Study plan

Name of study plan: Bachelor branch Web and Software Engineering, spec. Software Engineering, 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: 160 Elective courses credits: 20 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)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
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	Bachelor project Zden k Muziká Zden k Muziká 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 Ji í Hunka	Z,ZK	6	2P+2R+1L	Z,L	PP
BI-DPR	Document., Presentation, Rhetorics Ond ej Guth	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	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 Ladislav Vagner	Z,ZK	6	2P+2R+2C	Z	PP
BI-PA2	Programming and Algorithmics 2 Ladislav Vagner	Z,ZK	7	2P+1R+20	L	PP

BI-PS1	Programming in Shell 1 Zden k Muziká	KZ	5	2P+2C	Z	PP	
BI-SI1.2	Software Engineering I Ji í Mlejnek, Zden k Rybola Zden k Rybola Ji í Mlejnek (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 MathematicsZ,ZK52P+2CZJi ina ScholtzováZZZZZ						
BI-ZMA	Elements of Calculus Ivo Petr	Z,ZK	6	3P+2C	Z	PP	
Characteristics of the	e courses of this group of Study Plan: Code=BI-PP.2015 Name	-Compulsorv	Course	s of Bach	elor Stud	ly Program	
Informatics, Presente	ed in Czech, Version 2015	-companeory	eeulee				
	gorithms and Graphs 1 is of efficient algorithm design, data structures, and graph theory, belonging to the co	re knowledge of ov			,ZK	6 d partially	
	n the course BI-DML.21, in which students acquire the knowledge and skills in comb			•			
	follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematic	cs, in particular, the	asymptotic				
	Itomata and Grammars pasic theoretical and implementation principles of the following topics: construction, us	so and mutual trans	formations		,ZK	6 ar expressions	
	slation finite automata, construction and use of pushdown automata, hierarchy of formation				-		
	h the module is applicable in designs of algorithms for searching in text, data compres						
BI-BAP Ba	ichelor Thesis	i	-		Z	14	
BI-BPR Ba	ichelor project				Z	2	
	ecurity			Z	,ZK	6	
	hematical fundamentals of cryptography and have an overview of current cryptographic	algorithms and appl	lications: sy		· .	cryptosystems,	
and hash functions. They als	so learn the fundamentals of secure programming and IT security, the fundamentals of	of designing and us	ing modern	cryptosyste	ms for comp	uter systems.	
	ly and securely cryptographic primitives and systems that are based on these primitiv	ves.					
	gital and Analog Circuits				,ZK	5	
	al understanding of technologies underlying electronic digital systems. They understa nd conductors. They are able to design simple circuits and evaluate circuit parameters						
of electronic devices.		s. They understand		ices betweel	i analog anu	uigitai moues	
	atabase Systems			7	,ZK	6	
	he database engine architecture and typical user roles. They are briefly introduced to	various database i	models. The	1	· I	-	
	ts) using a conceptual model and implement them in a relational database engine. Th			-	-		
its theoretical foundation - the	e relational database model. They learn the principles of normalizing a relational databa	ase schema. They u	inderstand t	he fundamer	ital concepts	of transaction	
	llel user access to a single data source, as well as recovering a database engine fron	-	-	-	-	-	
	respect to speed of access to large quantities of data. This introductory-level course of	does not cover: Adr	ministration	of database	systems, de	bugging and	
	tions, distributed database systems, data stores.				/7	4	
	ocument., Presentation, Rhetorics rofessional communication and writing of the scientific texts (bachelor's and diploma the	esis) Students will h	earn to crea	1	KZ	4	
	idience. Students will also learn to write technical reports and scientific texts.	esis). Otudents wiin	earrito crea	te and prepa		presentations	
	near Algebra			7	,ZK	7	
	ch. Students understand the theoretical foundation of algebra and mathematical princi	iples of linear mode	els of syster	1	·	dependencies	
among components are only	Inear. They know the basic methods for operating with matrices and linear spaces. T	hey are able to per	form matrix	operations a	nd solve sys	stems of linear	
equations. They can apply th	nese mathematical principles to solving problems in 2D or 3D analytic geometry. They	y understand the er	ror-detectin	g and error-o	correcting co		
	athematical Logic			Z	,ZK	5	
The course seminary is taug					714		
	perating Systems	odulo "Drogromoir			,ZK	5 adaptation	
	ssical theory of operating systems (OS) in addition to the knowledge gained in the m ads implementations. They understand the problems of race conditions, thread sched	-	-			-	
	lory, principles and architectures of disks, RAID and file systems. They are able to deal	0,		,			
	omputer Networks	5	,		,ZK	5	
	sic common techniques, protocols, technologies, and algorithms necessary to commo	unicate in compute	r networks.				
	OSI model. They also get a basic understanding of communication media, security, an	nd network administ	tration. Stud	lents will be	able to write	a simple	
network application and cont							
	obability and Statistics			1	,ZK	5	
	asics of probabilistic thinking, the ability to synthesize prior and posterior information						
	iable distributions and solve applied probabilistic problems in informatics and comput ributional parameters from random sample characteristics. They will also be introduce	•				·	
more random variables.							
	ogramming and Algorithmics 1			Z	,ZK	6	
	ormulate algorithms for solving basic problems and write them in the C language. The	ey understand data	types (sim			-	
	ept of recursion. They learn to analyse simple cases of algorithm complexity. They know	ow fundamental alg	orithms for	searching, s	orting, and n	nanipulating	
with linked lists.							
	ogramming and Algorithmics 2			1	,ZK	7	
I STUDENTS KNOW the instrume	pre or opport origination programming and are able to use them for specifying and imple	ementing abstract o	iata types (stack, queue	eniargeable	e array, set,	
	nts of object-oriented programming and are able to use them for specifying and imple	ab this is not a mod	Ile of progre	-	-	-	
table). They can implement lin	nked structures. They learn these skills using the programming language C++. Althoug	gh this is not a modu	ule of progra	-	-	-	
table). They can implement lin with all C++ features needed	inked structures. They learn these skills using the programming language C++. Althoug d to achieve the main objective (operator overloading, templates).	gh this is not a modu	ule of progra	Imming in C+	+, students a	are introduced	
table). They can implement lii with all C++ features needed BI-PS1 Pro	nked structures. They learn these skills using the programming language C++. Althoug	-		Imming in C+	+, students a	are introduced	
table). They can implement lii with all C++ features needed BI-PS1 Pro Students become knowledge	nked structures. They learn these skills using the programming language C++. Althoug d to achieve the main objective (operator overloading, templates). ogramming in Shell 1	tal principles of the	operating s	ystems (file s	+, students a	are introduced 5 ocesses and	

BI-SI1.2	Software Engineering I	Z,ZK	5					
Students learn the meth	Students learn the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get practical skill thanks to applying							
hands-on analysis and o	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-rel	ated problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and testing proces	sses.						
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, stud	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 digit	al 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 mat	hematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula	approximation, too	ols for solving					
recurrent equations, and	I basics of graph theory.							
BI-ZMA	Elements of Calculus	Z,ZK	6					
Students acquire knowle	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. The	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: 32 The role of the block: PZ

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

Name of the group: Compulsory Courses of Bachelor Specialization Software Engineering, in Czech, Version 2015

Requirement credits in the group: In this group you have to gain 32 credits Requirement courses in the group: In this group you have to complete 8 courses

Credits in the group: 32

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-KOM	Conceptual Modelling Robert Pergl	Z,ZK	5	2P+2C	Z	PZ
BI-OOP	Object-Oriented Programming Filip K ikava	Z,ZK	4	2P+2C	Z	PZ
BI-PAI	Law and Informatics Zden k Ku era	ZK	3	2P	Z	PZ
BI-PPA	Programming Paradigms Jan Janoušek	Z,ZK	5	2P+2R	Z	PZ
BI-SI2.3	Software Engineering 2 Martin Hlavatý Zden k Rybola Martin Hlavatý (Gar.)	Z,ZK	3	2P	Z	PZ
BI-SP1	Team Software Project 1 Ji í Mlejnek	KZ	4	2C	L	PZ
BI-SP2.1	Team Software Project 2 Ji í Mlejnek	KZ	4	2C	Z	PZ
BI-TJV	Java Technology Ond ej Guth	Z,ZK	4	2P+2C	Z	PZ

Characteristics of the courses of this group of Study Plan: Code=BI-PZ-WSI-SI.2015 Name=Compulsory Courses of Bachelor Specialization Software Engineering, in Czech, Version 2015

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	n how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data repres	entation in the Int	ernet. They also					
learn the foundations of	enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEM	O method and the	BPMN notation					
will be taught. The cours	e is designed with the respect to continuation in software implementations.							
BI-OOP	Object-Oriented Programming	Z,ZK	4					
Object-oriented program	ming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togethe	er by message pa	ssing. In this					
course we look at some	of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software deve	elopment includin	g testing, error					
handing, refactoring and	I design patterns.							
BI-PAI	Law and Informatics	ZK	3					
This course is presented	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).							
BI-PPA	Programming Paradigms	Z,ZK	5					
The course deals with b	asic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of part	icular approache	s. Functional					
programming paradigm	and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming	. The principles a	re demonstrated					
on lambda calculus and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstream programming languages								
such as C++ and Java.								
BI-SI2.3	Software Engineering 2	Z,ZK	3					
This course is presented	is course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).							

	am Software Project 1			1	KZ	4
	erience with the analysis, design, and prototyping of a large-scale software system. The		•			
	s the necessary techniques and theory. Teams consisting of 4-6 students will work on h the team (at the seminars) with respect to both the formal and material aspects of the team of the seminars) with respect to both the formal and material aspects of the team of team of the team of team of team of team of the team of t					
in the BEI-SP2 course.	in the team (at the seminars) with respect to both the formal and material aspects of th	le design. The les	Sulling Work		ei developed a	
	am Software Project 2				KZ	4
1 1	zech. However, there is an English variant in the program Informatics (B1801 / 4753)			I		
BI-TJV Jav	a Technology			Z	,ZK	4
, ,	ce the programming language Java. The student gains practical experiences for smal				, ,	
	ayers enterprise systems. The student practically exercises all communication interfac	es for each layers	(JDBC, Res	stWeb servi	ces, JNDI etc.)	. At the
course end is student able to	create three layers enterprise application.					
Name of the block	c: Compulsory elective economic-management co					
		uises				
	of credits of the block: 4					
The role of the blo	ock: VE					
Code of the group	b: BI-PV-EM.2015					
Name of the grou	p: Compulsory Elective Economical Courses of Be	c. Program	Inform	atics. I	Presente	d in
Czech, Ver. 2015						•
,	lite in the group: In this group you have to gain at I	looot 1 oro	dita (at	mont 1	2)	
•	lits in the group: In this group you have to gain at		•		•	
•	rses in the group: In this group you have to comple	ete at leas	t 1 coui	rse (at	most 3))
Credits in the gro	up: 4					
Note on the group):					
	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
	members)	Completion	oround	000000		
DI DANI	Tutors, authors and guarantors (gar.)	7 71/		00.00		
BI-DAN	Taxes for non-Economists	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-PRR	Project management David Pešek	KZ	4	2P+2C	Z	VE
BI-SEP	World Economy and Business Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	L	VE
BI-MIK	Fundamentals of Microeconomics Tomáš Evan 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 Na	me=Compuls	sory Elec	tive Eco	nomical C	ourses of

Macroeconomic Context of Domestic and World Economy

Law and business **Project management** Z,ZK

Z,ZK

4

4

2P+2C

2P+1R

Ζ

L

VE

VE

BI-MEK

BI-PRP

Bc. Program Infor	matics, Presented in Czech, Ver. 2015		
BI-DAN	Taxes for non-Economists	Z,ZK	4
Taxes, including social i	nsurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the way how a significa	ant portion of GDI	P 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	ind shows how th	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	about important
taxpayers' formal duties	s towards public administration.		
FI-VEZ	economic-managerial course from a study abroad	Z	4
A "Humanities subject t	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 appr	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 presente	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		1
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is presente	d in Czech.		•
BI-PRP	Law and business	Z,ZK	4
This course is presente	d in Czech.		1
BI-PRR	Project management	KZ	4
This course is presente	d in Czech.		•
BI-SEP	World Economy and Business	Z,ZK	4
This course is presente	d in Czech. The course introduces students of technical university to the international business. It does that predominantly by	comparing indiv	idual countries
and key regions of world	economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as we	l as indexes of ec	onomic freedom,
corruption and econom	ic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of	of discussions ba	sed on individual
readings. It is advised to	o take bachelor level of this course BIE-SEP as a prerequisite.		
BI-MIK	Fundamentals of Microeconomics	Z,ZK	4
This course is presente	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		•

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	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-EMP	Economics and Management Principles David Buchtela	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 wi	th fields: enterpris	e foundation,			
enterprise putting into s	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 prod	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: -- 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) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
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 ca	n be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in E	nglish comparable	e to or exceeding		
the B2 level of the Corr	mon European Framework of Reference for Languages.				
BI-ANG	English Language, Internal Certificate	ZK	2		
Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG					

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

Code of the group: BI-PT.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:

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

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

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

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

Name of the block: 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

Faculty guarantees the availability of these modules. Note on the group: Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) Philosophy FI-FIL Z,L ΖK 2 2P VH Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.) **History of Mathematics and Informatics BI-HMI** Z.ZK 3 2P+1C L VН Alena Šolcová **Alena Šolcová** Alena Šolcová (Gar. **History of Technology and Economics** FI-HTE ΖK 2 Z.L 2+0VH Jan Mikeš, Marcela Efmertová Marcela Efmertová Jan Mikeš (Gar.) Humanities subject from a study abroad FI-HPZ Ζ 3 Z,L 0+0 VH Miroslav Balík Managerial Psychology FI-MPL ΖK 2 2+0 Z,L VН Jan Fiala Introduction to European Economic History **BI-EHD** 2P+1C Z,ZK 3 Z,L VН Tomáš Evan Tomáš Evan Tomáš Evan (Gar.) Cultural and Social Anthropology FI-KSA L.Z 7K 2 2P VH Jakub Šenovský **Cultural and Social Anthropology BI-KSA** ΖK 2 2P Z,L VН Alena Libánská, Tomáš Houdek, Jakub Šenovský **Jakub Šenovský** Alena Libánská (Gar.) Introduction to Linguistics for Computer FI-ULI 2 2P L ΖK VH Václav Cvr ek

FI-GNO Introduction to Gnoseology Ivo Janoušek	ZK	2	2+0	L	VH
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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						
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 comparison with the development of						
the European region 19	to 21 century.					
FI-HPZ	Humanities subject from a study abroad	Z	3			
A "Humanities subject t	hat has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module th	at is required in t	the curriculum.			
The substitution is appr	oved 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 cour	se aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the dive	rsity of the world	- examples from			
anthropological researc	h from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, he	alth, history, deat	h, 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 cour	se aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diver	sity of the world	- examples from			
anthropological researc	h from our "exotio" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, he	alth, history, deat	h, 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	í do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, 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 na teorii p írodních jazyk a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín na hlediska estetického vnímání. Samostatnou						
kapitolou jsou modely s	pojitých p írodních soustav a systém, v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozvo	je. Pedmtped	náší a garantuje			
Ing. Ivo Janoušek CSc.	Ing. Ivo Janoušek CSc.					

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

Code of the group: BI-V-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 structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English version of the course see BIE-AG2.					

Code of the group: BI-V.2017Name of the group: Purely Elective Courses of Bachelor Programme BI, Version 2017Requirement credits in the group:Requirement courses in the group:Credits in the group: 0Note 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)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
BI-ALO	Algebra and Logic Jan Starý Jan Starý 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 Ji í Dan ek	Z,ZK	4	2P+1R+1C	Z	V
NI-AFP	Applied Functional Programming Robert Pergl, Marek Suchánek, Daniel N mec Robert Pergl Robert Pergl (Gar.)	КZ	5	2P+1C	L	V
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek	Z,ZK	4	2P+2C	L	V
BI-BLE	Blender Lukáš Ba inka Lukáš Ba inka Lukáš Ba inka (Gar.)	Z,ZK	4	2P+2C	L	V
NI-DSP	Database Systems in Practes Tomáš Vichta Tomáš Vichta Tomáš Vichta (Gar.)	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 Jí í Dan ek	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 Hynek, Tomáš ejka Tomáš ejka Tomáš ejka (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.)	КZ	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	C# language and data access Pavel Št pán Pavel Št pán Pavel Št pán (Gar.)	KZ	4	0P+3C	Z	V
BI-CS3	Language C# - design of web applications Pavel Št pán Pavel Št pán Pavel Št pán (Gar.)	КZ	4	3C	Z	V
BI-SQL.1	Language SQL, advanced Michal Valenta Michal Valenta (Gar.)	KZ	4	3C	L	V
BI-QAP	Quantum algorithms and programming Ivo Petr, Tomáš Kalvoda 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	Managerial Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P	Z,L	V
NI-MSI	Mathematical Structures in Computer Science Jan Starý	Z,ZK	4	2P+1C	L	V
BI-MPP.21	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MIT	Mikrotik technologies Jan Fesl Jan Fesl Jan Fesl (Gar.)	КZ	3	1P+2C	Z	V
NI-MOP	Modern Object-Oriented Programming in Pharo Jan Blizni enko Robert Pergl Robert Pergl (Gar.)	KZ	4	3C	Z	V
BI-MVT.21	Modern Visualisation Technologies Ji í Chludil, Petr Pauš Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MMP	Multimedia team project Zde ka echová Zde ka echová Zde ka echová (Gar.)	КZ	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	КZ	5	4C	L	V
BI-ACM2	Programming Practices 2 Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	КZ	5	4C	Z	V
BI-ACM3	Programming Practices 3 Tomáš Valla, Ond ej Suchý Tomáš Valla 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	KZ	4	3C	L	v
BI-CS1	Jan Mottl, Jan Vep ek, Marek Kodr Jan Mottl Marek Kodr (Gar.) Programming in C# Pavel Št pán, Helena Wallenfelsová Helena Wallenfelsová Pavel Št pán (Gar.)	KZ	4	3C	L,Z	v
BI-PJV	Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	v
BI-PJS.1	JavaScript Programming Old ich Malec	KZ	4	3C	L	v
BI-KOT	Programing in Kotlin Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+2C	L	v
NI-PSL	Programming in Scala Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+1C	Z	v
BI-PMA	Programming in Mathematica Zden k Buk Zden k Buk Zden k Buk (Gar.)	Z,ZK	4	2P+2C	Z,L	v
BI-PHP.1	Programing in PHP	KZ	4	3C	Z	V
BI-PS2	Programming in shell 2 Lukáš Ba inka	Z,ZK	4	2P+2C	L	v
NI-PDD	Data Preprocessing	Z,ZK	5	2P+1C	Z	v
BI-PKM	Marcel Ji ina Marcel Ji ina Marcel Ji ina (Gar.) Introduction to mathematics	Z	4		Z	v
NI-REV	Tomáš Kalvoda Tomáš Kalvoda Tomáš Kalvoda (Gar.) Reverse Engineering			1P+2C	Z	
	Josef Kokeš Josef Kokeš Josef Kokeš (Gar.)	Z,ZK	5			V
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SCE2	Computer Engineering Seminar II Hana Kubátová Hana Kubátová 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 Marcel Ji ina	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,Z	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
BI-TS1	Theoretical Seminar I Dušan Knop, Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	V
BI-TS2	Dusan Knop, Tomáš Valla, Ond ej Suchý Tomáš Valla Ond ej Suchý (Gar.)	Z	4	2C	L	v
BI-TS3	Theoretical Seminar III Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	v
BI-TS4	Theoretical Seminar IV Tomáš Valla, Ond ej 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	ЗP	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 Zden k Muziká Zden k Muziká (Gar.)	Z	2	4D	Z	v

BI-OPT	Introduction to Optical Networks Pavel Tvrdík	Z,ZK	4	2P+1C	Z	v
NI-VCC	Virtualization and Cloud Computing Tomáš Vondra, Jan Fesl Tomáš Vondra Tomáš Vondra (Gar.)	Z,ZK	5	2P+1C	L	V
BI-VHS	Virtual game worlds Radek Richtr	ZK	4	2P+2C	Z	V
BI-VR1	Virtual reality I Petr Klán, Petr Pauš Petr Klán Petr Klán (Gar.)	KZ	4	2P+2C	L,Z	V
BI-VR2	Virtual reality II Petr Klán Petr Klán (Gar.)	KZ	3	1P+2C	L	V
BI-VAK.21	Selected Applications of Combinatorics Tomáš Valla Michal Opler Michal Opler (Gar.)	Z	3	2R	L	V
BI-VMM	Selected Mathematical Methods Marzieh Forough Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	4	2P+2C	L	V
NI-VYC	Computability Jan Starý Jan Starý 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	3D Printing Miroslav Hron ok, Tomáš Sýkora Tomáš Sýkora Miroslav Hron ok (Gar.)	KZ	4	3C	L	V

Characteristics of the courses of this group of Study Plan: Code=BI-V.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			
TVKZV	Physical Education Course	Z	0			
TVKLV	Physical Education Course	Z	0			
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-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 compute	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.or	g <http: td="" www.al<=""><td>govision.org>)</td></http:>	govision.org>)			
that make understandir	ig 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 Achievene	nt - students are	due to: -Take an			
active part in the languation	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	rs 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	anguages are on			
the rise nowadays and	the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, mas	ering this paradic	jm 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 t	he areas of state			
space search, multi-age	ent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algori	hms and the neu	ral networks, will			
be presented as well.						
BI-BLE	Blender	Z,ZK	4			
The course extends know	weledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those	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	s applications) co	ourse.			
NI-DSP	Database Systems in Practes	Z,ZK	4			
This course is presente						

BI-STO Storage and Filesystems	Z,ZK	4
The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and a	1 1	storage scaling,
load balancing and high availability.		
NI-DZO Digital Image Processing	Z,ZK	4
This course presents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical	-	-
implement and have an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that		
of digital image processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HD	-	-
frequency domain, abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray interactive as-rigid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, a		
NI-DDM Distributed Data Mining	KZ	4 maturiy.
Course focuses on state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain han		-
data processing framework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementation		-
approaches to parallelize other algorithms. The course is prezented in czech language.		
BI-EP1 Effective programming 1	Z	4
The course is taught in Czech.	1	I
BI-EP2 Efficient Programming 2	KZ	4
Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving inc	dividual problems	are discussed,
with the aim to choose the best one and avoid implementation errors.		
BI-EJA Enterprise Java	Z,ZK	4
The course is on advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information	systems which a	re 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	•	
operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modific	-	
of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage	gement accounting	g are base of
Business Inteligence moduls in Business information systems.	KZ	4
BI-HAM HW accelerated network traffic monitoring	1	
This course introduces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring. network traffic are mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as	-	-
for analysis). The goals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network		
level and to develop their practical abilities in this field.		
BI-ARD Interactive applications on Arduino	KZ	4
The subject is designed for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple app	lications for mode	rn programmable
kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedde	d systems, i.e. to s	see the results
not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore	re is suitable even	for Web and
Software Engineering students.		
NI-IAM Internet and Multimedia	Z,ZK	4
The NI-IAM course is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes a	-	
presentation of AV signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practi audiovisual transmissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the		
the quality and latency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the students and the students will be and the students an		
for audience.		
BIE-IMA2 Introduction to Mathematics 2	Z	2
Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a	-	-
examples.		·
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 Mid	1	he 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	as 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 SQ		
and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational dat		-
(ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual M	odel, Storage Mod	lel and Mapping
(XML description).	1/7	4
BI-CS3 Language C# - design of web applications	KZ	4
The students will be introduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overv on thisplatform. They will learn to create WebAPI and to use it by client programs.	lew of the develop	nent possibilities
	KZ	4
BI-SQL.1 Language SQL, advanced Module is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language.	1	1
triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the p	-	
structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plar		
will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Or	acle DBMS and pa	artially on
PostgreSQL.		
BI-QAP Quantum algorithms and programming	KZ	5
Course aims at giving students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanic	-	-
are based, and algorithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software deve	-	
on Python language. 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-V	MM and experience	ce with Python
might be an advantage. No previous knowledge of physics is assumed.		-
NI-LSM Statistical Modelling Lab	KZ	5
The subject is oriented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress i available information and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms		
At this point, the subject is on the border of own research and may result in the topic of final work (diploma or bachelor thesis).	, and analyses of t	
NI-MPL Managerial Psychology	ZK	2

NI-MSI Mathematical Structures in Computer Science	Z,ZK	4
Mathematical semantics of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Sco	tt model of lambd	a calculus.
Introduction to category theory.		1
BI-MPP.21 Methods of interfacing peripheral devices	Z,ZK	5
The course is focused on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Univ includes both PC side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of		
drivers, simple application development, and APIs of selected devices.	JOD devices, Linc	
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	1	-
middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on th	e metallic, optical	or wireless links
and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer	er networks conce	pts like protocols
and technologies of the data-link, network and transport layer of the OSI model.		
NI-MOP Modern Object-Oriented Programming in Pharo	KZ	4
Object-oriented programming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, while is used to build complex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the	,	
of object systems in modern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development	-	-
addition to deepening object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to we		
technologies in terms of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct invol	vement in the Pha	aro Consortium.
BI-MVT.21 Modern Visualisation Technologies	Z,ZK	5
The goal of the course is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and an		
high resolution displays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the men	ioned technologie	es, namely fractal
and procedural visualization, scientific data visualization, and 3D model scanning.	1/7	4
BI-MMP Multimedia team project This course is presented in Czech.	KZ	4
	Z,ZK	4
NI-OLI Linux Drivers The Linux operating system is an important operating system for personal computer and also for embedded systems. Systems on chip and combinin	1 1	1 -
increase the variability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver developm		
course provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practical experience		
BI-ACM Programming Practices 1	KZ	5
This course is presented in Czech.	·	
BI-ACM2 Programming Practices 2	KZ	5
This course is presented in Czech.		
BI-ACM3 Programming Practices 3	KZ	5
This course is presented in Czech.		_
BI-ACM4 Programming Practices 4	KZ	5
This course is presented in Czech. BI-AND.21 Programming for the Android Operating System	KZ	4
This course is presented in Czech.		4
BI-CS1 Programming in C#	KZ	4
The goal of the course is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamenta	1	1 -
operators, arrays, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class definitions are classed on the object oriented programming in C# - classed on the object oriented programming i	efinition and class	instancing,
constructors, methods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugg	ing and exception	n processing, as
well as work with files are emphasized.		
BI-PJV Programming in Java	Z,ZK	4
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	1/7	4
BI-PJS.1 JavaScript Programming Main goal of the course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases developme	KZ	4
recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register i	-	
of study.		
BI-KOT 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 ad	vanced language	constructions.
The language is fully Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development o	i a modern, object	t-functional way
with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages).		
NI-PSL Programming in Scala	Z,ZK	4
The course introduces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language fea advance standard library. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks		
Scalaz, etc.	and ibraries e.g.	ridy, Cassaliula,
BI-PMA Programming in Mathematica	Z,ZK	4
Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional program		-
etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.		
BI-PHP.1 Programing in PHP	KZ	4
The course is taught in Czech. Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices		
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	for BIE-TWA.1.T	hey should
BI-PS2 Programming in shell 2	7 71/	4
BI-PS2 Programming in shell 2 Students gain a general overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ac	Z,ZK	1 -
into shell and some other particular scripting languages and will get practical experience with shell script programming.	anon, mey yant a	a dooper moight
NI-PDD Data Preprocessing	Z,ZK	5
Students learn to prepare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various data		1
time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of character	ristics from image	es or from web
pages.		

BI-PKM	Introduction to mathematics	Z	4
This course is presented	d in Czech.		
NI-REV	Reverse Engineering	Z,ZK	5
	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		
	C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be d ing work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the compute the computer of the second second second second second second second secon		
	ninars, where students will solve practically oriented tasks from the real world.		
BI-SCE1	Computer Engineering Seminar I	Z	4
	er Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance	ce to failures and a	attacks. Students
	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	-	
	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead	chers. The topics	are new for each
semester.	Computer Engineering Sominor II	Z	4
BI-SCE2 The Seminar of Comput	Computer Engineering Seminar II er Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistanc		
	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is a supervisor.		
	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead	-	
semester.			
BI-ST1	Network Technology 1	Z	3
	to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	ed under the Cisc	o Netacad -
CCNA1 - R&S Intro		7	0
BI-ST2	Network Technology 2	Z	3
This course is presented BI-ST3		Z	3
	Network Technology 3 nance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented durir	_	-
	the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, pre	-	
simple topology, security		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,
BI-ST4	Network Technology 4	Z	3
Students will further ent	hance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switchi	ng presented duri	ng BI-ST1 and
-	her extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased eff		-
	gy, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a complete		
	ess) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and swit ncy procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitig		
network running.		ation ways while i	
BI-SOJ	Machine Oriented Languages	Z,ZK	4
	will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optima	· ·	-
	n of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of vie		
This knowledge will be u	used during reverse engineering, optimization, and evaluation of code security.		
BI-SVZ	Machine vision and image processing	Z,ZK	5
-	ecoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluat	-	
	lifferent types of camera systems and a variety of methods for image and video processing. The course is focused on practical at the graduates may encounter.	use of camera sys	stems for solving
	Parsing and Compilers	Z,ZK	5
	the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of		•
	troduced to special applications of parsers, such as incremental and parallel parsing.		
BI-GIT	Version control system GIT	KZ	2
Students will be introduc	ced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and pr	actically. In this pa	articular system
even the implementation	n details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git server	r administrators.	
TV2K1	Physical Education 2	Z	1
BI-TS1	Theoretical Seminar I	Z	4
	ntended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier of the students which want to come in deeper contact with contemporary theoretical computer science with the students which want to come in deeper contact with contemporary theoretical computer science with the students which want to come in deeper contact with contemporary the students which want to come in deeper contact with contemporary the students which want to compute science with the students		
-	and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is b. The capacity is limited by the the potentials of the teachers of the seminar.	s a work with scie	ntific papers and
BI-TS2	Theoretical Seminar II	Z	4
	ntended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classifier the science in the science is a student science with contemporary theoretical computer science.		
	and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is		
other scholarly literature	e. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS3	Theoretical Seminar III	Z	4
	ntended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a class		-
-	and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is	s a work with scie	ntific papers and
BI-TS4	e. The capacity is limited by the the potentials of the teachers of the seminar.	Z	Λ
	Theoretical Seminar IV ntended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a cla		4 up. The students
	and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is		
-	e. The capacity is limited by the the potentials of the teachers of the seminar.		-
BI-TDA	Test driven architecture	KZ	4
	on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that		-
	a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occur i		-
NI-TSP	Testing and Reliability	Z,ZK	5 with the help of
-	ledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to l zation and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with		-
-	analyze, and control the reliability and availability of the designed circuits.	- Sant-III-SEII-leSl (

BI-CCN Compiler Construction	Z,ZK	5
This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic princip understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching the	-	students to
BI-TEX TeX and Typography	Z,ZK	4
This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part or rules.	of the course focuse	s on typographic
BI-ULI Introduction to Linux	Z	2
Students become familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and because	ome familiar with ba	sic commands
and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal).	7 71/	
BI-OPT Introduction to Optical Networks Students get basic overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, or		4 with deployment
of optical network technology and on their solutions. The course will include the history of optical communications, an overview of passive compo		
dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission		-
the most up-to-date topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, su		
ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their paramet	ers. Students will so	lve real tasks
from practice. NI-VCC Virtualization and Cloud Computing	Z,ZK	5
Students will gain knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies	1 1	-
acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to	-	
performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effort	ective technology to	day for the
management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical	skills in the use of mo	odern integration
and development tools (Continuous integration and development).	ZK	4
BI-VHS Virtual game worlds The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This curre		•
complemented by the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual work		-
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 Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirement		
The course focuses on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves and shared social activities.	computational thin	king, empathy
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. Th	1	-
for computer science and gamification in various social metaverse and desktop engines.		
BI-VAK.21 Selected Applications of Combinatorics	Z	3
The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to		
issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some		
with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretica will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, op	-	
also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		
BI-VMM Selected Mathematical Methods	Z,ZK	4
The lecture begins with an introduction to the analysis of complex functions of a complex variable. Next, we present the Lebesgue integral. We the	n address Fourier s	eries and their
properties. Further, we introduce and study the properties of the Discrete Fourier Transform (DFT) and its fast implementation (FFT). We discuss it	he wavelet transforr	n. We examine
the linear programming problem in more detail and its solution using the Simplex algorithm. Each topic is demonstrated with interesting examples	7 71/	4
NI-VYC Computability Classical theory of recursive functions and effective computability.	Z,ZK	4
BI-ZS10 Bachelor internship abroad for 10 credits	Z	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/		-
internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the prof	essional content and	d extent 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 cred	-	
employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divid	led into two subjects	if the internship
exceeds the academic year's dead-line. BI-ZS20 Bachelor internship abroad for 20 credits	Z	20
Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/	1	-
internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the prof		
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 cred	ts correspond to 4 w	veeks 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 divide	led into two subjects	s if the internship
exceeds the academic year's dead-line.	7	00
BI-ZS30 Bachelor internship abroad for 30 credits Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/	Z Z	30 Before the
internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the prof		
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 cred		veeks 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 divide	ts correspond to 4 w	
exceeds the academic year's dead-line.		s if the internship
	led into two subjects	
BI-ZIVS Intelligent Embedded System Fundamentals	led into two subjects	4
	led into two subjects KZ m of the course is to	4 o teach students
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The air and the system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The air and the system fundamentals for the sy	KZ m of the course is to control, sensor rea	4 o teach students ding, application
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The ai modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to technologies.	KZ KZ m of the course is to n control, sensor rea get practical experi	4 o teach students ding, application ence with these
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The ai modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to technologies. BI-ZPI Process engineering	KZ Monotical experience KZ Monotrol, sensor rea get practical experience KZ	4 b teach students ding, application ence with these 4
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The ai modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to technologies. BI-ZPI Process engineering Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principle	KZ m of the course is to control, sensor rea get practical experi KZ ss of process model	4 b teach students ding, application ence with these 4 ing and they will
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The ai modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to technologies. BI-ZPI Process engineering Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principle 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 the used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of the used notations.	KZ m of the course is to control, sensor rea get practical experi KZ s of process model of business process	4 b teach students ding, application ence with these 4 ing and they will es using modern
BI-ZIVS Intelligent Embedded System Fundamentals Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The ai modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to technologies. BI-ZPI Process engineering Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principle	KZ m of the course is to control, sensor rea get practical experi KZ s of process model of business process	4 b teach students ding, application ence with these 4 ing and they will es using modern

BI-ZNF	PHP Framework Nette - basics	KZ	3
Students will gain the ba	asics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czecl	n popular framewo	ork. The resulting
knowledge should serve	e for the efficient creation of a web backend in PHP language.		
BI-ZRS	Basics of System Control	Z,ZK	4
The course gives an int	oduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will for	cus our attention	particularly on
control of engineering a	nd physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, descript	ion methods of sy	/stem models,
basic linear dynamic sy	stems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of c	eating a descripti	on of the system
model, the basic linear	dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also give	n to sensors and	actuators in
control loops, issues of	stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industr	ial implementatio	n of continuous
and digital controllers a	nd PLC control.		
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
This course is presente	d in Czech.		'
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
This course is presente	d in Czech.		
BI-3DT.1	3D Printing	KZ	4

Code of the group: BI-WSI-SI-VO.2017

Name of the group: Elective Vocational Courses for Bachelor Specialisation BI-WSI-SI, Version 2017 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Všechny povinné předměty oborů a zaměření s výjimkou tohoto zaměření

- I- · · ·					
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
Unix Administration Zden k Muziká	Z,ZK	5	2P+2C	L	V
Windows Administration Ji í Kašpar, Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V
Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	2P+2C	Z	V
Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	V
DB Technologies for Big Data Jan Matoušek	KZ	4	2P+2C	Z	V
Hardware Security Ji í Bu ek	Z,ZK	5	2P+2C	Z	V
Computer Units Alois Pluhá ek	Z,ZK	5	2P+2C	Z	V
Multimedia and Graphics Applications	Z,ZK	5	2P+2C	Z	V
Computer graphics programming	Z,ZK	5	2P+2C	L	V
Practical Digital Design Martin Novotný	KZ	5	2P+2C	Z	V
Law and business	Z,ZK	4	2P+1R	L	V
Programming Languages and Compilers Jan Janoušek	Z,ZK	5	2P+1C	L	V
Programming of graphic applications Radek Richtr	Z,ZK	5	2P+2C	Z	V
Python Programming	Z,ZK	4	2P+2C	L	V
System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V
Real-time systems Jaroslav Borecký	KZ	4	2P+2C	Z	V
XML Technology Jan Mokrý	Z,ZK	4	2P+2C	L,Z	V
Information Systems Design	Z,ZK	5	2P+1C	Z	V
User Interface Design Jan Schmidt	Z,ZK	4	2P+2C	L	V
Web Application Design <i>Filip Glazar</i>	Z,ZK	5	2P+2C	Z	V
Embedded Systems Miroslav Skrbek	Z,ZK	5	2P+2C	L	V
Searching the Web and Multimedia Databases Tomáš Skopal	Z,ZK	5	2P+1C	L	V
	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.) Unix Administration Zden k Muziká Windows Administration Ji í Kašpar, Miroslav Prágl Miroslav Prágl (Gar.) Algorithms and Graphs 2 Ond ej Suchý Architectures of Computer Systems Pavel Tvrdík Secure Code Róbert Lórencz DB Technologies for Big Data Jan Matoušek Hardware Security Ji í Bu ek Computer Units Alois Pluhá ek Multimedia and Graphics Applications Ji í Chludil Computer graphics programming Practical Digital Design Martin Novotný Law and business Programming of graphic applications Radek Richtr Python Programming System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.) Real-time systems Jaroslav Borecký XML Technology Jan Mokrý Information Systems Design User Interface Design Jan Schmidt Web Application Design Filip Glazar Embedded Systems Miroslav Skrbek	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.)CompletionUnix Administration Zden k MuzikáZ,ZKWindows Administration Ji i Kašpar, Miroslav Prágl Miroslav Prágl Miroslav Prágl (Gar.)Z,ZKAlgorithms and Graphs 2 Ond ej SuchyZ,ZKArchitectures of Computer Systems Pavel TvrdikZ,ZKSecure Code Róbert LórenczZ,ZKDB Technologies for Big Data Jan MatousekKZHardware Security Ji i Bu ekZ,ZKComputer Units Alois Pluhá ekZ,ZKMultimedia and Graphics Applications Ji i ChludilZ,ZKPractical Digital Design Martin NovotnýKZLaw and businessZ,ZKProgramming of graphic applications Radek RichtrZ,ZKProgramming of graphic applications Alons JanoušekZ,ZKProgramming of graphic applications Jan SchnidtZ,ZKVin Dostál J i Dostál J i Dostál (Gar.)KZXML Technology Jan SchmidtZ,ZKVetor Programming Jansiav BoreckyZ,ZKKeal-time systems Jansiav BoreckyZ,ZKKut Technology Jan SchmidtZ,ZKVeb Application Design Jan SchmidtZ,ZKVeb Application Design Filip GlazarZ,ZKEmbedded Systems Miroslav SkrbekZ,ZKSearching the Web and Multimedia DatabasesZ,ZK	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.)CompletionCreditsUnix Administration Zden k MuzikáZ,ZK55Windows Administration Ji i Kašpar. 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BI-VZD	Data Mining Karel Klouda, Ond ej Tichý, Daniel Vašata, Alexander Kovalenko Ond ej Tichý Pavel Kordík (Gar.)	Z,ZK	4	21 120	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	Z,ZK	4	2P+2C	L	V
BI-ZNS	Knowledge-based Systems Marcel Ji ina	Z,ZK	5	2P+2C	Z	v
	of the courses of this group of Study Plan: Code=BI-WSI-SI-VO.2017 -WSI-SI, Version 2017	Name=Elec	tive Voc	<u>.</u>	ourses fo	or Bachelo
This course is presente	ed in Czech.				· · ·	
BI-AG2 This course, presented	Algorithms and Graphs 2 d in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the in	troduction given	in the corr	1	Z,ZK	5 It further delv
nto advances data stru	uctures and amortized complexity analysis. It also includes a very light introduction to approxi	mation algorithm	ns. For Eng	glish version o	of the cours	e see BIE-AG
BI-ZRS	Basics of System Control			Z	Z,ZK	4
The course gives an int	troduction to the field of automatic control. Students will gain knowledge in this rapidly evolvir	ng field of great	future. We	will focus our	attention p	articularly on
control of engineering a	and physical systems. We will provide basic information from the feedback control of linear dy	namical SISO s	vstems de	escription met	hods of sve	stem models
° °	ystems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Stu					
				0		,
	r dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy			-		
	f stability in control systems, single and continuous adjustment of the controller parameters, a	and certain aspe	cts of the i	ndustrial imple	ementation	of continuou
and digital controllers a	and PLC control.					
BI-ADU.1	Unix Administration			Z	Z,ZK	5
	internal structure of the UNIX operating system, with the administration of its basic subsystems	and with the sec	urity princi		· ·	the difference
	ninistrator roles. They will get theoretical and practical knowledge of user management and ad					
				•		
, ,,	etwork services and remote access, and in the areas of system deployment and virtualization	i. In the labs, the	y will verily	y the knowledg	ge nom me	e lectures on
specific examples from						
BI-ADW.1	Windows Administration			2	Z,ZK	4
This course is presente	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).					
BI-APS.1	Architectures of Computer Systems			Z	Z,ZK	5
Students will learn the	construction principles of internal architecture of computers with universal processors at the	level of machine				given on the
			Instruction	ns. Special err	nphasis is g	
Dipelined instruction pro	rocessing and on the memory hierarchy. Students will understand the basic concepts of RISC a	and CISC archit		-		ction process
			ectures an	d the principle	es of instruc	
not only in scalar proce	rocessing and on the memory hierarchy. Students will understand the basic concepts of RISC essors, but also in superscalar processors that can execute multiple instructions in one cycle, w borates the principles and architectures of shared memory multiprocessor and multicore syste	vhile ensuring th	ectures and e correctne	d the principle ess of the seq	es of instruction	del of program
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not only in scalar proce The course further elab BI-BEK	essors, but also in superscalar processors that can execute multiple instructions in one cycle, we borates the principles and architectures of shared memory multiprocessor and multicore system Secure Code	vhile ensuring th ems and the me	ectures and e correctne mory cohe	d the principle ess of the seq erence and cor Z	es of instructures of instructures of instructures of instructures of instancy in ,ZK	del of program n such syster 5
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BI-PGA Programming of graphic applications	Z,ZK	5
This course is presented in Czech only.	7 71/	4
BI-PYT Python Programming The course is taught in Czech.	Z,ZK	4
	7 71	5
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	1/7	4
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. Thereticle	•	
experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore as in BI-VES subject and FPGA.	the used design k	its are the same
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, DC	DM). 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 basics of	of XSLT programm	ing. XSLT and
XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies.		
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 (custo	mers) with applica	ations of existing
technologies (databases, programming languages, GUI etc.).		
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 whe		
not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Student	s gain an overview	v of the methods
that bring users into the development process to ensure optimal communication with a user.		_
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 partly with some propert		°
structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web application modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symf		
on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.	ony 2, Docume 2.	Developments
BI-VES Embedded Systems	Z,ZK	5
Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and emb	1 '	
peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.		,
BI-VWM Searching the Web and Multimedia Databases	Z.ZK	5
Students get basic overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous stora	1 '	-
students acquire information about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction fro	m web pages. The	ey get detailed
knowledge of similarity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming wet	search engines f	or the mentioned
data types (documents).		
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 preprocessing, m	ultidimensional d	ata visualization,
statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships	between model bi	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 basic	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 class		
space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algority	thms and the neu	ral 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 artificial	-	-
require human judgment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of knowledge of act theory, prehability theory, artificial neural networks, and evalutionary algorithm	• •	stems to support
decision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutionary algorithm	<u>ъ.</u>	

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	language instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both th	ne 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 ind	ividual teachers du	ring the first
	class of the term.		
BI-AAG	Automata and Grammars	Z,ZK	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 gramm	ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between fo	rmal 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 digit	tal circuits.
BI-ACM	Programming Practices 1	KZ	5
	This course is presented in Czech.		
BI-ACM2	Programming Practices 2	KZ	5
	This course is presented in Czech.		1

BI-ACM3	Programming Practices 3	KZ	5
BI-ACM4	This course is presented in Czech.	KZ	5
DI-ACIVI4	Programming Practices 4 This course is presented in Czech.	ΝZ	5
BI-ADU.1	Unix Administration	Z,ZK	5
	the internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They		-
between user and	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, mem	ory, network services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the known	wledge from the l	ectures on
	specific examples from practice.	7 71/	
BI-ADW.1	Windows Administration This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	4
BI-AG1	Algorithms and Graphs 1	Z,ZK	6
	rs the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing cur		-
	vledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the		
	prithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics are provided by the second se	-	
BI-AG2	Algorithms and Graphs 2	Z,ZK	5
	nted in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory control of the second secon		
	a structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English version		1
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.	1/7	4
BI-AND.21	Programming for the Android Operating System This course is presented in Czech.	KZ	4
BI-ANG	English Language, Internal Certificate	ZK	2
DI-ANG	Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-AN		2
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2
BI-APJ	Aplication Programming in Java	Z,ZK	4
BINTO	This course is presented in Czech. Advanced technologies in Java.	2,213	-
BI-APS.1	Architectures of Computer Systems	Z,ZK	5
	rn the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec		1
pipelined instructio	n processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the princ	ciples of instruction	n processing
	rocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the	-	
	elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and		
BI-ARD	Interactive applications on Arduino	KZ	4
	gned for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple applicati aried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded systems.		-
	ay of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore		
	Software Engineering students.		
BI-AVI.21	Algorithms visually	Z,ZK	4
	ments other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer sc		-
knowledge present	ed in BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision.org&l	t;http://www.algovis	sion.org>)
	that make understanding the principles of algorithms easy.	7	
BI-BAP	Bachelor Thesis	Z	14
BI-BEK	Secure Code	Z,ZK	5
	s gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		•
-	vileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing		
security and	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and th	e defense against	them.
BI-BEZ	Security	Z,ZK	6
	nd the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a		
and hash functions	s. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	ystems for comput	ter systems.
	They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.	1/7	4
BI-BIG	DB Technologies for Big Data This course is presented in Czech.	KZ	4
BI-BLE	Blender	Z,ZK	4
	l Biender Ids knowledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those in		-
	offers a complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graph	-	-
BI-BPR	Bachelor project	Z	2
BI-CAO	Digital and Analog Circuits	Z,ZK	5
	e fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and	•	
transistors, gates,	circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw	veen analog and d	igital modes
	of electronic devices.		_
BI-CCN	Compiler Construction	Z,ZK	5
	uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching	-	
BI-CS1	Programming in C#	KZ	s. 4
	urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental cc		1
-	s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class defi		
	nods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging		-
	well as work with files are emphasized.		

BI-CS2	C# language and data access	KZ	4
	and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Micros		
	ts used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current tech	-	
	erving and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQL (L	-	
	.). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data u of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Mode		-
	(XML description).	, Storage Moder a	nu mapping
BI-CS3	Language C# - design of web applications	КZ	4
	e introduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overview of	1	
	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	portion of GDP is re	edistributed.
	rns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and		
of income, consur	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
	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the	-	
	Jation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda		
	lling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to	-	
	ases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of datal		U U
	optimizing database applications, distributed database systems, data stores.		00 0
BI-DPR	Document., Presentation, Rhetorics	KZ	4
This subject is aime	ed to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and pr	repare interactive p	resentations
	and presenting before an audience. Students will also learn to write technical reports and scientific texts.		
BI-EHD	Introduction to European Economic History	Z,ZK	3
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-EJA	Enterprise Java	Z,ZK	4
The course is on a	advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information system	stems which are co	onnected to
	a database and are accessed through the web interface.		
BI-EMP	Economics and Management Principles	KZ	4
	ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	-	
enterprise putting	into state economic environment (CR), management of property and capital structure, business transaction records keeping during a		d, a relation
	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination		4
BI-EP1	Effective programming 1 The course is taught in Czech.	Z	4
BI-EP2	Efficient Programming 2	KZ	4
	fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi	1	-
	with the aim to choose the best one and avoid implementation errors.		aloouoooa,
BI-FMU	Financial and Management Accounting	Z,ZK	5
	rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pa		operations,
operations in acco	ounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification	on of bookkeeping,	description
of economic ope	rations 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.		
BI-FTR.1	Financial Markets	Z,ZK	5
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-GIT	Version control system GIT	KZ	2
	troduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and pract		
	mplementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git s		
BI-HAM	HW accelerated network traffic monitoring	KZ	4
	duces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring. Th mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a s	-	-
	poals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traff		
	level and to develop their practical abilities in this field.		
BI-HMI	History of Mathematics and Informatics	Z,ZK	3
	This course is presented in Czech.	,	-
BI-HWB	Hardware Security	Z,ZK	5
	s with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar wit		nciples of
cryptographic mod	ules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about v	ulnerabilities of HV	/ resources,
including side-char	nnel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec		applications
	and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of		
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
	This course is presented in Czech.		
BI-JPO	Computer Units	Z,ZK	5
	their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail v		
-	nputer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using approp ne organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, includin	-	
· ·	lel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of comm	•	
	and the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational micropro		
	and programmable hardware design kits (FPGA).	-	

	Conceptual Modelling	Z,ZK	5
	ised on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te		
	cify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struc	-	
	/ learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent		
	ns of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO r will be taught. The course is designed with the respect to continuation in software implementations.	nethoù anu the Bri	IVIN HOLALION
BI-KOT	Programing in Kotlin	Z,ZK	4
	n, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advar	· · ·	
The language is fu	Ily Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a	modern, object-fun	ctional way
	with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages)		
BI-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversit search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, healt	,	
antinopological res	search nom our exolic cultures (topics: kinship, religion, social exclusion, migration, giobalization, material culture, language, near	n, nistory, death, ei	
BI-LIN	Linear Algebra	Z,ZK	7
	ht in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroun	I '	I I
	s are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation	-	
	ey can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting a	-	codes.
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
DIMOA	This course is presented in Czech.	7 71/	
BI-MGA	Multimedia and Graphics Applications uainted with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for wor	Z,ZK	5
	ation will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to gra		
	y learn to use multimedia transmission and representation systems, including real-time multimedia processing. They understand the		
	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
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-MIT	Mikrotik technologies	KZ	3
	on of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are con		
	vice providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the m strate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks and practically deploy them.		
	and technologies of the data-link, network and transport layer of the OSI model.	etworks concepts in	Re protocolo
BI-MLO	Mathematical Logic	Z,ZK	5
Brineo	The course seminary is taught in Czech.	_,	Ŭ
BI-MMP	Multimedia team project	KZ	4
	This course is presented in Czech.	•	
BI-MPP.21	Methods of interfacing peripheral devices	Z,ZK	5
			Ŭ Ŭ
	sed on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universa		The course
	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE		The course
includes both PC s	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices.	3 devices, Linux ar	The course nd Windows
includes both PC s BI-MVT.21	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices. Modern Visualisation Technologies	3 devices, Linux an	The course ad Windows 5
BI-MVT.21 The goal of the co	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices. Modern Visualisation Technologies urse is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augn	3 devices, Linux ar Z,ZK nented reality, visua	The course ad Windows 5 alization on
BI-MVT.21 The goal of the co	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices. Modern Visualisation Technologies	3 devices, Linux ar Z,ZK nented reality, visua	The course ad Windows 5 alization on
BI-MVT.21 The goal of the co high resolution disp	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE drivers, simple application development, and APIs of selected devices. Modern Visualisation Technologies urse is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augn plays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentione and procedural visualization, scientific data visualization, and 3D model scanning. Object-Oriented Programming	3 devices, Linux ar Z,ZK nented reality, visua ed technologies, na Z,ZK	The course ad Windows 5 alization on amely fractal 4
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includes both PC s BI-MVT.21 The goal of the co- high resolution disp BI-OOP Object-oriented p course we look at BI-OPT Students get basic of optical network dispersion compen the most up-to-date ultrastable freque BI-OSY Students understa kernels, process manageme BI-PA1 Students gain the statements, function BI-PA2 Students know th table). They can imp	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USI drivers, simple application development, and APIs of selected devices. Modern Visualisation Technologies of selected devices. Modern Visualisation Technologies and their principles, namely technologies related to virtual and augn olays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentione and procedural visualization, scientific data visualization, and 3D model scanning. Object-Oriented Programming rogramming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software develot handing, refactoring and design patterns. Introduction to Optical Networks overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on poss technology and on their solutions. The course will include the history of optical components and on verview of active components (optical switches and amplifiers, high-speed coherent transmission syster e topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such as incy transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters. Impractice. Doperating Systems and the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They sees and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and dead nt of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple mult on virtual memory, principles and architectures of disks, RA	A devices, Linux and Z,ZK mented reality, visual ed technologies, nated technologies, the technologies, the technologies, the technologies, the technologies, technologies, technologies, technologies, technologies, and material technologies, and material technologies,	The course ad Windows 5 alization on imely fractal 4 ing. In this isting, error 4 deployment ultiplexors, II also cover on Internet, real tasks 5 odge of OS ies of the ions. 6 xpressions, anipulating 7 array, set, e introduced

BI-PGR.1	Computer graphics programming	Z,ZK	5
	to program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textu		netric details
and materials (I	ike wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in	computer graphics	, such as
graphical pipeline,	geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid func	damentals for your	professional
development, e.g	. for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface	s, and scientific vis	sualisation.
BI-PHP.1	Programing in PHP	KZ	4
The course is t	aught in Czech Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices a	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 f	or BIE-TWA.1. The	ey should
	register for this course in their 3rd semester of study.		
BI-PJP	Programming Languages and Compilers	Z,ZK	5
Students master b	asic methods of implementation of common high-level programming languages. They get experience with the design and implementati	ion of individual co	mpiler parts
for a simple progr	amming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has	a certain syntax i	nto a target
form and write a c	ompiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but	t extends to all oth	er programs
	for parsing and processing text in a language defined by a LL(1) grammar.		
BI-PJS.1	JavaScript Programming	KZ	4
-	course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development	-	
recommended for	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	Z,ZK	4
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	-	
BI-PKM	Introduction to mathematics	Z	4
	This course is presented in Czech.		
BI-PMA	Programming in Mathematica	Z,ZK	4
	orking with modern technical and scientific software. Students will learn how to use different programming styles (functional programm		ogramming,
	etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.		-
BI-PNO	Practical Digital Design	KZ	5
-	verview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the		-
-	ion technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in		
	tools.		-
BI-PPA	Programming Paradigms	Z,ZK	5
	s with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of partic	· ·	
	digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. Th		
on lambda calculu	us and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr	eam programming	languages
	such as C++ and Java.		
BI-PRP	Law and business	Z,ZK	4
	This course is presented in Czech.	,	1
BI-PRR	Project management	KZ	4
	This course is presented in Czech.		
BI-PS1	Programming in Shell 1	KZ	5
	e knowledgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating systems		-
	ahts, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell, I		
	process various text data.	,	
BI-PS2	Programming in shell 2	Z,ZK	4
	eneral overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In additi		eper insight
	into shell and some other particular scripting languages and will get practical experience with shell script programming.	, , , , ,	
BI-PSI	Computer Networks	Z,ZK	5
	nd the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topic	, ,	
	of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students v		
	network application and configure a simple network.		
BI-PST	Probability and Statistics	Z,ZK	5
	earn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable		
	andom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction		,
	nown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the st		•
BI-PYT	Python Programming	Z,ZK	4
5	The course is taught in Czech.	_,	
BI-QAP	Quantum algorithms and programming	KZ	5
	ing students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanics, o		-
-	gorithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software developr	-	-
	age. 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-VMN		
	might be an advantage. No previous knowledge of physics is assumed.	1	,
BI-SAP	Computer Structure and Architecture	Z,ZK	6
	and basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, input	, ,	
	ps, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital desi	-	-
	e of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connect	• •	
	languages.		ŭ
BI-SCE1	Computer Engineering Seminar I	Z	4
	mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to		
	ndividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the		
	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher	-	
	semester.		

BI-SCE2	Computer Engineering Seminar II	Z	4
	mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	- 1	
	dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the		
	rofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher		
	semester.		
		7 71/	4
BI-SEP	World Economy and Business	Z,ZK	4
	sented in Czech. The course introduces students of technical university to the international business. It does that predominantly by c		
	world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as		
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
	he methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get prac		
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
and	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and tes	sting processes.	
BI-SI2.3	Software Engineering 2	Z,ZK	3
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-SOJ	Machine Oriented Languages	Z,ZK	4
	rse 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	-	
and emclent coope	This knowledge will be used during reverse engineering, optimization, and evaluation of code security.	iked to higher level	languages.
		1/7	4
BI-SP1	Team Software Project 1	KZ	4
-	ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by th		
	hat teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the		
leader, regularly co	onsults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be f	urther developed a	nd finished
	in the BEI-SP2 course.		
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-SQL.1	Language SQL, advanced	KZ	4
	knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In pa	I I	
	jueries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of		
	exes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan ar	-	
	d. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Ora		-
will be discusse		acie DBIVIS allu pai	ually off
	PostgreSQL.		
BI-SRC	Real-time systems	KZ	4
Students obtain the	e basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla kn	owledges from lect	ures will be
experimentally veri	fied on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore the	used design kits ar	e the same
	as in BI-VES subject and FPGA.		
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-ST1	Network Technology 1	7	3
	iented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	- 1	
	CCNA1 - R&S Introduction to Networks.		Clabad
		7	0
BI-ST2	Network Technology 2	Z	3
	This course is presented in Czech.		
BI-ST3	Network Technology 3	Z	3
Students will furthe	r enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during E	BI-ST1 and BI-ST2	courses will
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 Technology 4	Z	3
	er enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switching	- 1	
	ot further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased effici		
-	topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a completely		
	e Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and switch		
	nergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitigation	-	
		on ways while mail	itali ili g ti e
51 070	network running.		
BI-STO	Storage and Filesystems	Z,ZK	4
The student will lea	rn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archi	ving, as so as stora	age scaling,
	load balancing and high availability.		
BI-SVZ	Machine vision and image processing	Z,ZK	5
	are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluate in		The course
	s to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical use		
	problems of practice that the graduates may encounter.	-	5
BI-TDA	Test driven architecture	KZ	4
	eused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that ar	I I	
	urse has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occu		
		-	-
BI-TEX	TeX and Typography	Z,ZK	4
This course is pres	ented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of the	course focuses on	typographic
	rules.		
BI-TIS	Information Systems Design	Z,ZK	5
	ous types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customer	s) with applications	of existing
	technologies (databases, programming languages, GUI etc.).	-	-

BI-TJV	Java Technology	Z,ZK	4		
	s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programmi	°			
to build the three and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb services, JNDI etc.). At the course end is student able to create three layers enterprise application.					
BI-TS1	Theoretical Seminar I	Z	4		
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	1			
	ually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a				
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.				
BI-TS2	Theoretical Seminar II	Z	4		
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic				
are treated individu	ually 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.	WORK WITH SCIENTIFIC	papers and		
BI-TS3	Theoretical Seminar III	Z	4		
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	-			
are treated individu	ually 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.		1		
BI-TS4	Theoretical Seminar IV	Z	4		
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ually 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.	WORK WIT SCIENTING	papers and		
BI-TUR	User Interface Design	Z,ZK	4		
Students have a b	asic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where s	1	products do		
not communicate v	vith the user optimally, since the needs and characteristics of users are not taken into account during product development. Students ga	ain an overview of t	the methods		
	that bring users into the development process to ensure optimal communication with a user.				
BI-TWA.1	Web Application Design	Z,ZK	5		
	e of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some propertie and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications,		-		
	acilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfon				
	on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework Angular		·		
BI-ULI	Introduction to Linux	Z	2		
Students become	familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become		commands		
	and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (te				
BI-VAK.21	Selected Applications of Combinatorics	Z	3		
	b introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the b tions to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic				
	ticipation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) info				
will select problem	ms to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimiz	ation and more. St	udents will		
	also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		1		
BI-VES	Embedded Systems	Z,ZK	5		
Students learn to o	lesign embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedd peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.	ed processors, the	ir integrated		
BI-VHS	Virtual game worlds	ZK	4		
	tudents to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current stud	1	-		
complemented by	the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world. T	he course can be f	followed by		
	the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR device				
BI-VMM	Selected Mathematical Methods	Z,ZK	4		
-	s with an introduction to the analysis of complex functions of a complex variable. Next, we present the Lebesgue integral. We then ad rr, we introduce and study the properties of the Discrete Fourier Transform (DFT) and its fast implementation (FFT). We discuss the w				
	he linear programming problem in more detail and its solution using the Simplex algorithm. Each topic is demonstrated with interesting		vo oxamino		
BI-VR1	Virtual reality I	KZ	4		
Introduction to Virt	ual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of	virtual worlds com	munication.		
The course focus	es on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves con	nputational thinking	g, empathy		
	and shared social activities.	1/7	0		
BI-VR2	Virtual reality II e course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The obje	KZ	applications		
	for computer science and gamification in various social metaverse and desktop engines.		applications		
BI-VWM	Searching the Web and Multimedia Databases	Z,ZK	5		
	ic overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storag		particular,		
	information about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from				
knowledge of simil	arity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web se	arch engines for the	e mentioned		
	data types (documents).	7.71	4		
BI-VZD Students are introc	Data Mining Juced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multi	Z,ZK	4 isualization.		
	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships betw				
and know the fu	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic d	lata mining tools to	common		
	problems (classification, regression, clustering).		1		
BI-XML	XML Technology	Z,ZK	4		
	make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX, DOM) vhich enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics of X	-	-		
	XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies.				
1					

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
-	ed system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of t		
	robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion cont		
Intenaces, robot na	avigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get p technologies.	ractical experience	e with these
BI-ZMA	Elements of Calculus	Z,ZK	6
	knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking a	1 · ·	-
	chniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the lir	-	
	sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic ex		
BI-ZNF	PHP Framework Nette - basics	KZ	3
	he basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech po	1	he resulting
	knowledge should serve for the efficient creation of a web backend in PHP language.		
BI-ZNS	Knowledge-based Systems	Z,ZK	5
Students will becor	ne familiar with the systems based on knowledge (knowledge-based systems), which are systems that usetechniques of artificial inte	lligence to solve pr	roblems that
	ment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of knowle		is to support
	cision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutiona	, ,	1
BI-ZPI	Process engineering	KZ	4
	fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of p	-	-
	used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of bus	•	U U
	le of process engineering for information systems development is discussed as well as its importance in the overall context of inform an enterprise.	auon anu business	sualegy of
BI-ZRS	Basics of System Control	Z.ZK	4
	an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focu	,	-
	ring and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description		
s .	ic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creat		
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	ctuators 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
	and digital controllers and PLC control.		
BI-ZS10	Bachelor internship abroad for 10 credits	Z	10
	once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re		
	an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content. The student must provide evidence of the professional content.		
	/ courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits cor	•	
	foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided int exceeds the academic year's dead-line.		
BI-ZS20	Bachelor internship abroad for 20 credits	Z	20
	once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re	. –	-
	an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.		
	/ courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits cor		
employment with a	foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into	o two subjects if th	ne internship
	exceeds the academic year's dead-line.		
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
	an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content.		
	/ courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits cor		
employment with a	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 th	ie internsnip
	exceeds the academic year's dead-line.	7.71	4
BI-ZUM	Artificial Intelligence Fundamentals uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classic	Z,ZK	4
	i-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm		
,,,,,,,	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
	se can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in Engli		1 -
	the B2 level of the Common European Framework of Reference for Languages.		
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh ar	nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a	able to apply them	in particular
	examples.	1	
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
	uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classic		
space search, mult	i-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.	71/	-
FI-FIL	Philosophy	ZK	2
	see A0B16	71/	
FI-GNO	Introduction to Gnoseology		2
-	uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v do lenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um ní o		
-	isti na teorii p írodních jazyk a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín na hlediska este	-	

	Ing. Ivo Janoušek CSc.	·	a garantuje
FI-HPZ	Humanities subject from a study abroad	7	3
	pject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that	_	-
	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	ces the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in comparison	arison with the de	velopment of
	the European region 19 to 21 century .		
FI-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity		
anthropological res	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health	n, history, death, e	etc) will be
FI-MPL	shown. The course is an interesting alternative to other humanities, taught at FIT.	ZK	2
	Managerial Psychology	ZK	2
FI-ULI	Introduction to Linguistics for Computer This course is presented in Czech.	۲n	2
FI-VEZ	economic-managerial course from a study abroad	7	4
	ject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that		1
	The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.	•	
NI-AFP	Applied Functional Programming	KZ	5
This course is pres	sented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional p	rogramming langu	lages are on
the rise nowadays	s and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, master	ing this paradigm	becomes a
	necessary competence of a software engineer: the theory and especially the practice.		
NI-DDM	Distributed Data Mining	KZ	4
	n state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands o amework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations a		
	approaches to parallelize other algorithms. The course is prezented in czech language.	ind will be capable	
NI-DSP	Database Systems in Practes	Z,ZK	4
	This course is presented in Czech.	_,	
NI-DZO	Digital Image Processing	Z,ZK	4
This course prese	ents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical alg	orithms that are b	oth easy to
	re an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is als		
	processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDR		-
	, abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray conv gid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ac		
NI-IAM	Internet and Multimedia	Z,ZK	4
	se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq	,	1
presentation of AV	signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u	ise case scenario	
audiovisual transr	nissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effective of the state of the st	ect of various com	s of real-time
audiovisual transr	nissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe	ect of various com	s of real-time
audiovisual transr the quality and late	nissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe ency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the for audience.	ect of various com e scene up to the	s of real-time ponents on presentation
audiovisual transr the quality and late NI-LSM	nissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe ency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the for audience. Statistical Modelling Lab	ect of various corr e scene up to the KZ	s of real-time ponents on presentation 5
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NI-SYP	Parsing and Compilers	Z,ZK	5
-	upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va	I '	-
	of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing.		approationo
NI-TSP	Testing and Reliability	Z,ZK	5
Students will gain	knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pref	pare a test set with	the help of
the intuitive path s	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 equi	oment. 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 ga	n knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and	organizations. The	ey will get
acquainted with vi	rtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficie	ently operate and o	ptimize the
performance pa	rameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effecti	ve technology tod	ay for the
management of co	mplex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills in	n the use of moder	n integration
	and development tools (Continuous integration and development).		
NI-VYC	Computability	Z,ZK	4
	Classical theory of recursive functions and effective computability.	<u>.</u>	
TV1	Physical Education	Z	0
TV2	Physical Education	Z	0
TV2K1	Diversional Endourantian O	7	1
1 V Z K I	Physical Education 2	Z	1
TV2K1	Physical Education 2 Physical Education	Z	1
			1 1 0
TVK1	Physical Education	Z	1 1 0 0
TVK1 TVKLV	Physical Education Physical Education Course	Z Z	

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-11-21, time 16:46.