as well.			
BI-BLE	Blender	Z,ZK	4
The course extends know	weldge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those	e interested in 3D	graphics and
animation. It offers a co	mplete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphic	cs applications) co	ourse.
NI-DSP	Database Systems in Practes	Z,ZK	4
This course is presente	d in Czech.		
BI-STO	Storage and Filesystems	Z,ZK	4
The student will learn p	rinciples and current solutions of storage systems architecture. The module explains principles of data store, protection, and a	rchiving, as so as	storage scaling,
load balancing and high			
	n availability.		
NI-DZO	n availability. Digital Image Processing	Z,ZK	4
NI-DZO This course presents a	n availability. Digital Image Processing comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical a	Z,ZK algorithms that are	4 e both easy to
NI-DZO This course presents a implement and have an	n availability. Digital Image Processing comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that i	Z,ZK algorithms that are s also valuable out	4 e both easy to tside the domain
NI-DZO This course presents a implement and have an of digital image process	n availability. Digital Image Processing comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that ising. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDF	Z,ZK algorithms that are s also valuable out & compression, de	4 e both easy to tside the domain e-blurring in
NI-DZO This course presents a implement and have an of digital image process frequency domain, abso	n availability. Digital Image Processing comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that i sing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDF raction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray of	Z,ZK algorithms that are s also valuable out & compression, de conversion, contex	4 e both easy to tside the domain e-blurring in t enhancement,

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 hand	ls on experience v	with large scale
data processing framework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementation	s and will be capa	ible to propose
approaches to parallelize other algorithms. The course is prezented in czech language.		
BI-EP1   Effective programming 1	Ζ	4
DLED2	1/7	4
BI-EP2   Efficient Programming 1. Students will practice implementation of elegatithms by solving typical problems. Various ways of colving ind		4 aro discussod
with the aim to choose the best one and avoid implementation errors		lle discussed,
RI-FIA Enterprise Java	7 7K	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.	-,	
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	particular accoun	iting operations,
operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification of the statement of the st	ation of bookkeepi	ng, description
of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage	ement accounting	, are base of
Business Inteligence moduls in Business information systems.	T	
BI-HAM   HW accelerated network traffic monitoring	KZ	4
I his course introduces students to modern and widely used technologies and principles in the area of network intrastructure and traffic monitoring. I	he monitoring and	d analysis of
for analysis). The goals of the course are to acquisint students with the modern trends and corporations principles in the area of monitoring network t	a source of inform	ation and data
level and to develop their practical abilities in this field	and on a natuwa	re and software
BI-ARD Interactive applications on Arduino	K7	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 appl	ications 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 embedded	systems, i.e. to s	ee 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 therefore	e 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	quisition of AV sig	gnals (input),
presentation of AV signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practic	al use case scena	arios of real-time
audiovisual transmissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the	effect of various co	omponents on
the quality and latency of AV transmissions. Students will learn now to build internet intrastructure for end-to-end AV transmissions from the recording for audience.	j the scene up to t	ine presentation
PIE IMA2 Introduction to Mathematics 2	7	
Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a	re able to apply th	em in particular
examples.		en n' paraoarai
BI-CS2 C# language and data access	KZ	4
The C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Mic	rosoft platform. Th	e students will
get to know objects used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current te	chnologies such a	s LINQ - a set
of features for querying and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQL	. (LINQ to Objects	, LINQ to XML
and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data	using domain-sp	ecific objects
(ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Mc	del, Storage Mode	el and Mapping
NIL description).	K7	
DI-C55   Language C# - design of web application development on the NET platform. They will acquire a comprehensive event	rz	
The students will be introduced to current technologies in web abbication development on the $.NET$ biation. They will acquire a completions we over vis	w of the develop	4
on thisplatform. They will learn to create WebAPI and to use it by client programs	ew of the developn	4 nent possibilities
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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 o	commonly used by	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 c	or wireless links
and how to administrate	and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary compute	er networks concep	ts like protocols
and technologies of the	data-link, hetwork and transport layer of the OSI model.	1/7	4
NI-IVIOP	Modern Object-Oriented Programming in Pharo	KZ	4 ural abstraction
is used to build complex	mining is currently one of the most widespread paradigms of software creation, especially enterprise miorifiation systems, with modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the s	kills of design and	implementation
of object systems in mo	dern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development	needs and areas	of interest. In
addition to deepening o	bject programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to wo	rk on interesting p	rojects and OO
technologies in terms o	f semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involved	ement in the Phar	o Consortium.
BI-MVT.21	Modern Visualisation Technologies	Z,ZK	5
The goal of the course	s to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and au	gmented reality, vi	sualization on
high resolution displays	(e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the ment	ioned technologies	s, namely fractal
and procedural visualiz	ation, scientific data visualization, and 3D model scanning.		
BI-MMP	Multimedia team project	KZ	4
This course is presente	d in Gzech.		
	Linux Drivers	Z,ZK	4
The Linux operating sys	tem is an important operating system for personal computer and also for embedded systems. Systems on chip and combining the science of a system of the sector of the sect	powerful process	ors and FPGAs
	or penprieral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development dae of Linux operating system architecture, principles of development of various types drivers, including practical experience		idents. The
BI-ACM	Drogramming Practices 1		5
This course is presente	din Czech	NZ	5
BI-ACM2	Programming Practices 2	K7	5
This course is presente	d in Czech		5
BI-ACM3	Programming Practices 3	K7	5
This course is presente	d in Czech.		Ŭ
BI-ACM4	Programming Practices 4	K7	5
This course is presente	d in Czech.		Ũ
BI-AND 21	Programming for the Android Operating System	K7	4
This course is presente	d in Czech.		
BI-CS1	Programming in C#	KZ	4
The goal of the course	s to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamenta	I construction, type	es of variables,
operators, arrays, loops	, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class de	finition and class i	nstancing,
constructors, methods,	properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugg	ng and exception	processing, as
well as work with files a	re emphasized.		
BI-PJV	Programming in Java	Z,ZK	4
This course is presente	d 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 course	is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development	t in Javascript. The	e course is
recommended for stude	nts of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for	or this course in the	eir 4th semester
of study.			
BI-KOT	Programing in Kotlin	Z,ZK	4
Kotlin is a modern, stati	cally-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of adv	anced language c	onstructions.
I ne language is fully Ja	va compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of	a modern, object-	functional way
	Diale code. Last but not least, kouin is suitable for designing of DSLs (Domain-Specific Languages).	7 71/	4
NI-PSL	Programming in Scala he medern programming lenguage Scale which evolute chiest functional paradism. Scale comprises educate lenguage fact		4 motohing and
advance standard librar	ne modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language reat	ures - e.g.pattern	matching and
Scalaz etc	y. Scala enables to use of applications functional patterns e.g. Trenst, monaus, etc. Scala is used by many powerful nameworks	and indianes e.g. F	iay, Cassaliula,
	Programming in Mathematica	7 7K	1
Students will be working	a with modern technical and scientific software. Students will learn how to use different programming styles (functional programming styles)	∠,∠r\   Imming rule-base	+ norogramming
etc.). how to create dvn	amic interactive applications and visualisations, data processing and presentations.	inining, rule base	a programmig,
BI-PHP1	Programing in PHP	K7	1
The course is taught in	Czech Main goal of the course is an introduction to PHP - language and technology Students will learn also best practices.	and will use tool th	at eases
development in PHP. Th			ev should
register for this course i	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register	for BIE-TWA.1. Th	
BI-PS2	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study.	for BIE-TWA.1. Th	
	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study. Programming in shell 2	for BIE-TWA.1. Th	4
Students gain a genera	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study. Programming in shell 2 overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad	for BIE-TWA.1. Th	4 deeper insight
into shell and some oth	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study. Programming in shell 2 overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad er particular scripting languages and will get practical experience with shell script programming.	for BIE-TWA.1. Th	4 deeper insight
into shell and some oth	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study. Programming in shell 2 loverview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad er particular scripting languages and will get practical experience with shell script programming. Data Preprocessing	for BIE-TWA.1. Th Z,ZK dition, they gain a Z,ZK	4 deeper insight 5
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into shell and some oth NI-PDD Students learn to prepa time series, etc., and le pages.	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register n their 3rd semester of study. Programming in shell 2 overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad er particular scripting languages and will get practical experience with shell script programming. Data Preprocessing re raw data for further processing and analysis. They learn what algorithms can be used to extract information from various da arn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characte	for BIE-TWA.1. Th Z,ZK dition, they gain a Z,ZK ta sources, such a ristics from images	4 deeper insight 5 s images, texts, s or from web
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Students gain a genera into shell and some oth NI-PDD Students learn to prepa time series, etc., and le pages. BI-PKM This course is presente NI-REV Students will get acqua is called. Students will u applications written in C	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register In their 3rd semester of study. Programming in shell 2 overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad er particular scripting languages and will get practical experience with shell script programming. Data Preprocessing re raw data for further processing and analysis. They learn what algorithms can be used to extract information from various da arn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characte Introduction to mathematics d in Czech. Reverse Engineering nted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens inderstand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dec i++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be defined and the det back in the estimated and the det back in the estim	for BIE-TWA.1. Th Z,ZK dition, they gain a Z,ZK ta sources, such a ristics from images Z Z,ZK before and after th dicated to reverse edicated to debug	4 deeper insight 5 s images, texts, s or from web 4 5 the main function engineering of gers: how
Students gain a genera into shell and some oth NI-PDD Students learn to prepa time series, etc., and le pages. BI-PKM This course is presente NI-REV Students will get acqua is called. Students will u applications written in C debuggers and debugg	e course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register In their 3rd semester of study. Programming in shell 2 overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad er particular scripting languages and will get practical experience with shell script programming. Data Preprocessing re raw data for further processing and analysis. They learn what algorithms can be used to extract information from various da arm the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characte Introduction to mathematics d in Czech. Reverse Engineering Inted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens inderstand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dec i++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be d ng work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the compute reprocessing whore students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be d ng work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the compute reprocessing who are students will apply are protected to the latest trends on the compute reprocessing targets and the students will be dedicated to the latest trends on the compute reprocessing the protection to the protection to the course will be dedicated to the latest trends on the compute reprocessing the protection to the protec	for BIE-TWA.1. Th Z,ZK dition, they gain a Z,ZK ta sources, such a ristics from images Z Z,ZK before and after th dicated to reverse of edicated to debug er malware scene	4 deeper insight 5 s images, texts, s or from web 4 5 ie main function engineering of gers: how . The focus of

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 resistance of the seminar of Computer Engineering is a seminar of Computer Engineering is a seminar of the seminar of Computer Engineering is a seminar of the seminar of Computer Engineering is a seminar of the seminar of	nce to failures and a	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 wor	k 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 to	eachers. The topics	are new for each
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 resistance of the students who want to deal with deeper topics of digital design, reliability and resistance of the students who want to be a student student student student student students who want to be a student student student student student student students who want to be a student stud	ince to failures and a	attacks. Students
are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part is approached at the subject is limited by the pessibilities of the compare the selected supervisor.	of the subject is wor	k with scientific
articles and other professional literature and/or work in K IN laboratories. The capacity of the subject is limited by the possibilities of the seminar to	eachers. The topics	are new for each
PI ST1 Notwork Technology 1	7	2
DI-STT INERWOR RECTITIONOUSY T The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acre	∠ dited under the Cisc	o Netacad -
CCNA1 - R&:S Introduction to Networks.		
BI-ST2 Network Technology 2	7	3
This course is presented in Czech.	-	Ŭ
BI-ST3 Network Technology 3	7	3
Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented du	I I I I I I I I I I I I I I I I I I I	ST2 courses will
get further extended in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, p	redictability, extensi	ion beyond a
simple topology, security, etc.		
BI-ST4 Network Technology 4	Z	3
Students will further enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and swite	ching presented dur	ing BI-ST1 and
BI-ST2 courses got further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased	efficiency, predictab	ility, extension
beyond a simple topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a complete topology.	tely other type of ne	etwork (Non
Broadcast Multiple Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and s	witch firmware, perfo	orm password
recoveries, and emergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mi	tigation ways while	maintaining the
network running.		
BI-SOJ   Machine Oriented Languages	Z,ZK	4
Students of the course will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on opti	nal use of micropro	cessor's features
and efficient cooperation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of v	view linked to higher	level languages.
I his knowledge will be used during reverse engineering, optimization, and evaluation of code security.	7 71/	
BI-SVZ   Machine vision and image processing	Z,ZK	5
Camera systems are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evalu	ate image informati	on. The course
Introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on practic	al use of camera sy	stems for solving
Problems of practice that the graduates may encounter.	7 71/	
INI-51P Paising and compliers		D D
The module builds upon the knowledge of fundamentals of automata medy, formal language and formal translation mednes. Students gain knowledge	e or various variants	and applications
I NEER NAIGINN ANN AIG ININNNNPON IN CNOPAL ANNIPAINNE NENAROUS CHEN AC INPOMONIALANN NAIAINN NAICINN		
DI LA parsing and are introduced to special applications of parsers, such as incremental and parallel parsing.	K7	2
BI-GIT Version control system GIT	KZ	2
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser	KZ practically. In this pa	2 articular system
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV/2K1       Physical Education 2	KZ practically. In this pa /er administrators.	2 articular system
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2	KZ practically. In this pa ver administrators. Z	2 articular system
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a set of the section 2	KZ practically. In this pa ver administrators. Z lassical reading gro	2 articular system 1 4
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a or are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course	KZ practically. In this pa ver administrators. Z lassical reading gro	2 articular system 1 4 up. The students ntific papers and
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a care treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the cours other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.	KZ practically. In this pa ver administrators. Z lassical reading gro a is a work with scie	2 articular system 1 4 up. The students ntific papers and
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a content science in the second principles of the cours other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.         BI-TS2       Theoretical Seminar II	KZ practically. In this pa ver administrators. Z assical reading gro is a work with scie	2 articular system 1 4 up. The students ntific papers and
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a contern science is intended for students by the the potentials of the teachers of the seminar.         BI-TS2       Theoretical Seminar II         Theoretical Seminar II       Theoretical Seminar II	KZ practically. In this pa ver administrators. Z lassical reading gro is a work with scie Z lassical reading gro	2 articular system 1 4 up. The students ntific papers and 4 up. The students
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a contern scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.         BI-TS2       Theoretical Seminar II         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a contern scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.         BI-TS2       Theoretical Seminar II         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a contern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the cours other scholarly literature. The capacity is limited by the time of the cours of the seminar.         BI-TS2       Theoretical Seminar II         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a contern themselves with interesting topics from the latest research in the area. Therefore, an integr	KZ practically. In this pa ver administrators. Z lassical reading gro is a work with scie Z lassical reading gro a is a work with scie	2 articular system 1 4 up. The students ntific papers and 4 up. The students ntific papers and
BI-GIT       Version control system GIT         Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git ser         TV2K1       Physical Education 2         BI-TS1       Theoretical Seminar I         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context schedule is gravely is limited by the the potentials of the teachers of the seminar.         BI-TS2       Theoretical Seminar II         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context schedule is schedule in the seminar.         BI-TS2       Theoretical Seminar II         Theoretical Seminar II       Theoretical Seminar II         Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context science is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context science is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context science is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a context science is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mo	KZ         practically. In this payer administrators.         Z         Iz         Iassical reading groep is a work with sciep         Z         Iz	2 articular system 1 4 up. The students ntific papers and 4 up. The students ntific papers and
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BI-OPT	Introduction to Optical Networks	Z,ZK	4
Students get basic over	view of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on p	ossible problems	with deployment
of optical network techr	ology and on their solutions. The course will include the history of optical communications, an overview of passive componer	nts (optical fibres,	multiplexors,
dispersion compensato	s, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission sy	stems). The cours	se will also cover
the most up-to-date top	cs presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such	as the accurate t	time on Internet,
from practice	inster, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters	s. Students will so	ive real tasks
	Virtualization and Cloud Computing	7 7K	Б
Students will gain know	of a replaced up of a replaced computer systems that are used in data centers and computer infrastructure of companies and	Z,ZR	J boy will got
acquainted with virtuali:	edge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and vation principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to eff	iciently operate ar	ney will get
performance parameter	s of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effect	ive technoloav to	day for the
management of comple	x computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical ski	lls in the use of mo	odern integration
and development tools	(Continuous integration and development).		Ū
BI-VHS	Virtual game worlds	ZK	4
The course leads stude	ts to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current	students knowledg	ge is furthermore
complemented by the th	eory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world	The course can b	be followed by
the course MI-PVR with	the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devices.		
BI-VR1	Virtual reality I	KZ	4
Introduction to Virtual R	eality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirement	s of virtual worlds	communication.
The course focuses on	the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves co	omputational think	king, empathy
and shared social activi			
BI-VR2	Virtual reality II	KZ	3
Continuation of the cou	se Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The o	bjective is to deve	elop applications
for computer science ar	a gaminication in various social metaverse and desktop engines.	7	0
BI-VAK.21	Selected Applications of Combinatorics	۲ د ا	3
ine course aims to intro	Jouce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the	e basic courses, v	we approach the
with the active particina	to meety. regement, we will facus on solving popular and easily formulated problems from various areas of (not only theoretical)	informatics Areas	s from which we
will select problems to b	e solved will include for example graph theory combinatorial and algorithmic game theory approximation algorithms optim	ization and more	Students will
also try to implement so	Jutions to the studied problems with a special focus on the effective use of existing tools.		
BI-VMM	Selected Mathematical Methods	7 7K	4
We start reviewing geor	netric properties of linear spaces with inner product. Next. we introduce and analyze the discrete Fourier transform (DFT) an	d its fast impleme	ntation (FFT).
Further we deal with dif	ferential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functi	ons. For this purp	oses, we study
normed linear spaces a	nd quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization ar	nd duality. The line	ear programming
and the Simplex method	nd quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization ar I is analyzed in more detail.	nd duality. The line	ear programming
normed linear spaces a and the Simplex method NI-VYC	nd quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization ar t is analyzed in more detail. Computability	nd duality. The line	ear programming
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BI-ZRS Ba	sics of System Control			Z	Z,ZK	4
The course gives an introdu	ction to the field of automatic control. Students will gain knowledge in this rapidly evolv	ing field of great f	uture. We wi	Il focus our	attention part	icularly on
control of engineering and p	hysical systems. We will provide basic information from the feedback control of linear of s analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Sti	Iynamical SISO s	ystems, des he methods	cription met	thods of syste	m models, of the system
model, the basic linear dyna	mic systems analysis and design verification and simple PID feedback, PSD, and fuzz	y controllers. Atte	ntion is also	given to se	nsors and act	uators in
control loops, issues of stabi	lity in control systems, single and continuous adjustment of the controller parameters,	and certain aspe	cts of the inc	lustrial impl	ementation of	continuous
and digital controllers and P	LC control.					
BI-IOS   Fu This course is presented in (	ndamentals of iOS Application Development for iPhone and iPad				KZ	4
BI-ZWU Int	roduction to Web and User Interfaces			Z	Z,ZK	4
BI-3DT 1 3D	Printing				K7	4
						•
Code of the group						
Nome of the grou	p: Elective Vegetional Courses for Rechalor Speci	alication P			largian 2	017
			1-0031-6	GR, V		017
Requirement cree	aits in the group:					
Requirement cou	irses in the group:					
Credits in the gro	up: 0					
Note on the grou	p: Všechny povinné předměty obor	ů a zaměřer	ní s výjim	ikou toh	oto zaměi	fení
	Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)	-				
	Unix Administration	7 7K	5	2P+2C	1	V
	Zden k Muziká Windows Administration	2,21		21 120		· ·
BI-ADW.1	Ji í Kašpar, Miroslav Prágl Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
BI-AG2	Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V
BI-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	2P+2C	Z	V
BI-BEK	Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	V
BI-BIG	<b>DB Technologies for Big Data</b> Josef Gattermayer, Jan Matoušek, Monika Borkovcová <b>Jan Matoušek</b> Monika Borkovcová (Gar.)	КZ	4	2P+2C	z	V
BI-HWB	Hardware Security Ji í Bu ek, Filip Kodýtek, Róbert Lórencz Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-JPO	Computer Units Alois Pluhá ek	Z,ZK	5	2P+2C	Z	V
BI-KOM	Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-OOP	Object-Oriented Programming Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-PNO	Practical Digital Design Martin Novotný Martin Novotný Martin Novotný (Gar.)	KZ	5	2P+2C	Z	V
BI-PRP	Law and business Zden k Ku era. Martin Samek Martin Samek Zden k Ku era (Gar.)	Z,ZK	4	2P+1R	L	V
BI-PJP	Programming Languages and Compilers Jan Janoušek	Z,ZK	5	2P+1C	L	V
BI-PPA	Programming Paradigms Jan Janoušek	Z,ZK	5	2P+2R	Z	V
BI-SI2.3	Software Engineering 2 Martin Hlavatý Zden k Rybola Martin Hlavatý (Gar.)	Z,ZK	3	2P	Z	V
BI-SP1	Team Software Project 1 Ji í Mlejnek	KZ	4	2C	L	V
BI-SP1.21	Team Software Project 1 Radek Richtr, Marek Suchánek, Michal Valenta, Ji í Chludil, Ji í Mlejnek, Ji í Hunka, Zden k Rybola, Ji í Borský, Jan Matoušek, Zden k Rybola Ji í Mlejnek (Gar.)	ΚZ	5	2C	L	V
BI-SSB	System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-SRC	Real-time systems Jaroslav Borecký, Hana Kubátová Jaroslav Borecký Hana Kubátová (Gar.)	KZ	4	2P+2C	Z	V
BI-TJV	Java Technology Ond ej Guth	Z,ZK	4	2P+2C	Z	V
BI-XML	XML Technology Jan Mokrý	Z,ZK	4	2P+2C	L,Z	V
BI-TIS	Information Systems Design Pavel Náplava Pavel Náplava (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-TWA.1	Web Application Design Filip Glazar, David Bernhauer <b>Filip Glazar</b> David Bernhauer (Gar.)	Z,ZK	5	2P+2C	Z	V

BI-VES	Embedded Systems Miroslav Skrbek	Z,ZK	5	2P+2C	L	V
BI-VWM	Searching the Web and Multimedia Databases Tomáš Skopal	Z,ZK	5	2P+1C	L	V
BI-VZD	Data Mining Alexander Kovalenko, Karel Klouda, Ond ej Tichý, Daniel Vašata Daniel Vašata Pavel Kordík (Gar.)	Z,ZK	4	2P+2C	L,Z	v
BI-ZRS	Basics of System Control Kate ina Hyniová	Z,ZK	4	2P+2C	Z	v
BI-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ZNS	Knowledge-based Systems Marcel Ji ina Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	Z	V
Characteristics of the	e courses of this group of Study Plan: Code=BI-WSI-PGR-VO.201	7 Name=Ele	ctive Voc	ational C	ourses fo	or Bachelor
BI-PRP	w and business			7	.ZK	4
This course is presented in	Czech.				,   	-
BI-AG2 Alg	gorithms and Graphs 2	straduction siven	in the ears	Z	,ZK	5 further deliver
into advances data structure	es and amortized complexity analysis. It also includes a very light introduction to appro-	timation algorithm	in the comp is. For Engli	sh version o	f the course	see BIE-AG2.
BI-ZRS Ba	isics of System Control			Z	,ZK	4
The course gives an introdu	ction to the field of automatic control. Students will gain knowledge in this rapidly evolv	ing field of great f	uture. We w	ill focus our	attention par	ticularly on
control of engineering and p	hysical systems. We will provide basic information from the feedback control of linear of a package and design verification simple RID feedback RED and fuzzy controllers.	ynamical SISO sy	ystems, des	cription met	nods of syste	em models,
model, the basic linear dyna	mic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Su	controllers. Atte	ntion is also	given to ser	isors and ac	tuators in
control loops, issues of stab	ility in control systems, single and continuous adjustment of the controller parameters,	and certain aspe	cts of the inc	dustrial imple	ementation of	of continuous
and digital controllers and P	LC control.					
BI-ADU.1   Ur	hix Administration			Z	,ZK	5
between user and administr	al structure of the UNIX operating system, with the administration of its basic subsystems ator roles. They will get theoretical and practical knowledge of user management and a	dministration of u	unity principle isers access	es. i ney will s rights file s	understand t systems disl	ne differences
processes, memory, networ	k services and remote access, and in the areas of system deployment and virtualizatio	n. In the labs, the	y will verify t	the knowled	ge from the l	ectures on
specific examples from prac	tice.					
BI-ADW.1 W	ndows Administration			Z	,ZK	4
This course is presented in	Czech. However, there is an English variant in the program Informatics (B1801 / 4753).				71/	
DI-APO. I AI	CITILECTUTES OF COMPUTER SYSTEMS	level of machine	instructions	Special em	,∠n   Inhasis is div	O ven on the
pipelined instruction process	sing and on the memory hierarchy. Students will understand the basic concepts of RISC	and CISC archite	ectures and	the principle	s of instructi	on processing
not only in scalar processors	s, but also in superscalar processors that can execute multiple instructions in one cycle,	while ensuring the	e correctnes	s of the seq	uential mode	l of programs.
The course further elaborate	es the principles and architectures of shared memory multiprocessor and multicore sys	tems and the mer	nory cohere	ence and cor	sistency in s	such systems.
BI-BEK Se	CUTE CODE		tions Aftor (	Z   Notting famili	,ZK	5 root modeling
theory, students gain practic	al experience with running programs with reduced privileges and methods of specifyin	a these privileges	. since not e	everv progra	m needs to i	reat modeling
administrator privileges. Dar	ngers inherent in buffer overflows will be practically demonstrated. Students will be intro	duced to the prin	ciples of se	curing data a	and the relat	ionships of
security and database syste	ms, web, remote procedure calls, and sockets in general. The module concludes with I	Denial of Service	attacks and	the defense	against the	n.
BI-BIG DE	3 Technologies for Big Data				KZ	4
	czech.			7	71	5
The course deals with hard	vare resources used to ensure security of computer systems including embedded ones	. The students be	come famili	ar with the c	,∠r   perating pri	nciples of
cryptographic modules, the	security features of modern processors, and storage media protection through encrypti	on. They will gain	knowledge	about vulne	rabilities of F	IW resources,
including side-channel attac	ks and tampering with hardware during manufacture. Students will have an overview of o	contact and contact	ctless smart	card techno	logy includin	g applications
and related topics for multi-f	actor authentication (biometrics). Students will understand the problems of effective im	plementation of c	phers.	7	71/	
DI-JFU CO	mputer Offits : knowledge of digital computer units acquired in the obligatory course of the program (	BIE-SAP) net an	quainted in	∠ ∣ detail with th	, <b>∠n</b>   e internal st	C hucture and
organization of computer un	its and processors and their interactions with the environment, including accelerating a	rithmetic-logic uni	ts and using	appropriate	codes for in	plementation
of multiplication. The organiz	zation of main memory and other internal memories (addressable, LIFO, FIFO and CAN	A) will be discusse	ed in detail,	including co	des for error	detection and
correction for parallel and se	erial data transmissions. They will also get acquainted with the methodology of controlle	r design, with the	principles o	of communic	ation of the p	processor with
and programmable hardwar	e design kits (FPGA).		Juucational	meroprogra	ninea broce	รรษา ราทานไลเบโ
BI-KOM Co	proceptual Modelling			Z	,ZK	5
The course is focused on de	eveloping abstract thinking and precise formulation skills using conceptual models. Stud	lents learn skills o	of discerning	g key terms i	n a domain,	the ability to
categorize and specify corre	ct relations in complex systems of social reality, mostly enterprises and institutions. Stud	dents learn basics	of ontologic	cal structural	modeling in	the OntoUML
liotation. Next, they learn ho learn the foundations of enter	w to express business rules and constraints using the OCL language and foundations of provide engineering, being a discipline for conceptual modelling of enterprises and institu-	I OVVL/KDF SEM	antic data re esses The l	presentatio	od and the P	PMN notation
will be taught. The course is	designed with the respect to continuation in software implementations.					
BI-OOP Ot	pject-Oriented Programming			Z	,ZK	4
Object-oriented programmir	g has been used in the last 50 years to solve computational problems by using graphs	of objects that co	llaborate to	gether by m	essage pass	ing. In this
course we look at some of the	ne main principles of object-oriented programming and design. The emphasis is on pra	ctical techniques	tor software	developme	nt including f	esting, error
RI-PNO	actical Digital Design				K7	5
Students get an overview of	the contemporary digital design flow and learn practical skills to use synchronous desi	gn techniques. Th	ney understa	ا and the basi	S of the VH	DL language,
and implementation technol	ogies FPGA and ASIC. Students demonstrate practical use of the design techniques in	the module proje	ect sing mod	lern, industr	/-standard C	AD design
tools.						

BI-PJP Programming Languages and Compilers	Z,ZK	5
Students master basic methods of implementation of common high-level programming languages. They get experience with the design and imple	mentation of individua	al compiler parts
for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text to	hat has a certain synta	ax into a target
form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming langua	ges, but extends to all	other programs
for parsing and processing text in a language defined by a LL(1) grammar.		_
BI-PPA Programming Paradigms	Z,ZK	5
I he course deals with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of	particular approaches	s. Functional
programming paradigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming languages. Moreover, usage of these principles is demonstrated as modern is	ning. The principles ar	e demonstrated
such as C++ and lava	nainstream programm	iing languages
BI-SI2 3 Software Engineering 2	7 7K	3
This course is presented in Czech However, there is an English variant in the program Informatics (B1801 / 4753)	_ Ζ,ΖΙ	5
BI-SD1 Team Software Project 1	K7	1
Students gain bands-on experience with the analysis design and prototyping of a large-scale software system. Theoretical support is provided	IV∠   by the BEI-SWI course	+ that runs
concurrently and that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teache	r. in the role of the tea	m and project
leader, regularly consults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work is	will be further develop	ed and finished
in the BEI-SP2 course.		
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 the BIE-SWI course	that runs
concurrently and that teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. Th	e teacher, in the role of	of 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	vare artefact will be fu	rther developed
and finished in the BIE-SP2 course.		
BI-SSB System and Network Security	Z,ZK	5
This course is focused on selected areas of computer networks and computer systems in terms of cyber security		
BI-SRC Real-time systems	KZ	4
Students obtain the basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. There	eticla knowledges from	lectures will be
experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, theref	ore the used design ki	ts are the same
as in BI-VES subject and FPGA.		
BI-TJV Java Technology	Z,ZK	4
The subject goal is to introduce the programming language Java. The student gains practical experiences for smaller enterprise application prog	ramming. This subject	presents how
to build the three and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, Res	tWeb services, JNDI	etc.). At the
course end is student able to create three layers enterprise application.		
BI-XML XML Technology	Z,ZK	4
Students learn to make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX	, DOM). An emphasis	will be given to
language XPath which enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basi	cs of XSLI programm	ing. XSLI and
A Path programming will be based on version 2.0. Students will gain a broad overview of XML technologies.	7 71/	
BI-TIS   Information Systems Design	Z,ZK	5
Students know various types of ISs and their practical implementation aspects and are able to match the needs of different market segments (cu	ustomers) with applica	tions of existing
DL TMA 4	7 71/	<u>г</u>
BI-TWA.1 Web Application Design	Z,ZK	5
The basic course of web application development. Initially, the students become familiar with HTTP and its possibilities and party with some pro	perties of language de	escribing the
structure (HTML) and presentation of document of the web (CSS). These shirs provide the necessary basis for the development of web applications. Server side will be demonstrated on PHP technology using frameworks S	Symfony 2 Doctrine 2	
on the client side will be demonstrated using a JavaScript Janguage with library iQuery and possibly MV* framework AngularJS.	, Dootinio 2.	Developmente
BLVES Embedded Systems	7 7K	5
Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and e	embedded processors	their integrated
peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.		, alon integrated
BI-V/WM Searching the Web and Multimedia Databases	7 7K	5
Students get basic overview about search techniques in the web environment that is interpreted as a very large distributed and beterogeneous s	storage of documents	In particular
students acquire information about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction	from web pages. The	v get detailed
knowledge of similarity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming	web search engines for	or the mentioned
data types (documents).	C C	
BI-VZD Data Mining	Z.ZK	4
Students are introduced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessin	g, multidimensional da	ata visualization,
statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationsh	nips between model bia	as and variance,
and know the fundamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply ba	asic data mining tools	to common
problems (classification, regression, clustering).		
BI-ZUM Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the	classical tasks from th	ne areas of state
space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary al	gorithms and the neur	al networks, will
be presented as well.		
BI-ZNS Knowledge-based Systems	Z,ZK	5
Students will become familiar with the systems based on knowledge (knowledge-based systems), which are systems that usetechniques of artifi	cial intelligence to solv	e problems that
require human judgment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of	knowledge-based sys	tems to support
decision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutionary algorithms and evolutionary algorithms are assumed by the set of the se	thms.	

### 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 an
active part in the I	anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both th	e midterm and the	final term
tests with the succe	ess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by indi	vidual teachers du	ring the first
BI-AAG	Automata and Grammars	7 7K	6
Students are introd	uced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite	automata, regular	expressions
and regular gramma	ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between for	mal languages an	d automata.
Knowledge acquir	ed through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation,	and design of digi	tal circuits.
BI-ACM	Programming Practices 1	KZ	5
	This course is presented in Czech.	1/7	-
BI-ACM2	Programming Practices 2	κz	5
BLACM3	Programming Practices 3	K7	5
DI-ACIVIS	This course is presented in Czech.	ΝZ	5
BI-ACM4	Programming Practices 4	KZ	5
-	This course is presented in Czech.		-
BI-ADU.1	Unix Administration	Z,ZK	5
Students will learn t	he internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They	will understand the	differences
between user and a	administrator roles. They will get theoretical and practical knowledge of user management and administration, of users access rights, i	file systems, disk s	subsystems,
processes, memo	ry, network services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the kno	wiedge from the i	ectures on
	Windows Administration	7 7K	1
DI-ADW.1	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	2,213	-
BI-AG1	Algorithms and Graphs 1	Z,ZK	6
The course cover	s the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing cur	riculum. It links an	d partially
develops the know	ledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the	time and space co	mplexity of
algo	rithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics in particular.	ptotic notation.	-
BI-AG2	Algorithms and Graphs 2	Z,ZK	5 rthor dolvos
into advances data	structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English versic	on of the course se	e BIE-AG2.
BI-ALO	Algebra and Logic	Z.ZK	4
	The course extends and deepens the study of topics touched upon in the basic course in logic.	,	
BI-AND.21	Programming for the Android Operating System	KZ	4
	This course is presented in Czech.		
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-AN	G	0
BI-ANGT	English Language Examination without Preparatory Courses	Z,ZK	2
BI-APJ	Aplication Programming in Java This course is presented in Czech. Advanced technologies in Java	Z,ZK	4
BI-APS 1	Architectures of Computer Systems	7 7K	5
Students will lear	n the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec	ial emphasis is giv	ven on the
pipelined instructior	processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the prince	ciples of instruction	processing
not only in scalar pr	ocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the	sequential model o	of programs.
The course further	elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and		ch systems.
BI-AKD	Interactive applications on Arouno ned for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple application	NZ	4 arammable
kits and control va	ried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded s	ystems, i.e. to see	the results
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-AVI.21	Algorithms visually	Z,ZK	4
The course comple	ments other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer sc	ience that extend s	substantially
n nowiedge hiesellie	that make understanding the principles of algorithms easy.	ι,πιμ.//www.alg0vi8	ουτιοιgαgι;)
BI-BAP	Bachelor Thesis	Z	14
BI-BEK	Secure Code	Z.ZK	5
The students will lea	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	miliar with the thre	at modeling
theory, students	gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every	program needs to	run with
administrator privi	leges. Dangers inherent in butter overflows will be practically demonstrated. Students will be introduced to the principles of securing tatabase systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	data and the relati	onships of them

BI-BEZ	Security	Z.ZK	6
Students understan	d the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a	and asymmetric cry	ptosystems,
and hash functions	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	ystems for comput	er systems.
	They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.		
BI-BIG	DB Technologies for Big Data	KZ	4
Brbio	This course is presented in Czech.		•
BI-BI F	Blender	7 7K	1
	de knowledge of opensource program Blander from BLMC4 (Multimedia and Graphics Applications) course. It is intended for those i	nterested in 3D ars	hice and
animation It o	as knowledge of operatories program blender nom or how (multimedia and organics Applications) course. In simerice due to mose	hice applications) of	
	These a complete and practically offended introduction to bender environment. Students may continue to BFF GA (Frogramming graph		00156.
BI-BPR	Bachelor project	Z	2
BI-CAO	Digital and Analog Circuits	Z,ZK	5
Students get the	fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and	principles of functi	onality of
transistors, gates, c	ircuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw	veen analog and di	gital modes
	of electronic devices.		
BI-CCN	Compiler Construction	Z,ZK	5
This is an introdu	ictory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles	of compilers for st	udents to
understa	nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching	theme of the class	6.
BI-CS1	Programming in C#	KZ	4
The goal of the cou	urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental co	onstruction, types of	of variables.
operators, arravs	b loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class def	inition and class in	stancing.
constructors, meth	ods. properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics, Debugging	and exception pro	cessing, as
,	well as work with files are emphasized.		
BLCS2	C# language and data access	K7	1
	of iai iguade and a second and a	oft platform The st	tudonte will
act to know object	and data access course objective is to innounce students several data access technologies - database, AiviL, NOSQL - on the Michael	pologios such as l	
of footures for que	s used to retrieve data - connection, commando, bata keader and bataAdapter V ADC-11 Next, they will rear to use current tech	INO to Objects	
and LINO to SOL	ying and opposing data, integrated unleady with the two planom languages, which enable third use with objects, Awe and Sec []		
(OPM) This part of	. Another objective is the Entry Francework - an object-relational mapper that entables the 1 developers to work with relational data to the active introduces and the france strategies and the second	Ising uomain-speci	nc objects
	the course introduces code rinst, balabase rinst, woder rist approaches. The students will also get to know the conceptual wode	i, Storage Model al	iu mapping
<b>DI 000</b>		1/7	
BI-CS3	Language C# - design of web applications	KZ	4
I he students will be	introduced to current technologies in web application development on the .NE1 platform. They will acquire a comprehensive overview (	of the development	possibilities
	on thisplatform. They will learn to create WebAPI and to use it by client programs.		
BI-DAN	Taxes for non-Economists	Z,ZK	4
Taxes, including so	cial insurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the way how a significant I	portion of GDP is re	edistributed.
This course concer	ns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and	shows how they aff	ect taxation
of income, consum	nption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well a	s information abou	t important
	taxpayers' formal duties towards public administration.		
BI-DBS	Database Systems	Z,ZK	6
Students are intro	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear	n to design small d	atabases
(including integrity of	constraints) 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 found	ation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda	mental concepts of	transaction
processing, control	ling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced t	to special ways of s	storing data
in relational databa	ases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of datal	base systems, deb	ugging and
	optimizing database applications, distributed database systems, data stores.		
BI-DPR	Document., Presentation, Rhetorics	KZ	4
This subject is aime	d to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and pr	epare interactive p	esentations
	and presenting before an audience. Students will also learn to write technical reports and scientific texts.		
BI-EHD	Introduction to European Economic History	7 7K	3
DILIID	This course is presented in Czech However there is an English variant in the program Informatics (B1801 / 4753)	2,213	0
		7.7%	1
	EIIIEI JIISE JAVA	$  \boldsymbol{L}, \boldsymbol{L} \boldsymbol{\Lambda}  $	4
The course is on a	avances technologies in the Java programming language. The locus is on technologies for development of enterprise information sys	sterns which are co	minected to
BI-EMP	Economics and Management Principles	KZ	4
This course is aim	ted to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	fields: enterprise for	oundation,
enterprise putting in	nto state economic environment (CR), management of property and capital structure, business transaction records keeping during a	n accounting period	d, a relation
	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination	l.	
BI-EP1	Effective programming 1	Z	4
	The course is taught in Czech.		
BI-EP2	Efficient Programming 2	KZ	4
Continuation of Ef	ficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi	dual problems are	discussed,
	with the aim to choose the best one and avoid implementation errors.		
BI-FMU	Financial and Management Accounting	Z.ZK	5
The aim of the cou	rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pa	rticular accounting	operations.
operations in accor	unts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification	n of bookkeeping,	description
of economic oper	ations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage	ment accounting a	re base of
	Business Inteligence moduls in Business information systems.	5	
BI-FTR 1	Financial Markets	7 7K	5
2.1.11.1	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753)	-,	Ū
	Varian control evetom CIT	<b>K</b> 2	n
Students will be int	voi suu voi i voi suu	ically in this particu	∠ Ilar evetom
	noused to pass principles or version control systems. These principles will be then shown on DOVS Git both theoretically and place notemantation datails will be shown. Students will be challenged to use Cities users project menagers, team leaders as well as Cities	enver administrate	ura systelli
evenule li		server aurimistiato	13.

This course introduces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring. The monitoring and ar network traffic are mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a source of informatior for analysis). The goals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traffic on a hardware an level and to develop their practical abilities in this field.          BI-HMI       History of Mathematics and Informatics       Z,ZK         BI-HWB       Hardware Security       Z,ZK         The course deals with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with the operating princeryptographic modules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vulnerabilities of HW including side-channel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card technology including an and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.         BI-IOS       Fundamentals of IOS Application Development for iPhone and iPad       KZ         It is course is presented in Czech.       Z,ZK       It is course is presented in Czech.         BI-IOS       Fundamentals of IOS Application Development for iPhone and iPad       KZ         It is course is presented in czech.       Z,ZK       It is course is presented in Czech.	alysis of and data d software 3 5 siples of resources, splications 4 5 :ture and mentation
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and programmable hardware design kits (FPGA).	simulator
BI-KOM 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, the	ability to
categorize and specify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological structural 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 representation in the Internet	They also
learn the foundations of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO method and the BPM	N notation
will be taught. The course is designed with the respect to continuation in software implementations.	
BI-KOI   Programing in Kotlin   Z,ZK	4
Kotlin is a modern, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advanced language const	ructions.
The language is fully dava compliant and allows for mixed projects that preserve existing parts written in dava, and continue with mising the nodern, object-function of the state of the s	ional way
with minimum of bolief-plate code. Last but not least, Kotum is suitable for designing of DSLs (Domain-Specific Languages).	
BI-KSA Cultural and Social Anthropology ZK	Z
I ne one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific discipline dealing with the diversity of the world - example a scientific dis	iples from
antiropological research from our exolic cultures (topics: kinship, religion, social exclusion, ringration, giobalization, , material culture, language, nealth, mistory, death, etc	) will be
DI-LIN   Linear Algebra The source is taught in Crash Students understand the theoretical foundation of leaders and mathematical principles of linear models of sustains around us, where the day	<i>I</i> andonaioa
The course is ladgitum czech. Students understand the information in algebra and manifernatical principles of milear models of systems and under the dependent of algebra and manifernatical principles of milear models of systems and the system matrix operations and endus system.	siluencies
equations They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting of	odes
BI-MEK     Macroeconomic Context of Domestic and World Economy     7.7K	<u></u>
This course is presented in Czech	-
BLMGA Multimedia and Graphics Applications Z 7K	5
Students get acquainted with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for working with images vir	leos 3D
graphics and animation will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to graphic formats, and co	mpression
technologies. They learn to use multimedia transmission and representation systems, including real-time multimedia processing. They understand the principle of operation	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-MIK Fundamentals of Microeconomics Z.ZK	4
BI-MIK         Fundamentals of Microeconomics         Z,ZK           This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).         Image: Provide ProvideProvide Provide ProvideProvide Provide Provide Provi	4
BI-MIK     Fundamentals of Microeconomics     Z,ZK       BI-MIT     Mikrotik technologies     KZ	4
BI-MIK     Fundamentals of Microeconomics     Z,ZK       This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).       BI-MIT     Mikrotik technologies       KZ	4 3 small and
BI-MIK       Fundamentals of Microeconomics       Z,ZK         This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).       KZ         BI-MIT       Mikrotik technologies       KZ         The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic. optical or wirr	4 3 small and eless links
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BI-MIK         Fundamentals of Microeconomics         Z,ZK           This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).         KZ           BI-MIT         Mikrotik technologies         KZ           The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or wir and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks concepts like and technologies of the data-link, network and transport layer of the OSI model.         Z,ZK           BI-MLO         Mathematical Logic         Z,ZK           The course seminary is taught in Czech.         KZ         The course seminary is taught in Czech.           BI-MMP         Multimedia team project         KZ           The course is focused on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universal serial bus (USB). Tincludes both PC side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USB devices, Linux and drivers, simple application development, and APIs of selected devices.         Z,ZK           BI-MMP.21         Modern Visualisation Technologies         Z,ZK           The coaurse is to give an overview	4 3 small and eless links protocols 5 4 5 he course Windows 5 zation on lely fractal
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BI-MIK       Fundamentals of Microeconomics       Z,ZK         BI-MIT       Mikrotik technologies       KZ         The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or wir and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks concepts like and technologies of the data-link, network and transport layer of the OSI model.       KZ         BI-MLO       Mathematical Logic       Z,ZK         BI-MMP       Multimedia team project       KZ         The course is presented in Czech.       KZ       Image: the theorem of the subject stands in the interfacing of peripheral devices. Interfacing peripheral devices is focused on techniques based on Universal serial bus (USB). This course is presented in Czech.         BI-MMP       Methods of interfacing of real peripheral devices is focused on techniques based on Universal serial bus (USB). The course is fore and peripheral devices. Labs are practically oriented. Students gain experience with implementation of relevant parts of USB devices, Linux and drivers, simple application development, and APIs of selected devices.         BI-MVP.21       Modern Visualisation Technologies       Z,ZK         The goal of the course is to give an overview of modern visualization echnologies and their principles, namely technologies related to virtual and	4 3 small and aless links protocols 5 4 5 4 5 he course Windows 5 zation on hely fractal 4 2 1 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3
BI-MIK       Fundamentals of Microeconomics       Z,ZK         BI-MIT       Mikrotik technologies       KZ         The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or win and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks concepts like and technologies of the data-link, network and transport layer of the OSI model.         BI-MLO       Mathematical Logic       Z,ZK         The course seminary is taught in Czech.       KZ         BI-MMP       Multimedia team project       KZ         The course is focused on methods for interfacing of peripheral devices. Interfacing peripheral devices is focused on techniques based on Universal serial bus (USB). T includes both PC side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USB devices, Linux and drivers, simple application development, and APIs of selected devices.       Z,ZK         BI-MVT.21       Modern Visualization technologies and their principles, namely technologies related to virtual and augmented reality, visual high resolution displays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentioned technologies, nam and procedural visualization, scientific data visualization, and 3D model scanning.	4 3 small and eless links protocols 5 4 5 4 5 he course Windows 5 zation on hely fractal 4 g. In this ing, error
BI-MIK         Fundamentals of Microeconomics         Z,ZK           BI-MIT         Mikrotik technologies         KZ           The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and create the architectures of the network solutions which are based on the metallic, optical or use and technologies of the data-link, network and transport layer of the OSI model.           BI-MLO         Mathematical to fail peripheral devices.         Z,ZK           The course is focused on methods for interfacing of peripheral devices is focused on techniques based on Un	4 3 small and eless links protocols 5 4 5 4 5 he course Windows 5 zation on hely fractal 4 g. In this ing, error
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BI-MIK         Fundamentals of Microeconomics         Z,ZK           BI-MIT         Mikrotik technologies         KZ           The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or win and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks concepts like and technologies of the data-link, network and transport layer of the OSI model.         Z,ZK           BI-MLO         Mathematical Logic         Z,ZK         The course seminary is taught in Czech.         KZ           BI-MMP         Multimedia team project         KZ         KZ           The course is presented in Czech.         KZ         This course is presented in Czech.         KZ           BI-MMP         Multimedia team project         KZ         This course is presented in Czech.         KZ           BI-MMP2.1         Methods of interfacing of peripheral devices. Interfacing of real peripheral devices is focused on methods for interfacing of peripheral devices. Interfacing of selected devices.         Z,ZK         The course is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augmented reality, visual isaliton sin practice. Several lectures deal with the content creation for the mentioned technologies, name an	4 3 small and eless links protocols 5 4 5 4 5 vindows 5 zation on nely fractal 4 g. In this ing, error 4 ployment

dispersion comper	sators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission system	ms). The course wi	Il also cover
ultrastable freque	ncy transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters.	Students will solve	real tasks
51.001	from practice.	7 71	
BI-OSY Students underst	Uperating Systems and the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They	∠,∠K ∉ get a solid knowle	dae of OS
kernels, process	ses and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and dead	llocks, the techniqu	les of the
manageme	nt of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple mul	tithreaded applicat	ions.
BI-PA1	Programming and Algorithmics 1	Z,ZK	6
students gain the	ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, stru- ons, concent of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for search	ctured, pointers), e ing sorting and m	aninulating
	with linked lists.	,	
BI-PA2	Programming and Algorithmics 2	Z,ZK	7
Students know th	e instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, o element linked structures. They learn these skills using the programming language C++. Although this is not a module of programming i	queue, enlargeable n C++ students ar	e array, set,
table). They carried	with all C++ features needed to achieve the main objective (operator overloading, templates).		
BI-PAI	Law and Informatics	ZK	3
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-PGA	Programming of graphic applications This course is presented in Czech only.	Z,ZK	5
BI-PGR.1	Computer graphics programming	Z,ZK	5
Students are able t	o program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textu	ures imitating geom	netric details
and materials (ii graphical pipeline	ke wall surrace, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in neometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fun-	computer graphics	, such as professional
development, e.g.	for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface	es, and scientific vis	sualisation.
BI-PHP.1	Programing in PHP	KZ	4
The course is ta	aught in Czech Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices	and will use tool th	at 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 register to register to this course in their 3rd semester of study.	for BIE-TWA.1. The	ey should
BI-P IP	Programming Languages and Compilers	7 7K	5
Students master ba	asic methods of implementation of common high-level programming languages. They get experience with the design and implementat	ion of individual co	mpiler parts
for a simple progra	amming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has	s a certain syntax i	nto a target
form and write a co	ompiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, bu	t extends to all oth	er programs
	tor parsing and processing text in a language defined by a LL(1) grammar.	1/7	4
DI-PJO. I Main goal of the	JavaScript Programming course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development	∣ <b>r∠</b> t in Javascript The	course is
recommended for s	students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for the	his course in their 4	th semester
	of study.		
BI-PJV	Programming in Java This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	4
BI-PKM	Introduction to mathematics	Z	4
	This course is presented in Czech.	1	I
BI-PMA	Programming in Mathematica	Z,ZK	4
Students will be wo	rking with modern technical and scientific software. Students will learn how to use different programming styles (functional programming styles) and visualisations and visualisations and visualisations.	ning, rule-based pr	ogramming,
BI-PNO	Practical Digital Design	K7	5
Students get an ov	erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the	basics of the VHD	L language,
and implementati	on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, ir	ndustry-standard C	AD design
	tools.		
BI-PPA	Programming Paradigms	Z,ZK	5 Eunctional
programming para	digm and its basic paradigms of high-level programming languages, including their basic execution models, benefits, and immations of para	ne principles are de	emonstrated
on lambda calculu	s and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr	ream programming	languages
BI-PRP	Law and business	Z.ZK	4
	This course is presented in Czech.	, ,	I
BI-PRR	Project management This course is presented in Czech	KZ	4
BI-PS1	Programming in Shell 1	KZ	5
Students become	knowledgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating systems	(file systems, prod	cesses and
threads, access rig	hts, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell,	basic commands, a	and filters to
	process various text data.	7 71/	4
BI-PSZ Students gain a g	Programming In Shell 2	$  \angle, \angle K$	4 ener insidht
Students gain a gi	into shell and some other particular scripting languages and will get practical experience with shell script programming.	ion, mey yant a der	ะหะเ แอเมแ
BI-PSI	Computer Networks	Z,ZK	5
Students understa	d the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topic	cs are primarily for	used on the
2nd to 4th layer	of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students network application and configure a simple network	will be able to write	a simple

-	Probability and Statistics	Z,ZK	5
The students will le	arn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable	s. They will be able	e to to apply
basic models of rai	ndom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical inductiv	on they will be able	e to perform
esumations of unkr	nown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the si more random variables	austical dependent	ce or two or
RI-PYT	Python Programming	7 7K	4
	The course is taught in Czech.	2,21	-
BI-QAP	Quantum algorithms and programming	KZ	5
Course aims at givi	ng students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanics, o	n which quantum te	echnologies
are based, and alg	porithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software developr	nent kit Qiskit, whic	ch is based
on Python langua	ge. Knowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VMM	1 and experience w	ith Python
	might be an advantage. No previous knowledge of physics is assumed.	774	
BI-SAP Students understa	Computer Structure and Architecture	L Z,ZK	bne enerot
transfer. In the lab	s. students gain practical experience with the design and implementation of the logic of a simple processor using modern digital desi	an tools. The subie	ect teaches
basic knowledge	of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connect	ions to higher prog	ramming
	languages.		
BI-SCE1	Computer Engineering Seminar I	Z	4
The Seminar of Co	mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	o failures and attack	ks. Students
are approached in	dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the refersional literature and/or work in K. Nichoratories. The capacity of the subject is limited by the possibilities of the cominar teacher.	subject is work will	th scientific
articles and other p	semester.	s. The topics are h	ew ioi eacii
BI-SCE2	Computer Engineering Seminar II	7	4
The Seminar of Co	mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	failures and attack	ks. Students
are approached in	dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the	subject is work wit	th scientific
articles and other p	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher	rs. The topics are n	ew for each
	semester.	774	4
BI-SEP	World Economy and Business	Z,ZK	4
and key regions of	world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as	indexes of econom	nic freedom
corruption and eco	nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of di	scussions based o	n individual
	readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite.		
BI-SI1.2	Software Engineering I	Z,ZK	5
Students learn th	he methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get prac	tical skill thanks to	applying
hands-on analysis	and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE	E tools and UML for	r modelling
	aching activian related problems. They get everyiew of chicet eriented enclysic, design, crebitedure, velidetion, verification, and ter	ting process	
	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and tes	sting processes.	2
BI-SI2.3	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and tes Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753)	ting processes. Z,ZK	3
BI-SQ.I	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and tes Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Machine Oriented Languages	ting processes.	3
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BI-SI2.3 BI-SOJ Students of the cou and efficient coope BI-SP1 Students gain ha concurrently and t leader, regularly co BI-SP1.21 Students gain h	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and tes Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Machine Oriented Languages irse will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal us ration of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view lin This knowledge will be used during reverse engineering, optimization, and evaluation of code security. Team Software Project 1 ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by th that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the possible with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be form the BEI-SP2 course. Team Software Project 1 ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the possible will be used to both the formal and material aspects of the design. The resulting work will be form the BEI-SP2 course. Team Software Project 1 ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the	ting processes. Z,ZK e of microprocesson hked to higher level KZ e BEI-SWI course e role of the team a urther developed a KZ e BIE-SWI course t	3 4 or's features I languages. 4 that runs and project and finished 5 that runs
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	Network Technology 3	Ζ	3
Students will furthe	r enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during B	I-ST1 and BI-ST2	courses will
get further extend	ded in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predi	ctability, extension	beyond a
	simple topology, security, etc.		-
BI-ST4	Network lechnology 4	Z	3
Students will furth	er enhance their knowledge already acquired from previous BI-S11, BI-S12, and BI-S13 courses. Principles of routing and switching	presented during E	BI-SI1 and
BI-SIZ courses g	or further extended in Br-513. Students were able to start time-tune protocols settings to gain certain advantages like increased effici-	ency, predictability,	extension
Broodcost Multiple	topology, security, etc. This module teaches students to configure and fine-tune wide Area Networks and to experience a completely	firmwore perform	ork (Non
recoveries and en	e Access) which radically differs from weil-known Ethemet (bloadcast) type of networks. Students will also manage router and switch pergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-petwork attacks and the mitigatic	nimware, penorm	passworu
recoveries, and en	network running	on ways while mail	itan ing the
BLSTO	Storage and Filesystems	7 7K	4
The student will lea	Surger and runners and current solutions of storage systems architecture. The module explains principles of data store protection, and architecture architecture and architecture and architecture and architecture architecture and architecture and architecture		noileas ang
	In principles and current solutions of storage systems aromeetare. The module explains principles of data store, protection, and arom	ving, as so as store	age seamig,
BLSV/7	Machine vision and image processing	7 7K	5
Camera systems a	iviacining vision and inage processing are becoming a common part of life by being university available. Related to this obenomenon is the need to process and evaluate in	,∠,∠i∧	J The course
introduces students	to different types of camera systems and a variety of methods for imane and video procession. The course is focused on practical use	of camera system	s for solving
	problems of practice that the graduates may encounter.		o loi oonnig
	Test driven architecture	K7	1
The course is for	rest driver and denome with tools like Gitlah Docker. Kubernetes and more that an	e well known in the	- DevOns
world. This co	use has a strong connection on courses like BI(E)-S11 and BI(E)-S12. The main goal of this course is to learn by examples that occu	r in the semester p	roiect.
BI-TEX	TeX and Typography	7 7K	1
This course is pres	ented in Czech This course gives basics of programming in TeX (plain TeX ConTeXt LaTeX OnTeX LuaTeX) Te second part of the c		T typographic
	rules.		.)pog.apo
BI-TIS	Information Systems Design	7 7K	5
Students know vari	initiation organization	s) with applications	s of existing
	technologies (databases programming languages GIII etc.)	o) mar application	or oxioting
BI-T IV	lava Tachology	7 7K	1
The subject goal is	s to introduce the programming language lays. The student areas practical experiences for smaller enterprise application programming	ng This subject pre	- sents how
to build the three	and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (IDBC RestWeb	services JNDI et	c) At the
	course end is student able to create three layers enterprise application.		
BI-TS1	Theoretical Seminar I	7	4
Theoretical semina	r 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 individu	ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a	work with scientific	papers and
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS2	Theoretical Seminar II	7	4
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Theoretical semina	r 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
Theoretical semina are treated individu	r is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a v	al reading group. T work with scientific	he students papers and
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Theoretical semina are treated individu BI-TS3 Theoretical semina are treated individu BI-TS4 Theoretical semina are treated individu BI-TUR Students have a ba not communicate w BI-TWA.1 The basic course structure (HTML) a modern libraries fa BI-ULI Students become BI-VLI Students become BI-VAK.21 The course aims to issue from applicat with the active part will select problem BI-VES Students learn to de BI-VHS The course leads st complemented by	is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally 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. Theoretical Seminar III ris intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally 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. Theoretical Seminar IV ris intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally 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. User Interface Design sic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where s in the user optimally, since the needs and characteristics of users are not taken into account during product development. Students get that bring users into the development process to ensure optimal communication with a user. Web Application Design of web application of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, clilitate the development of Web pages applications. Server side will be demonstrated on PIHP technology using framework Angular. Introduction to Linux familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become is to theory. Togethere, we will first drefet the basis	al reading group. T work with scientific Z al reading group. T work with scientific Z al reading group. T work with scientific Z,ZK oftware and other p ain an overview of t Z,ZK s of language desc which will be demo / 2, Doctrine 2. Dev JS. Z amiliar with basic of minal). Z asic courses, we all data structures. For ration and more. Stu Z,ZK ed processors, theil ZK lents knowledge is is the course can be for ces.	he students papers and 4 he students papers and 4 he students papers and 4 oroducts do he methods 5 oribing the instrated in velopments 2 commands 3 oproach the urthermore, in which we udents will 5 ir integrated 4 furthermore ollowed by

BI-VMM	Selected Mathematical Methods	Z,ZK	4		
We start reviewing	g geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and i	ts fast implementat	tion (FFT).		
Further we deal w	Further we deal with differential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functions. For this purposes, we study				
normed linear spaces and quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization and duality. The linear programming					
	and the Simplex method is analyzed in more detail.	1/7	4		
BI-VK1	VIFTUAL FEALINY ///P) virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of	NZ virtual worlds.com	4 munication		
The course focus	es on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves com	putational thinking	. empathy		
	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 object	ctive is to develop a	applications		
	for computer science and gamification in various social metaverse and desktop engines.				
BI-VWM	Searching the Web and Multimedia Databases	Z,ZK	5		
Students get basi	c overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storage	e of documents. In	particular,		
students acquire i	nformation about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from the search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web search	web pages. They g	et detailed		
Knowledge of Simile	data types (documents).		mentioned		
BI-VZD	Data Mining	Z.ZK	4		
Students are introd	uced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multi	dimensional data vi	isualization,		
statistical technique	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships between the transformation and fundamental principles of knowledge discovery methods.	veen model bias ar	nd variance,		
and know the fur	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic d	ata mining tools to	common		
	problems (classification, regression, clustering).				
BI-XIVL	XIVIL Technology	∠,∠K	4 he divor to		
language XPath M	nake and validate Aivit documents (Aivit Schema, Relax, Schemation) and learn standard methods of their processing (SAX, DOM) (high enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics of X	SLT programming	XSLT and		
	XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies.	programmig.			
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5		
Students get both	a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula ap	proximation, tools	for solving		
	recurrent equations, and basics of graph theory.				
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4		
Intelligent embedde	ed system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of t	he course is to tea	ch students		
interfaces robot na	robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion contr avigation and development tools. In labs, students program a set of basic task by using the robot simulator and real bardware to get p	oi, sensor reading, ractical experience	with these		
	technologies.				
BI-ZMA	Elements of Calculus	Z.ZK	6		
Students acquire	knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking a	nd reasoning and a	are able to		
use basic proof te	chniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the lin	ks between the inte	egrals and		
	sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic ex	pressions.			
BI-ZNF	PHP Framework Nette - basics	KZ	3		
Students will gain th	he basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Gzech po	pular framework.	he resulting		
	Knowledge should serve for the enforcement of a web backend in FriFrianguage.	774	5		
Students will becor	ne familiar with the systems based on knowledge (knowledge-based systems) which are systems that usetechniques of artificial inte	∠,∠r∖ lligence to solve pr	oblems that		
require human judg	ment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of knowle	dge-based systems	s to support		
deo	cision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutiona	ry algorithms.			
BI-ZPI	Process engineering	KZ	4		
Students will learn	fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of p	rocess modelling a	and they will		
learn basics of the	used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of busi	ness processes us	ing modern		
CASE tools. The ro	ale of process engineering for information systems development is discussed as well as its importance in the overall context of inform	ation and business	strategy of		
BI-7RS	Basics of System Control	7 7K	4		
The course gives	an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focus	ر میر مربع s our attention part	icularly on		
control of enginee	ring and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description	n methods of syster	m models,		
basic linear dynam	ic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creati	ing a description of	the system		
model, the basic	linear dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also given	to sensors and ac	tuators in		
control loops, issue	es of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial	implementation of	continuous		
BI_7910	Bachalor internship abroad for 10 prodite	7	10		
Each student can	once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re	search institution	IU Before the		
internship the Dea	an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.	nal content and ex	tent of the		
internship. Auxiliary courses 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 weeks of full-time					
employment with 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 7000	exceeds the academic year's dead-line.				
BI-ZS20	Bacnelor Internship abroad for 20 credits	Search institution	20 Before the		
internship the Dea	an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.	nal content and ex	tent of the		
internship. Auxiliary	courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits corr	respond to 4 weeks	s of full-time		
employment with 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		
	exceeds the academic year's dead-line.	<b>_</b>			
BI-ZS30	Bachelor internship abroad for 30 credits	Z	30		
Each student can	once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re	search institution.	Before the		
		and content and ex			

internship. Auxiliary courses 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 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship

	exceeds the academic year's dead-line.		
BI-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introd	duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical	al tasks from the ar	eas of state
space search, mult	ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm	s and the neural ne	etworks, will
	be presented as well.		
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
	This course is presented in Czech.		
BIE-EEC	English language external certificate	Z	4
The BIE-ECC cours	se can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in Endi	sh comparable to o	r exceedina
	the B2 level of the Common European Framework of Reference for Languages.		
BIE-IMA2	Introduction to Mathematics 2	7	2
Students refresh a	I indextend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a	ble to apply them i	in particular
olucino foncon a	examples		in partioulai
	Artificial Intelligence Eurodementals	7.7K	4
DIE-ZUIVI	A Unicial in the fundamental problems in the Artificial Intellingences and the basis methods for their solving. It focuses mainly as the classical the fundamental problems in the Artificial Intellingences and the basis methods for their solving. It focuses mainly as the classical solution of the fundamental problems in the classical solution of the fundamental problems in the classical solution of the fundamental problems in the classical solution of the fundamental solutio	Z,ZR	4
	Judeo to the fundamental problems in the Artincia menigence, and the basic meniods for their softwing, it focuses manny on the classic		eas of state
space search, mun	uragent systems, game theory, planning, and machine learning, modern soft-computing interious, including the evolutionary algorithm	s and the neural ne	elworks, will
		71/	0
FI-FIL	Philosophy	ZK	2
	see AUB16		
FI-GNO	Introduction to Gnoseology	ZK	2
P edm t studenty	uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v do	ou a um ním. Rozb	oorem d jin
modernismu a myš	šlenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um ní c	odhaleny mechanis	my tv rích
proces . V návazno	osti na teorii p írodních jazyk 🛛 a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín 🛛 na hlediska este	tického vnímání. S	amostatnou
kapitolou jsou mod	lely spojitých p írodních soustav a systém, v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozvoje.	P edm t p ednáší	a garantuje
	Ing. Ivo Janoušek CSc.		
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities sub	oject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that	is required in the	curriculum.
	The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.		
FI-HTE	History of Technology and Economics	ZK	2
The course introdu	ices the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in comp	arison with the dev	elopment of
	the European region 19 to 21 century .		
FI-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 diversit	u of the world over	_
		v oi the world - exa	amples from I
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health	h, history, death, et	amples from tc) will be
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health shown. The course is an interesting alternative to other humanities, taught at FIT.	h, history, death, et	amples from tc) will be
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health shown. The course is an interesting alternative to other humanities, taught at FIT. Managerial Psychology	h, history, death, et	amples from tc) will be
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health shown. The course is an interesting alternative to other humanities, taught at FIT. Managerial Psychology	h, history, death, et	amples from tc) will be
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health shown. The course is an interesting alternative to other humanities, taught at FIT. Managerial Psychology Introduction to Linguistics for Computer This course is presented in Czech	A, history, death, et	amples from tc) will be 2 2
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NI-MOP	Modern Object-Oriented Programming in Pharo	KZ	4
Object-oriented pro	gramming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, where	its ability to natural	abstraction
is used to build corr	plex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the skills	of design and imp	lementation
of object systems	in modern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development no	eeds and areas of	interest. In
addition to deepen	ing object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to work of	n interesting proje	cts and OO
technologies in ter	ms of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involver	ent in the Pharo C	onsortium.
NI-MPL	Managerial Psychology	ZK	2
NI-MSI	Mathematical Structures in Computer Science	Z,ZK	4
Mathematical se	emantics of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Scott	model of lambda	calculus.
	Introduction to category theory.		
NI-OLI	Linux Drivers	Z,ZK	4
The Linux operating	g system is an important operating system for personal computer and also for embedded systems. Systems on chip and combining po	werful processors	and FPGAs
increase the vari	ability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development	nt for master's stud	ents. The
CO	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
Students learn to p	repare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various datas	ources, such as im	ages, texts,
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 of	r from web
	pages.	7 71/	4
NI-PSL	Programming in Scala	Z,ZK	4 tabian and
I ne course introd	uces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language feature	es - e.g.pattern ma	tcning and
advance standard i	brary. Scala enables to use of applications functional patterns e.g. +-List, monaus, etc. Scala is used by many powerful frameworks and	libraries e.g. Play,	Cassanura,
	Deveree Engineering	7 71/	F
NI-REV	REVEISE ENGINEETING	Z,ZR	D Din function
is called Students	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.	ated to reverse end	ineering of
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 debug	ers: 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. Th	ne 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	pon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va	rious 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
Students will gain I	knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre	pare a test set with	the help of
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	ment. They
	will be able to compute, analyze, and control the reliability and availability of the designed circuits.		
NI-VCC	Virtualization and Cloud Computing	Z,ZK	5
Students will gai	n knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and	organizations. The	y will get
acquainted with vi	rtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficie	ntly operate and o	ptimize the
performance pa	rameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effection of the state of the stat	ve technology toda	ay for the
management of co	nplex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills in	the use of moderr	n integration
	and development tools (Continuous integration and development).		
NI-VYC	Computability	Z,ZK	4
	Classical theory of recursive functions and effective computability.		-
I V1	Physical Education	Ζ	0
TV2	Physical Education	Z	0
TV2K1	Physical Education 2	Z	1
TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0
Τνν	Physical education	Z	0
TVV0	Physical education	7	0
		4	5

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-05-20, time 13:00.