Study plan

Name of study plan: Bachelor branch Security and Information Technology, 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) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-AG1	Algorithms and Graphs 1 Dušan Knop	Z,ZK	6	2P+2C	Z	PP
BI-AAG	Automata and Grammars Jan Janoušek	Z,ZK	6	2P+2C	Z	PP
BI-BAP	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BI-BPR	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 Alena Libánská, Ond ej Guth, Petra Pavlí ková, Dana Vynikarová Ond ej Guth Dana Vynikarová (Gar.)	KZ	4	2P+2C	Z,L	PP
BI-LIN	Linear Algebra Daniel Dombek Daniel Dombek (Gar.)	Z,ZK	7	4P+2C	L	PP
BI-MLO	Mathematical Logic Kate ina Trlifajová Kate ina Trlifajová Kate ina Trlifajová (Gar.)	Z,ZK	5	2P+1C	z	PP
BI-OSY	Operating Systems Ladislav Vagner	Z,ZK	5	2P+1R+1L	- L	PP
BI-PSI	Computer Networks Jan Fesl	Z,ZK	5	2P+1R+1C	L	PP
BI-PST	Probability and Statistics Petr Novák	Z,ZK	5	2P+1R+1C	Z	PP
BI-PA1	Programming and Algorithmics 1 Ladislav Vagner	Z,ZK	6	2P+2R+2C	Z	PP

BLPS1 Programming in SNeI 1 KZ 5 2P+2C Z PP BL-S1.2 Software Engineering 1 Arr Marka Z/XK 5 2P+1C Z/L PP BL-SAP Compute Sing Marka Carpon 1 Z/XK 6 2P+1AC Z/L PP BL-SAP Compute Sing Marka Large Sing Marka L PP BL-SAD Elements of Discrete Marka Z/ZK 6 2P+2C Z PP BL-ZAA Elements of Discrete Marka Kalk (Gar) Z/ZK 6 2P+2C Z PP Characteristics of the courses of his group of Study (Mark Code) BL-PZ015 Name-Compute Sing point on Study Pancing Sing Sing Pancing Pancin	BI-PA2	Programming and Algorithmics 2 Ladislav Vagner	Z,ZK	7	2P+1R+2C	L	PP					
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Souders are introduced to basic theoretical and implementation principles of the following topic: construction, use and mutual transmations of the textomation, regular expressions and regular grammars, translation final extormation, and usergin undersign of degline inclusts. Bi-BAP Bachelor Thesis Z 14 Bi-BPR Bachelor Thesis C 2 2 Bi-BEZ Security Soudents understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric asymmetry and and adplications and and applications: symmetric asymmetric asymmetry and and applications and adplication and an					0	·	. ,					
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BI-BPR Bachelor project Z 2 BH-BEZ Security Z,ZK 6 Student undestand the mathematikal fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric cryptosystems, and hash functions. They also learn the fundamentals of cryptography and systems that are based on these primitives. Z,ZK 6 BLOAD Digital and Analog Circuits Z,ZK 5 Students update value equiperity and security cryptography in primitives and systems. They understand the basic theoretical models and principerity of transitions, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital modes of electronic diverse. Z,ZK 6 BI-DBS Database Systems Z,ZK 6 Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various databases enders. They understand the undensential concepts of transaction processing, controlling parallel user access to aligited tata source, as well as set to transaction processing, controlling parallel user access to aligited tata source, as well as set to source the adjotent theories. They are briefly introduced to special ways of storing data and proteening before an audiners. Unsection of database explement, descet and set orgen and the descet protein and descet and the orgen and the data proteening before an audiners. They know the basic methods for opparating strend Scheening formatica set on transaction of database e			sion, simple parsir	ng and trans	lation, and o							
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of electronic devices. Image: Constraints Image	5											
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optimizing database applications, distributed database systems, data stores. Image: Control of the store of the sto			-	-	-	-	-					
BI-DPR Document., Presentation, Rhetorics KZ 4 This subject is aimed to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and prepare interactive presentations and presenting before an audience. Students understand the theoretical reports and scientific texts. Image: Comparison of the scientific texts (bachelor's and diploma thesis). Students will learn to create and prepare interactive presentations and solve systems around us, where the dependencies arong components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes. BI-MLO Mathematical Logic Z,ZK 5 The course seminary is taught in Czech. BI-OSY Operating Systems Z,ZK 5 Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and deadlocks, the techniques of the ananagement of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple multithreaded appleciations. BI-PSI Computer Networks Z,ZK 5 Students understand the basic			pes not cover: Adr	ninistration	of database	systems, del	bugging and					
This subject is aimed to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and prepare interactive presentations and presenting before an audience. Students will also learn to write technical reports and scientific texts. BI-LIN Linear Algebra Z,ZK 7 The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes. BI-MLO Mathematical Logic Z,ZK 5 The course seminary is taught in Czech. Qperating Systems Z,ZK 5 BI-OSY Operating Systems Z,ZK 5 Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and deadlocks, the techniques of the annagement of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple multithreaded applications. BI-PST Computer Networks Z,ZK 5	<u> </u>					1 / 7						
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BI-PS1	Programming in Shell 1	KZ	5					
Students become knowledgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating systems (file systems, processes and								
threads, access rights,	threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell, basic commands, and filters to							
process various text da	ia.							
BI-SI1.2	Software Engineering I	Z,ZK	5					
Students learn the meth	nods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pra-	ctical skill thanks	to applying					
hands-on analysis and	design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CA	ASE tools and UM	L for modelling					
and solving software-re	lated problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and testing proces	ses.						
BI-SAP	Computer Structure and Architecture	Z,ZK	6					
Students understand ba	sic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, in	nputs, outputs, da	ta storage and					
transfer. In the labs, stu	dents gain practical experience with the design and implementation of the logic of a simple processor using modern digital de	esign tools. The s	ubject teaches					
basic knowledge of digi	tal computer construction principles, how a computer performs its operations, what is machine code, and what are its connect	ctions to higher pr	ogramming					
languages.								
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5					
Students get both a ma	thematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula	approximation, to	ols for solving					
recurrent equations, an	d basics of graph theory.							
BI-ZMA	Elements of Calculus	Z,ZK	6					
Students acquire knowl	edge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking	and reasoning a	nd are able to					
use basic proof techniq	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	ns 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: Compulsory courses of the specialization Minimal number of credits of the block: 32 The role of the block: PO

Code of the group: BI-PO-BIT.2015

Name of the group: Compulsory Courses of Bc. Branch Security and Information Technology, in English, 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 at least 7 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-ADU.1	Unix Administration Zden k Muziká	Z,ZK	5	2P+2C	L	PO
BI-ADW.1	Windows Administration Ji í Kašpar, Miroslav Prágl Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	PO
BI-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	2P+2C	Z	PO
BI-BEK	Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	PO
BI-HWB	Hardware Security Ji í Bu ek, Filip Kodýtek, Róbert Lórencz Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	PO
BI-PAI	Law and Informatics Zden k Ku era	ZK	3	2P	Z	PO
BI-SSB	System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	PO

Characteristics of the courses of this group of Study Plan: Code=BI-PO-BIT.2015 Name=Compulsory Courses of Bc. Branch Security and Information Technology, in English, Version 2015

BI-ADU.1	Unix Administration	Z,ZK	5					
Students will learn the internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They will understand the differences								
between user and admin	nistrator roles. They will get theoretical and practical knowledge of user management and administration, of users access righ	nts, file systems, c	lisk subsystems,					
processes, memory, net	twork services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the k	nowledge from th	e lectures on					
specific examples from	practice.							
BI-ADW.1	Windows Administration	Z,ZK	4					
This course is presented	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).							
BI-APS.1	Architectures of Computer Systems	Z,ZK	5					
Students will learn the c	onstruction principles of internal architecture of computers with universal processors at the level of machine instructions. Spo	ecial emphasis is	given on the					
pipelined instruction pro	cessing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the p	principles of instru	ction processing					
not only in scalar proces	ssors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of	the sequential mo	del of programs.					
The course further elab	orates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence	and consistency	in such systems.					
BI-BEK	Secure Code	Z,ZK	5					
The students will learn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting familiar with the threat modeling								
theory, students gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every program needs to run with								
administrator privileges.	Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securin	ig data and the re	lationships of					
security and database s	systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	defense against ti	nem.					

BI-HWB	Hardware Security	Z,ZK	5						
The course deals with h	The course deals with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with the operating principles of								
cryptographic modules,	the security features of modern processors, and storage media protection through encryption. They will gain knowledge abo	ut vulnerabilities o	f HW resources,						
including side-channel a	attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card	d technology inclue	ding applications						
and related topics for m	ulti-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.								
BI-PAI	Law and Informatics	ZK	3						
This course is presente	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).								
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								

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

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

Name of the group: Compulsory Economics and Management Bachelor Courses, in Czech, Version 2015 Requirement credits in the group: In this group you have to gain 4 credits

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

Credits in the group: 4 Note on the group:

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

individuance poule pokynu z kateury contwaroveno inzerrytetti.								
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, Petra Pavlí ková David Buchtela David Buchtela (Gar.)	KZ	4	2P+2C	Z,L	PE		

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

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

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

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

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

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

Note on the group:

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Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-DAN	Taxes for non-Economists Savina Finardi, Tereza Ji íková Tereza Ji íková Savina Finardi (Gar.)	Z,ZK	4	2P+2C	Z	VE
FI-VEZ	economic-managerial course from a study abroad Miroslav Balík	Z	4	0+0	Z,L	VE
BI-FTR.1	Financial Markets Pavla Vozárová	Z,ZK	5	2P+2C	L	VE
BI-MEK	Macroeconomic Context of Domestic and World Economy Ivo Straka Ivo Straka Ivo Straka (Gar.)	Z,ZK	4	2P+2C	Z	VE
BI-PRP	Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.)	Z,ZK	4	2P+1R	L	VE
BI-PRR	Project management David Pešek	KZ	4	2P+2C	Z	VE
BI-SEP	World Economy and Business Tomáš Evan 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
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Characteristics of the courses of this group of Study Plan: Code=BI-PV-EM.2015 Name=Compulsory Elective Economical Courses of Bc. Program Informatics, Presented in Czech, Ver. 2015

BI-DAN	Taxes for non-Economists	Z,ZK	4
Taxes, including so	ocial insurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the wa	ay how a significant portion of GDP i	s redistributed.
This course conce	rns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy	y fundamentals and shows how they	affect taxation
of income, consum	nption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and in	nstitutions as well as information abo	out important
taxpayers' formal	duties towards public administration.		
FI-VEZ	economic-managerial course from a study abroad	Z	4
A "Humanities sub	pject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Hurr	nanities Module that is required in th	e curriculum.
The substitution is	approved 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 pres	sented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is pres	sented in Czech.		
BI-PRP	Law and business	Z,ZK	4
This course is pres	sented in Czech.	· · ·	
BI-PRR	Project management	KZ	4
This course is pres	sented in Czech.		
BI-SEP	World Economy and Business	Z,ZK	4
This course is pres	sented in Czech. The course introduces students of technical university to the international business. It does that	predominantly by comparing individu	ual countries
and key regions of	world economy. Students get to know about different religions and cultures, necessary for doing business in diverse	e societies as well as indexes of econ	nomic freedom,
corruption and eco	pnomic development, which are needed for the right investment decision. Seminars help to improve on the knowle	edge in the form of discussions base	d on individual
readings. It is advis	sed to take bachelor level of this course BIE-SEP as a prerequisite.		
BI-MIK	Fundamentals of Microeconomics	Z,ZK	4
This course is pre-	sented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	· · ·	

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 can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English comparable to or exceeding					
the B2 level of the Com	mon European Framework of Reference for Languages.					
BI-ANG	English Language, Internal Certificate	ZK	2			
Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG						

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

Code of the group: BI-PT.2015

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

Requirement credits in the group:

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

Credits in the group: 0

Note on the group:

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

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

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

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

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

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

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

Note on the group:

Faculty guarantees the availability of these modules.

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

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

			·			
FI-FIL	Philosophy	ZK	2			
see A0B16						
BI-HMI	History of Mathematics and Informatics	Z,ZK	3			
This course is presente	d in Czech.		1			
FI-HTE	History of Technology and Economics	ZK	2			
The course introduces	the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in co	mparison with the	e 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 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.					
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, dea	th, etc) will be			
shown. The course is a	n interesting alternative to other humanities, taught at FIT.					
BI-KSA	Cultural and Social Anthropology	ZK	2			
The one-semester 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, dea	th, etc) will be			
shown. The course is p	resented in Czech.					
FI-ULI	Introduction to Linguistics for Computer	ZK	2			
This course is presented in Czech.						
FI-GNO	Introduction to Gnoseology	ZK	2			
P edm t studenty uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v dou a um ním. Rozborem d jin						
modernismu a myšlenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um ní odhaleny mechanismy 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 spojitých p írodních soustav a systém, v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozvoje. P edm t p ednáší a garantuje						
Ing. Ivo Janoušek CSc.						

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.2017	
0 1	
Name of the group: Purely Elective C	ourses of Bachelor Programme BI, Version 2017
Requirement credits in the group:	
Requirement courses in the group:	
Credits in the group: 0	
Note on the group:	Volitelné předměty, které nejsou povinnými v programu ani žádného oboru či zaměření

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
BI-ALO	Tutors, authors and guarantors (gar.) Algebra and Logic Jan Starý Jan Starý (Gar.)	Z,ZK	4	2P+1C	L	V
BI-AVI.21	Jan Stary Jan Stary Jan Stary (Gar.) Algorithms visually Lud k Ku era 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	z	2	2C	L	V
BI-APJ	Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.) Aplication Programming in Java	Z,ZK		20 2P+1R+1C		v
DI-AFJ	<i>ji í Dan ek</i> Applied Functional Programming	۷,۷۲	4		· ~	v
NI-AFP	Marek Suchánek, Robert Pergl, Daniel N mec Robert Pergl Robert Pergl (Gar.)	KZ	5	2P+1C	L	V
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek Pavel Surynek (Gar.)	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	КZ	4	3C	L	V
BI-EP1	Effective programming 1 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 Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-FMU	Financial and Management Accounting David Buchtela David Buchtela David Buchtela (Gar.)	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 (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 Michal Valenta (Gar.)	КZ	4	3C	L	V
BI-QAP	Quantum algorithms and programming Tomáš Kalvoda, Ivo Petr Ivo Petr Ivo Petr (Gar.)	KZ	5	1P+2C	Z	V
NI-LSM	Statistical Modelling Lab Kamil Dedecius Kamil Dedecius (Gar.)	KZ	5	3C	L	V
NI-MPL	Managerial Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P	Z,L	V
NI-MSI	Mathematical Structures in Computer Science Jan Starý Jan Starý Jan Starý (Gar.)	Z,ZK	4	2P+1C	L	V
BI-MPP.21	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MIT	Mikrotik technologies Jan Fesl Jan Fesl (Gar.)	КZ	3	1P+2C	Z	V
NI-MOP	Modern Object-Oriented Programming in Pharo Marek Skotnica, Jan Blizni enko Robert Pergl Robert Pergl (Gar.)	КZ	4	3C	Z	V
BI-MVT.21	Modern Visualisation Technologies Ji í Chludil, Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MMP	Multimedia team project Zde ka echová Zde ka echová Zde ka echová (Gar.)	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, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	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	KZ	5	4C	Z	v
BI-AND.21	Tomáš Valla, Ond ej Suchý Tomáš Valla Ond ej Suchý (Gar.) Programming for the Android Operating System	KZ	4	3C	L	v
	Jan Mottl, Jan Vep ek, Marek Kodr Jan Mottl Marek Kodr (Gar.) Programming in C#			00		, v
BI-CS1	Pavel Št pán, Helena Wallenfelsová Helena Wallenfelsová Pavel Št pán (Gar.)	KZ	4	3C	L,Z	V
BI-PJV	Programming in Java Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	v
BI-PJS.1	JavaScript Programming Old ich Malec	KZ	4	3C	L	V
BI-KOT	Programing in Kotlin Jií Dan ek Jií Dan ek Jií Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
NI-PSL	Programming in Scala Jií Dan ek Jií Dan ek Jií Dan ek (Gar.)	Z,ZK	4	2P+1C	Z	V
BI-PMA	Programming in Mathematica Zden k Buk Zden k Buk Zden k Buk (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-PHP.1	Programing in PHP	KZ	4	3C	Z	v
BI-PS2	Programming in shell 2 Lukáš Ba inka	Z,ZK	4	2P+2C	L	v
NI-PDD	Data Preprocessing Marcel Ji ina Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+1C	Z	v
BI-PKM	Introduction to mathematics Tomáš Kalvoda Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z	4		Z	v
NI-REV	Reverse Engineering	Z,ZK	5	1P+2C	Z	v
BI-SCE1	Ji í Dostál, Josef Kokeš, Róbert Lórencz Ji í Dostál Ji í Dostál (Gar.) Computer Engineering Seminar I	Z	4	2C	L,Z	v
BI-SCE2	Hana Kubátová Hana Kubátová Hana Kubátová (Gar.) Computer Engineering Seminar II Hana Kubátová Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	v
BI-ST1	Network Technology 1	Z	3	2C	Z	v
BI-ST2	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 2	Z	3	3C	L	v
BI-ST3	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 3	Z	3	2C	Z	v
BI-ST4	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 4	Z	3	2C	L	v
BI-SOJ	Alexandru Moucha Alexandru Moucha (Gar.) Machine Oriented Languages	Z,ZK	4	2P+2C	L	V
BI-SVZ	Machine vision and image processing	Z,ZK	5	2P+2C	L,Z	v
NI-SYP	Lukáš Brchl, Marcel Ji ina, Jakub Novák Marcel Ji ina Marcel Ji ina (Gar.) Parsing and Compilers	Z,ZK	5	2P+1C	Z	v
BI-GIT	Jan Janoušek Jan Janoušek Jan Janoušek (Gar.) Version control system GIT	KZ	2	16P	Z,L	v
TV1	Petr Pulc Physical Education	Z	0	0+2	Z	V
TVV	Physical education	Z	0	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2	Physical Education	Z	0	0+2	L	V
TV2K1	Physical Education 2	Z	1		L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
BI-TS1	Theoretical Seminar I Dušan Knop, Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	v
BI-TS2	Dasan Holp, Fornas Valla, Ond ej Suchý Tomáš Valla Fornas Valla (Gal.) Theoretical Seminar II Tomáš Valla, Ond ej Suchý (Gar.)	Z	4	2C	L	v
BI-TS3	Theoretical Seminar III Tomáš Valla, Ond ej Suchý, Ond ej Guth 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	3P	L	v
BI-TEX	TeX and Typography Petr Olšák Petr Olšák Petr Olšák (Gar.)	Z,ZK	4	2P+1C	L	v
BI-ULI	Introduction to Linux Zden k Muziká, Jan Ž árek, Dana ermáková, Petr Zemánek 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 Radek Richtr Radek Richtr (Gar.)	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 Tomáš Valla Tomáš Valla (Gar.)	Z	3	2R	L	V
BI-VMM	Selected Mathematical Methods Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	4	2P+2C	L	V
NI-VYC	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			
TVKLV	Physical Education Course	Z	0			
TVKZV	Physical Education Course	Z	0			
BI-ALO	Algebra and Logic	Z,ZK	4			
The course extends and	d deepens the study of topics touched upon in the basic course in logic.					
BI-AVI.21	Algorithms visually	Z,ZK	4			
The course complemen	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	g the principles of algorithms easy.					
BI-A2L	English language, preparation for the B2 level exam	Z	2			
The content of the cour	se corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achieveme	nt - students are	due to: -Take an			
active part in the langua	age instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both	the midterm and	the final term			
tests with the success r	ate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by	individual teacher	s during the first			
class of the term.						
BI-APJ	Aplication Programming in Java	Z,ZK	4			
This course is presente	d in Czech. Advanced technologies in Java.					
NI-AFP	Applied Functional Programming	KZ	5			
This course is presente	d in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional	al programming la	inguages are on			
the rise nowadays and	the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, mas	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 the	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 knowledge 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 complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphics applications) course.						
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	rchiving, as so as	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 i of digital image processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDF		
frequency domain, abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray of	-	-
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
Course focuses on state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hand	ds on experience	with large scale
data processing framework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementation	is and will be capa	able to propose
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.	V7	4
BI-EP2 Efficient Programming 2 Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving inc	KZ	•
with the aim to choose the best one and avoid implementation errors.	inidial problems (are discussed,
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		•
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	jement accounting	g are base of
Business Inteligence moduls in Business information systems.	1/7	4
BI-HAM HW accelerated network traffic monitoring This course introduces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring.	KZ	4 d analysis of
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 is		
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 moder	n programmable
kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded	-	
not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefor	e is suitable even	for Web and
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	1 '	
presentation of AV signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practice	-	
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	g the scene up to	the presentation
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	re able to apply th	nem in particular
examples.	V7	4
BI-CS2 C# language and data access The C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Mic	KZ	
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		
of features for querying and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQ	e e	
and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data	a using domain-sp	ecific objects
(ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Mo	odel, Storage Mod	el and Mapping
(XML description).		
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 overvi on thisplatform. They will learn to create WebAPI and to use it by client programs.	ew of the developr	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. I	1	-
triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the po	-	
structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan		
will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS.	acle DBMS and pa	artially on
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 devel 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-VI	-	
might be an advantage. No previous knowledge of physics is assumed.		
NI-LSM Statistical Modelling Lab	КZ	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 is	1	-
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).		
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 compute	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.	า อนและการธุกรเษรโ (

BI-CCN Compiler Construction	Z,ZK	5
This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principle		-
understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme	-	
BI-TEX TeX and Typography	Z,ZK	4
This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of	· ·	-
rules.		ontypographic
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	1 1	
and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal).		
BI-OPT Introduction to Optical Networks	Z,ZK	4
Students get basic overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on p	1 ' 1	-
of optical network technology and on their solutions. The course will include the history of optical communications, an overview of passive componer	-	
dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission sy		-
the most up-to-date topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such	,	
ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameter		
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 an		-
acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to eff	-	
performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effect		•
management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical ski	ills in the use of mo	dern integration
and development tools (Continuous integration and development).		
BI-VHS Virtual game worlds	ZK	4
The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current	1 1	e is furthermore
complemented by the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world	. The course can l	be followed by
the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devices.		
BI-VR1 Virtual reality I	KZ	4
Introduction to Virtual 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 c		
and shared social activities.		3, 4 144 3
BI-VR2 Virtual reality II	KZ	3
Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The	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 the	. – .	-
issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some b		
with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical)		
will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optim	nization and more.	Students will
also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		
BI-VMM Selected Mathematical Methods	Z,ZK	4
We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and	d its fast impleme	ntation (FFT).
Further we deal with differential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functi	ons. For this purp	oses, we study
normed linear spaces and quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization a	nd duality. The line	ar programming
and the Simplex method is analyzed in more detail.		
NI-VYC Computability	Z,ZK	4
Classical theory of recursive functions and effective computability.		
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/or	research institutio	
internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profes	sional content and	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 credits	correspond to 4 w	eeks of full-time
employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided	d 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/or	research institutio	n. 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 profes	sional content and	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 credits	correspond to 4 w	eeks of full-time
employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided	d into two subjects	if the 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	research institutio	n. 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 profes		
internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits	-	
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	a into two subjects	it the internship
exceeds the academic year's dead-line.	·	
BI-ZIVS Intelligent Embedded System Fundamentals	KZ	4
Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim		
modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion of		
interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to g	ei practical experi	ence with these
	1/7	A
BI-ZPI Process engineering	KZ	4
Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles learn basics of the used notations (LIML_BPMN_BOPM). The focus in this subject lies in training of practical skills of formalisation and modelling of	-	
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 CASE tools. The role of process engineering for information systems development is discussed as well as its importance in the overall context of info	-	-
an enterprise.	Simation and DUSI	ness shareyy U
an one-photo.		

BI-ZNF	PHP Framework Nette - basics	KZ	3
Students will gain the ba	sics 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	roduction 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	reating 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	en 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 indust	rial 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.		1
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-V.2015

Name of the group: Elective Courses of Bachelor Program Informatics, Presented in Czech, Version 2015 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

p: In addition to the courses listed here, you can enroll as an elective any course that is offered within your study program and form of study that you did not enroll as a compulsory subject in the program/branch/specialization or a compulsory elective course.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ADU.1	Unix Administration Zden k Muziká	Z,ZK	5	2P+2C	L	V
BI-ALO	Algebra and Logic Jan Starý Jan Starý Jan Starý (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
BI-ATS	Automated Testing of Software	Z,ZK	4	0+3	L	V
BI-DAN	Taxes for non-Economists Savina Finardi, Tereza Ji íková Tereza Ji íková Savina Finardi (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-STO	Storage and Filesystems	Z,ZK	4	2P+2C	L,Z	V
BI-EP1	Effective programming 1 Martin Ka er Martin Ka er (Gar.)	Z	4	2P+2C	Z	V
BI-EP2	Efficient Programming 2 Martin Ka er Martin Ka er (Gar.)	KZ	4	2P+2C	L	V
BI-EJA	Enterprise Java Jií Dan ek Jií Dan ek Jií Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-EHA	Ethical Hacking Ji í Dostál	Z,ZK	5	2P+2C	L	V
BI-FTR	Financial Markets Pavla Vozárová	Z,ZK	4	2P+2C	Z,L	V
MI-GLR	Games and reinforcement learning Juan Pablo Maldonado Lopez	Z,ZK	4	2P+2C	L	V
BI-HWB	Hardware Security Ji í Bu ek, Filip Kodýtek, Róbert Lórencz Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-ARD	Interactive applications on Arduino Ji í Cvr ek, Robert Hülle, Vojt ch Miškovský, Jan ezní ek Robert Hülle Robert Hülle (Gar.)	ΚZ	4	3C	L	V
BI-CS2	C# language and data access Pavel Št pán Pavel Št pán Pavel Št pán (Gar.)	ΚZ	4	0P+3C	Z	V
BI-PCS	C# language and data access Pavel St pán	ΚZ	4	0P+3C	L	V
BI-CS3	Language C# - design of web applications Pavel Št pán Pavel Št pán Pavel Št pán (Gar.)	ΚZ	4	3C	Z	V
BI-SQL.1	Language SQL, advanced Michal Valenta Michal Valenta (Gar.)	KZ	4	3C	L	V
BI-MEK	Macroeconomic Context of Domestic and World Economy Ivo Straka Ivo Straka Ivo Straka (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-MPP	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-MMP	Multimedia team project Zde ka echová Zde ka echová Zde ka echová (Gar.)	KZ	4	3C	Z,L	V

BI-ACM	Programming Practices 1 Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	KZ	5	4C	L	V
BI-ACM2	Programming Practices 2 Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	KZ	5	4C	Z	V
BI-AND	Programming for the Android Operating System	Z,ZK	4	2P+2C	L	V
BI-CS1	Programming in C# Pavel Št pán, Helena Wallenfelsová Helena Wallenfelsová Pavel Št pán (Gar.)	KZ	4	3C	L,Z	v
BI-PJV	Programming in Java Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	v
BI-PJS	JavaScript Programming Pavel Št pán	KZ	4	0P+3C	L	V
BI-PJS.1	JavaScript Programming Old ich Malec	KZ	4	3C	L	V
BI-PMA	Programming in Mathematica Zden k Buk Zden k Buk Zden k Buk (Gar.)	Z,ZK	4	2P+2C	Z	v
BI-PHP.1	Programing in PHP	KZ	4	3C	Z	V
BI-PYT	Python Programming	Z,ZK	4	2P+2C	L	V
BI-PS2	Programming in shell 2 Lukáš Ba inka	Z,ZK	4	2P+2C	L	V
BI-PRR	Project management David Pešek	KZ	4	2P+2C	Z	V
BI-PKM	Introduction to mathematics Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z	4		Z	V
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SCE2	Computer Engineering Seminar II Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SM	Shell Minimum Tomáš Zahradnický	Z	2		Z	V
BI-ST1	Network Technology 1 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	V
BI-ST2	Network Technology 2 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	3C	L	V
BI-ST3	Network Technology 3 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	V
BI-ST4	Network Technology 4 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	L	V
BI-SOJ	Machine Oriented Languages	Z,ZK	4	2P+2C	L	V
BI-SVZ	Machine vision and image processing Lukáš Brchl, Marcel Ji ina, Jakub Novák Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	L,Z	V
BI-SEP	World Economy and Business Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	L	V
BI-GIT	Version control system GIT Petr Pulc	KZ	2	16P	Z,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	Theoretical Seminar II 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, Ond ej Guth 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-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	Z,L	V
BI-ULI	Introduction to Linux Zden k Muziká, Jan Žárek, Dana ermáková, Petr Zemánek Zden k Muziká Zden k Muziká (Gar.)	Z	2	4D	Z	V
BI-VMM	Selected Mathematical Methods Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ZIVS	Intelligent Embedded System Fundamentals Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	KZ	4	1P+3C	Z	V
ві-мік	Fundamentals of Microeconomics Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ZPI	Process engineering Robert Pergl Robert Pergl (Gar.)	KZ	4	1P+2C	L	V
BI-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	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 Presented in Czech,	e courses of this group of Study Plan: Code=BI-V.2015 Name=E Version 2015	Elective Cour	ses of Ba	chelor F	Program	Informatics
	nix Administration			Z	Z,ZK	5
Students will learn the inter	nal structure of the UNIX operating system, with the administration of its basic subsystem	s and with the sec	curity principle	s. They will	understand	the differences
	trator roles. They will get theoretical and practical knowledge of user management and a			-	-	-
	rk services and remote access, and in the areas of system deployment and virtualization	on. In the labs, the	ey will verify th	e knowled	lge from the	ectures on
specific examples from pra						
	ardware Security	- -	<i>.</i>		z,zk	5
	dware resources used to ensure security of computer systems including embedded one					-
, , , ,	e security features of modern processors, and storage media protection through encrypt cks and tampering with hardware during manufacture. Students will have an overview of	, ,	0			
	-factor authentication (biometrics). Students will understand the problems of effective in			aruteerin	blogy morae	ing applications
	axes for non-Economists				Z,ZK	4
	irance contributions, are obligatory payments paid by people or institutions to public budy	aets. This is the w	av how a sign	1	· · ·	-
-	pays which taxes or who bears the tax burden. The course introduces students to the tax	-				
of income, consumption, a	nd wealth. The course provides practical information on calculations of tax liabilities of b	oth citizens and	nstitutions as	well as inf	ormation al	out important
taxpayers' formal duties to	wards public administration.					
BI-MEK N	lacroeconomic Context of Domestic and World Economy			Z	Z,ZK	4
This course is presented in	n Czech.					
BI-PRR P	roject management				KZ	4
This course is presented in	n Czech.			-		
BI-SEP V	/orld Economy and Business			Z	z,zk	4
	Czech. The course introduces students of technical university to the international busin			, ,	•	
	conomy. Students get to know about different religions and cultures, necessary for doing b					
	levelopment, which are needed for the right investment decision. Seminars help to impro	ove on the knowle	edge in the for	m of discu	issions bas	ed on individua
	ke bachelor level of this course BIE-SEP as a prerequisite.				7 71/	
	undamentals of Microeconomics			4	Z,ZK	4
	Czech. However, there is an English variant in the program Informatics (B1801 / 4753)			-	7 71/	
	ntroduction to European Economic History In Czech. However, there is an English variant in the program Informatics (B1801 / 4753)			4	Z,ZK	3
				-	Z,ZK	4
-	Igebra and Logic eepens the study of topics touched upon in the basic course in logic.			2	_, ∠ r	4
	nglish language, preparation for the B2 level exam				Z	2
	corresponds to the preparation for the English exam at the B2 level. Requirements for c	ourse credit. Aca	demic Achieve	ement - stu	- 1	_
	instructionMeet the requirements for writing assignments - Summary, Abstract, Argur					
tests with the success rate	set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part).	Requirements wi	Il be specified	by individ	ual teachers	s during the firs
class of the term.						
	plication Programming in Java			Z	Z,ZK	4
	n Czech. Advanced technologies in Java.					
BI-STO S	torage and Filesystems			2	Z,ZK	4
	iples and current solutions of storage systems architecture. The module explains princip	les of data store,	protection, an	d archivin	g, as so as	storage scaling
load balancing and high av						
	ffective programming 1				Z	4
The course is taught in Cz				-		
	fficient Programming 2				KZ	. 4
	ogramming 1. Students will practice implementation of algorithms by solving typical pro best one and avoid implementation errors.	blems. various w	ays of solving	individual	problems a	re discussed,
	-				7 71/	
-	nterprise Java I technologies in the Java programming language. The focus is on technologies for deve	lonmont of ontor	orico informat		Z,ZK	4
	sed through the web interface.	elopment of enter	prise informat	ion system	is which an	s connected to
	Iteractive applications on Arduino				KZ	4
	students of first grade of bachelor study as introduction to embedded systems. Students v	will learn how to d	esion simple a	 pplication		•
	pherals with help of available libraries. The goal of the subject is to show varied software					
not only on display of a PC	. Thanks to possible control on higher (objective) layer, this platform is frequently used f	for artist performa	ance and there	fore is sui	table even	for Web and
Software Engineering stud	ents.					
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 - da	tabase, XML, No	SQL - on the	Microsoft p	platform. Th	e students will
	p retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Ne	-			-	
	d updating data, integrated directly with the .NET platform languages, which enable LIN	-			-	
	r objective is the Entity Framework - an object-relational mapper that enables .NET dever	-		-	-	-
(XML description).	urse introduces Code First, Database First, Model First approaches. The students will al	เอง yet to know tr	e conceptual	wouel, St	orage WOO	anu wapping
	anguage C# - design of web applications				KZ	4
	iced to current technologies in web application development on the .NET platform. They w	/ill acquire a comr	orehensive ove	1	1	
	earn to create WebAPI and to use it by client programs.					

Mandula in Instant and Instant	Language SQL, advanced	KZ	4		
		-			
		-	-		
PostgreSQL.	res will usually discuss SQL standard, but many reatures will be demonstrated on Oracle DBMS. Seminars are based on Ora	acie DBINIS and pa	artially on		
BI-MMP This course is presented	Multimedia team project d in Czech.	KZ	4		
BI-ACM	Programming Practices 1	KZ	5		
BI-ACM2	Programming Practices 2	KZ	5		
		V7	4		
BI-CS1					
, e					
			-		
		· ·			
BI-PJV	Programming in Java	Z,ZK	4		
BI-PJS.1	JavaScript Programming		4		
	nts of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-1 WA.1. They should register for	or this course in th	ieir 4th semester		
of study. BI-PMA	Dragromming in Mathematica	7 71/	1		
		anning, ruie-base	a programming,		
BI-PHP.1		K7	4		
	0 0				
-					
register for this course i	n their 3rd semester of study.				
BI-PS2	Programming in shell 2	Z,ZK	4		
Students gain a general	overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad	dition, they gain a	deeper insight		
into shell and some othe	er particular scripting languages and will get practical experience with shell script programming.				
BI-PKM This course is presented	Introduction to mathematics	Z	4		
BI-SCE1		7	4		
		ce to failures and a	attacks. Students		
are approached individu	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of i				
		the subject is wor	k with scientific		
		-			
semester.	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. BI-SCE2	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead Computer Engineering Seminar II	chers. The topics a	are new for each		
semester. BI-SCE2 The Seminar of Comput	Sional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead 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 resistance	chers. The topics Z ce to failures and a	are new for each 4 attacks. Students		
semester. BI-SCE2 The Seminar of Comput are approached individu	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 resistance ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the	Chers. The topics of Z be to failures and a the subject is wor	are new for each 4 attacks. Students k with scientific		
semester. BI-SCE2 The Seminar of Comput are approached individu	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 resistance ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the	Chers. The topics of Z be to failures and a the subject is wor	are new for each 4 attacks. Students k with scientific		
semester. BI-SCE2 The Seminar of Comput are approached individu articles and other profes semester.	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 resistant 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 teac	Chers. The topics of Z be to failures and a the subject is wor	are new for each 4 attacks. Students k with scientific		
semester. BI-SCE2 The Seminar of Comput are approached individu articles and other profes semester. BI-ST1	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 resistant 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 teac Network Technology 1	Z Z the to failures and a the subject is wor chers. The topics a Z	4 attacks. Students k with scientific are new for each 3		
semester. BI-SCE2 The Seminar of Comput are approached individu articles and other profes semester. BI-ST1 The subject is oriented	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 resistant 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 teac Network Technology 1 to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	Z Z the to failures and a the subject is wor chers. The topics a Z	4 attacks. Students k with scientific are new for each 3		
semester. BI-SCE2 The Seminar of Comput are approached individu articles and other profes semester. BI-ST1 The subject is oriented	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 resistant 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 teac Network Technology 1 to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	Z Z the to failures and a the subject is wor chers. The topics a Z	4 attacks. Students k with scientific are new for each 3		
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	Theoretical Cominant I	7	4
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			nunc papers and
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BI-TS2			-
-		s a work with scie	nunc papers and
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BI-TS3		. – .	
-		s a work with sciel	ntific papers and
BI-TS4		_	-
-		s a work with scie	ntific papers and
other scholarly literature	The capacity is limited by the the potentials of the teachers of the seminar.		
BI-ULI	Introduction to Linux	Z	2
Students become familia	ar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and becom	e familiar with bas	sic commands
and techniques of a Uni	x-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal).		
BI-VMM	Selected Mathematical Methods	Z.ZK	4
We start reviewing geon	netric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) an		ntation (FFT).
Further we deal with diff	erential calculus of functions involving multiple variables. We present methods for the localization of extreme values of function	ons. For this purp	oses, we study
normed linear spaces ar	nd quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization ar	nd duality. The line	ear programming
and the Simplex method	l is analyzed in more detail.		
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
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technologies.			
BI-ZPI	Process engineering	K7	1
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an enterprise.			ness sharegy of
BI-IOS	Eurodomontale of iOS Application Development for iDhone and iDed	K2	4
		<u>r</u> z	4
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
BI-ZWU This course is presented	Introduction to Web and User Interfaces d in Czech.		
BI-ZWU	Introduction to Web and User Interfaces d in Czech. 3D Printing	Z,ZK KZ	4
BI-ZWU This course is presented	Introduction to Web and User Interfaces d in Czech.		
BI-ZWU This course is presented BI-3DT.1 BI-ATS	Introduction to Web and User Interfaces d in Czech. 3D Printing Automated Testing of Software	KZ	4
BI-ZWU This course is presented BI-3DT.1 BI-ATS	Introduction to Web and User Interfaces d in Czech. 3D Printing Automated Testing of Software	KZ	4
BI-ZWU This course is presented BI-3DT.1 BI-ATS This course is presented BI-EHA	Introduction to Web and User Interfaces d in Czech. 3D Printing Automated Testing of Software d in Czech. Ethical Hacking	KZ Z,ZK Z,ZK	4 4 5
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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	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	thms and the neu	ral networks, will
be presented as well.			

Code of the group: BI-BIT-VO.2017

Name of the group: Elective Vocational courses originating from neighboring spec for bachelor spec.BI-BIT, ver. 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 oboru

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
BI-BIG	DB Technologies for Big Data Josef Gattermayer, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.)	KZ	4	2P+2C	Z	V
BI-JPO	Computer Units Alois Pluhá ek	Z,ZK	5	2P+2C	Z	V
BI-KOM	Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5	2P+2C	Z	V
BI-OOP	Object-Oriented Programming Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	V
BI-PGR.1	Computer graphics programming	Z,ZK	5	2P+2C	L	V
BI-PNO	Practical Digital Design Martin Novotný Martin Novotný Martin Novotný (Gar.)	KZ	5	2P+2C	Z	V
BI-PRP	Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.)	Z,ZK	4	2P+1R	L	V
BI-PJP	Programming Languages and Compilers Jan Janoušek	Z,ZK	5	2P+1C	L	V
BI-PPA	Programming Paradigms Jan Janoušek	Z,ZK	5	2P+2R	Z	V
BI-PGA	Programming of graphic applications Radek Richtr, Ji í Chludil Radek Richtr Radek Richtr (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-PYT	Python Programming	Z,ZK	4	2P+2C	L	V
BI-SI2.3	Software Engineering 2 Martin Hlavatý Zden k Rybola Martin Hlavatý (Gar.)	Z,ZK	3	2P	Z	V
BI-SP1.21	Team Software Project 1 Radek Richtr, Marek Suchánek, Michal Valenta, Ji í Chludil, Ji í Mlejnek, Ji í Hunka, Zden k Rybola, Ji í Borský, Jan Matoušek, Zden k Rybola Ji í Mlejnek (Gar.)	ΚZ	5	2C	L	V
BI-SP1	Team Software Project 1 Ji í Mlejnek	KZ	4	2C	L	V
BI-SP2	Team Software Project 2 Ji í Mlejnek	KZ	6	2C	Z	V
BI-SP2.1	Team Software Project 2 Marek Suchánek, Ji í Chludil, Robert Pergl, Marek Skotnica, Ji í Mlejnek, Ji í Hunka, Zden k Rybola, Ji í Borský Ji í Mlejnek Ji í Mlejnek (Gar.)	KZ	4	2C	Z	V
BI-SRC	Real-time systems Jaroslav Borecký, Hana Kubátová Jaroslav Borecký Hana Kubátová (Gar.)	KZ	4	2P+2C	Z	V
BI-TJV	Java Technology Ond ej Guth	Z,ZK	4	2P+2C	Z	V
BI-XML	XML Technology Jan Mokrý	Z,ZK	4	2P+2C	L,Z	V
BI-TIS	Information Systems Design Pavel Náplava Pavel Náplava Pavel Náplava (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-TUR	User Interface Design Jan Schmidt	Z,ZK	4	2P+2C	L	V
BI-TWA.1	Web Application Design Filip Glazar, David Bernhauer Filip Glazar David Bernhauer (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-VES	Embedded Systems Miroslav Skrbek	Z,ZK	5	2P+2C	L	V
BI-VWM	Searching the Web and Multimedia Databases Tomáš Skopal	Z,ZK	5	2P+1C	L	V

BI-VZD	Data Mining Alexander Kovalenko, Karel Klouda, Ond ej Tichý, Daniel Vašata Daniel Vašata Pavel Kordík (Gar.)	Z,ZK	4	2P+2C	L,Z	v
BI-ZRS	Basics of System Control Kate ina Hyniová	Z,ZK	4	2P+2C	Z	V
BI-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	v
BI-ZNS	Knowledge-based Systems Marcel Ji ina Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	Z	v
	courses of this group of Study Plan: Code=BI-BIT-VO.2017 Na	ame=Elective	Vocatio	hal cours	es origina	ating from
	bachelor spec.BI-BIT, ver. 2017					
BI-PRP Lav	v and business			2	,ZK	4
	orithms and Graphs 2			7	ZK	5
	ech, introduces basic algorithms and concepts of graph theory as a follow=up on the	introduction given	in the com	1	· ·	-
	s and amortized complexity analysis. It also includes a very light introduction to appro					
	sics of System Control			1	,ZK	4
	tion to the field of automatic control. Students will gain knowledge in this rapidly evolu-					
	nysical systems. We will provide basic information from the feedback control of linear of the set o					
	analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Si nic systems analysis and design verification and simple PID feedback, PSD, and fuzz			•	•	
	ity in control systems, single and continuous adjustment of the controller parameters,	-		-		
and digital controllers and PL		,				
	hon Programming			Z	,ZK	4
The course is taught in Czec				I		
BI-ZUM Arti	ificial Intelligence Fundamentals			Z	,ZK	4
	e fundamental problems in the Artificial Intelligence, and the basic methods for their so	•				
	stems, game theory, planning, and machine learning. Modern soft-computing method	ls, including the ev	olutionary a	algorithms ar	nd the neural	networks, will
be presented as well. BI-BIG DB	Technologies for Big Data				KZ	4
This course is presented in C				I		4
	mputer Units			7	,ZK	5
	knowledge of digital computer units acquired in the obligatory course of the program	(BIE-SAP), get ac	quainted in			-
	s and processors and their interactions with the environment, including accelerating a					
	ation of main memory and other internal memories (addressable, LIFO, FIFO and CA			-		
	ial data transmissions. They will also get acquainted with the methodology of controlle	-			-	
and programmable hardware	itecture of the bus system. The problems will be practically evaluated in the labs and w design kits (FPGA).		euucalionai	microprogra	mined proce	SSUI SIITIUIAIUI
	nceptual Modelling			Z	,ZK	5
	veloping abstract thinking and precise formulation skills using conceptual models. Stu	idents learn skills	of discernin			the ability to
	t relations in complex systems of social reality, mostly enterprises and institutions. Stu		-		-	
-	v to express business rules and constraints using the OCL language and foundations			-		-
	prise engineering, being a discipline for conceptual modelling of enterprises and instit designed with the respect to continuation in software implementations.	utes and their proc	esses. The	DEMO meth	od and the B	PMN notation
	Itimedia and Graphics Applications			7	,ZK	5
	multimedia technologies and applications for 2D/3D bitmap and vector graphics. Du	ring the course, cu	rrent tools			
	e introduced. Students learn several basic techniques of creation and editing content in	-		-	-	
	se multimedia transmission and representation systems, including real-time multimed	-	-	-	ple of operat	ion and use
	. They gain a number of practical skills, such as vectorizing raster images, retouching	photos, or creatir	ig 3D mode			
1	ject-Oriented Programming	o of objects that	lloharata	1	.,ZK	4 ing In this
, , , , , , ,	g has been used in the last 50 years to solve computational problems by using graphs e main principles of object-oriented programming and design. The emphasis is on pra			• •	• •	•
handing, refactoring and desi			ior soltware	ocveroprire	in moloung t	coung, choi
	mputer graphics programming			Z	,ZK	5
1 1	a simple interactive 3D graphical application like a computer game or scientific visua	lisation, to design	the scene,			
	ce, wood, sky), and set up the lighting. At the same time, they understand the fundam					
	transformations, or lighting model. They gain knowledge allowing orientation in compute				-	-
	ogramming and animations. They get used to techniques utilised in geometric model	ling, modelling of e	curves and		KZ	sualisation.
	ictical Digital Design the contemporary digital design flow and learn practical skills to use synchronous des	sian techniques. Tl	nev underst	1	1	-
-	gies FPGA and ASIC. Students demonstrate practical use of the design techniques in		-			
tools.						
BI-PJP Pro	gramming Languages and Compilers			Z	,ZK	5
	ds of implementation of common high-level programming languages. They get experi					
	iguage: data types, subroutines, and data abstractions. Students are able to formally				-	-
	sed on such a specification. The notion of compiler in this context is not limited to con xt in a language defined by a LL(1) grammar.	upilers of program	ning langu	ayes, but ext	enus lo all o	mer programs
	ogramming Paradigms			7	,ZK	5
1	paradigms of high-level programming languages, including their basic execution mod	els, benefits, and l	imitations o			
	ts basic principles are explained in details. Logic programming is introduced as anoth					
	isp (Racket) and Prolog programming languages. Moreover, usage of these principles	s is demonstrated	on modern	mainstream	programmin	g languages
such as C++ and Java.						

BI-PGA Programming of graphic applications	Z,ZK	5
This course is presented in Czech only.		
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-SP1.21 Team Software Project 1	KZ	5
Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is pro-	ovided in the BIE-SWI course	e that runs
concurrently and that teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific pro	ject. The teacher, in the role	of the team and
project leader, regularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting	ng software artefact will be fu	rther developed
and finished in the BIE-SP2 course.		
BI-SP1 Team Software Project 1	KZ	4
Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is pro-	ovided by the BEI-SWI cours	e that runs
concurrently and that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The	teacher, in the role of the tea	am and project
leader, regularly consults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting	g work will be further develop	ed and finished
in the BEI-SP2 course.		
BI-SP2 Team Software Project 2	KZ	6
Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first iterative	on is the result of the BEI-SP	1 course project.
However, this time, the functionality, testing and documenting of the system being developed will be emphasized. Students will work in te	ams of 4-6 people. The teach	er, in the role of
the team and project leader, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of the	eir solution. The BEI-SI2 cour	se that runs
concurrently will provide the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the	e software product.	
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).	I	
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 issue		•
experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems		
as in BI-VES subject and FPGA.		
BI-TJV Java Technology	Z,ZK	4
The subject goal is to introduce the programming language Java. The student gains practical experiences for smaller enterprise application		•
to build the three and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDE		-
course end is student able to create three layers enterprise application.		0.0.1.1.1.1.0
	Z,ZK	4
BI-XML XML Technology Students learn to make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing	· · · · ·	•
language XPath which enables addressing of parts of XML documents and its usage in different XML technologies. Students will also lea		°
XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies.	In basics of AGET programm	ing. AGET and
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 segme		-
technologies (databases, programming languages, GUI etc.).	ents (customers) with applica	allotis of existing
	7 71/	4
BI-TUR User Interface Design Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the pro	Z,ZK	•
not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development that bring users into the development process to ensure optimal communication with a user.	ant. Students gain an overview	w of the methods
	7 71/	F
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 so		
structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web		
modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using framework applications with library iQuery and pageibly MV/* framework applications.	vorks Symiony 2, Docume 2.	Developments
on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.	7 71/	
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 microcontrolle	rs and embedded processors	s, their integrated
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 heteroge	-	-
students acquire information about search techniques in text and hypertext documents (the web pages themselves) and about feature ex		
knowledge of similarity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for progra	mming web search engines for	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 prepro-	-	
statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the re		
and know the fundamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to a	apply basic data mining tools	to common
problems (classification, regression, clustering).	/	
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	-	-
require human judgment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architec		stems to support
decision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutionar	y algorithms.	

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
-	language instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both th		
tests with the succ	ess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by indi	vidual teachers du	ring the first
	class of the term.		
BI-AAG	Automata and Grammars	Z,ZK	6
	luced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite a	-	-
	ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between for		
	red through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation,		1
BI-ACM	Programming Practices 1 This course is presented in Czech.	KZ	5
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.		I
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		e differences
between user and	administrator roles. They will get theoretical and practical knowledge of user management and administration, of users access rights,	file systems, disk s	subsystems,
processes, memo	ory, network services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the known	owledge from the le	ectures on
	specific examples from practice.		
BI-ADW.1	Windows Administration	Z,ZK	4
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-AG1	Algorithms and Graphs 1	Z,ZK	6
The course cove	rs the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing cur	riculum. It links an	d partially
develops the know	vledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the	time and space co	mplexity of
algo	rithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asym	nptotic notation.	
BI-AG2	Algorithms and Graphs 2	Z,ZK	5
This course, prese	nted in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory of	ourse BI-AG1. It fu	rther delves
into advances data	structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English version	on of the course se	e BIE-AG2.
BI-ALO	Algebra and Logic	Z,ZK	4
	The course extends and deepens the study of topics touched upon in the basic course in logic.		
BI-AND	Programming for the Android Operating System	Z,ZK	4
	This course is presented in Czech.		•
BI-AND.21	Programming for the Android Operating System	KZ	4
	This course is presented in Czech.		
BI-ANG	English Language, Internal Certificate	ZK	2
	Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-AN	G	•
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2
BI-APJ	Aplication Programming in Java	Z,ZK	4
	This course is presented in Czech. Advanced technologies in Java.		I
BI-APS.1	Architectures of Computer Systems	Z,ZK	5
Students will lear	n the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec		ven on the
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
not only in scalar p	rocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the	sequential model of	of programs.
The course further	elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and	l consistency in su	ch systems.
BI-ARD	Interactive applications on Arduino	KZ	4
The subject is desig	gned for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple application	ions for modern pro	ogrammable
kits and control va	aried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded s	ystems, i.e. to see	the results
not only on displa	ay of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore	is suitable even for	r Web and
	Software Engineering students.		1
BI-ATS	Automated Testing of Software	Z,ZK	4
	This course is presented in Czech.		
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 presente	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>)
51 5 4 5	that make understanding the principles of algorithms easy.	-	
BI-BAP	Bachelor Thesis	Z	14
BI-BEK	Secure Code	Z,ZK	5
	earn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fa		-
-	s gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		
	rileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing		-
	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and th	-	
BI-BEZ	Security	Z,ZK	6
	In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a		
and nash tunctions	S. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.	ystems for comput	ei systems.
		1/7	Λ
BI-BIG	DB Technologies for Big Data This course is presented in Czech.	KZ	4

BI-BLE Blender Z,ZK 4 The course stands knowledge of opensource program Blender from BI-MGA Multimodia and Graphica Applications) course. It is intended for theirersed on 30 graphics and antimoti. It offers a complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphics applications) course. BI-DOR Bi-DoR Z ZK 5 BI-CAO Digital and Analog Circuits Z ZK 5 BI-CAO Complier Construction Z ZK 5 BI-CON Complier Construction for bacheto students in computer solmons. They goal of the class is to introduce back principles of compliens to students in computer solmons. The goal of the class is to introduce back principles of compliens to students in the operanding self-compliation is the overarching theme of the class. BI-CS1 Programming in cPL KZ 4 The goal of the class is to introduce back principles of ompliens to introduce the class. For analytic self. 4 The goal of the class is to introduce back principles. KZ 4 The class introduce solution introduce and class of the class is to introduce back principles. 4 4 The solution introduce and class and class introduce solution introduce and class introduce solution. KZ 4 Dis class introduce and classol	
animation. It affers a complete and practically oriented introducen to Blender environment. Students may continue to BI-PGA (Programming graphics applications) cours. BI-DAD Digital and Analog Circuits CZK 5 Budents get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of transitions, path, circuits, and conductors. They use able to design simple construction of electronic divices. BI-CCN BI-CCN COmplete Construction Complete Construc	
BI-CAO Digital and Analog Circuits Z.ZK 6 Students get the fundamental understanding of therbolicies undersign devices. The construction <	
Bit-Cost Control to the design angle detection is deplay systems. They understam the basic horaritical models and glinal modes of electronic devices. Control to the design angle detection is deviced. Section 1 Control to the design angle devices. Section 1 Control to the design angle devices. Section 2 Colspan= 2 Colspan="2">Section 2 Colspan="2">Section 2 Section 2 Section 2 Colspan="2">Section 2 Colspan="2">Section 2 Colspan="2">Section 2 Colspan="2">Section 2 Colspan= 2 Section 2 Colspan= 2 Colspan= 2 Colspan= 2 <th colspa<="" td=""></th>	
transitions, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital modes of electronic devices. EleCON Z,ZK 5 This is an introductory class on compiler construction for bachelor students in computer science. The goal of the cases is to introduce basic principles of compilers for students to understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme of the case. EleCON KZ 4 Bi-CS1 Programming in C# KZ 4 Bi-CS2 C/E language and data access KZ 4 Computer constructors, methods, properties, static members, Garbage Cellectric, hindrave and phymophymic, calicitation, delegates, and generics. Debugging and escapion processing, an well as work with files are emphasized. KZ 4 The C# language and data access course objective is to introduce students several data access technologies - database, NL, NSGU - on the Microsoft platform. The students will also get to know help sets as under to know beging such as LINC > as et of festures for quarying and updating idata, integrated directly with the XET platform languages, which enable LINC use with objects. XML and SQL (LINC to Objects, LINC to XL), and the values the object phymic and the stating and data. 4 The Stating social insurance contributions, save alguaters being social insurance contributions, save alguaters being social insurance contributions, save alguaters being social insurance contributions to whele soft many bease of t	
of electronic devices. Compiler Construction Z,ZK 5 This is an introductory class on complet construction for bachelor students in computer science. The goal of the class is to introduce basic principles of complets for students to understand the design and implementation of programming languages. Seeing and actualy understanding self-completion is the overarching them of the class. 5 BI-CS1 Programming in QF# KZ 4 The goal of the course is to introduce NET Framework as a multi-language development platform. Then, programming in Quege C2, its fundamental construction, types of variables, constructions, methods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging and exception processing, as well as work with lifes are emphasized. KZ 4 BI-CS2 C4 Innguage and data access tochnologies used as access tochnologies access tochnologies used as access tochnologies access tochonologies access tochnologies access tochonologies acces	
BI-CCN Completer Construction Z,ZK § This is an introductory class on completer construction for bachelor students in computer science. The goal of the class is to introduce back principles of completers for students to understand the design and implementation of programming language. Seeing and actually understanding self-compliation is the overarching theme of the class. BI-CS1 KZ 4 BI-CS2 CH language and implementation of programming language. Seeing and actually understanding self-compliants on its cover and the design and exception processing, as well as work with files are emphasized. KZ 4 BI-CS2 CH language and data access to use ourse tobeletive is to introduce students several data access to use ourse tobeletive is the intervence on the class definition and class instancing, and to know objects used to retrive data-concession. See used and the design of the data access to use ourset technologies such as LINO a set of features for querying and updating data. Integrated directly with the .NET platform languages, which enable LINO use with Objects. XML and SQL (LINO to Objects, LINO to SML and SQL (LINO to Objects, LINO to SML and SQL (LINO to Objects). LINO to SML and SQL (LINO to Objects). LINO to SML and LINO to SQL and the datas and the data specess on the object in the data specess on the data specess on the data specess. BI-CS3 Language CH - design of web applications KZ 4 The students will able introduces to definite and LINO to SQL and the datas and instructions as well as informations and antiperation. The visuage of the datasplasplating developerin table addition and class and th	
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BI-CS1 Programming in C# KZ 4 The geal of the course is to introduce. NET Framework as a multi-language development platform. Then, programming language C#, its fundamental construction, types of variables, operators, arrsy, loops, definitions and calls of functions will be discussed. Attention is tocused on the object oriented programming in C# -tasks definition and class instancing, as well as work with lifes are emphasized. BI-CS2 C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Microsoft platform. The students will get to hnov objects used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current technologies LNQ to Objects, LNQ to Charles objects, INQ to Charles	
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operators, arrays, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class definition and class instancing, constructors, methods, properties, static members, Garbage Collector, inhertance and polymorphism, collections, delegates, and generics. Debugging and exception processing, as well as work with files are emphasized. KZ 4 BI-CS2 C# flanguage and data access tourse objective is to introduce students several data access technologies - database, XML, NoSQL - on the Microsoft platform. The students will go to know objects used to retrieve data - connection, Command, Data Reader and DataAdapter V ADO.NET. Nack, they will learn to use current technologies such as LINQ - as etch of fatures for querying and updating data, integrated directly with the NET platform inaguages, which enable LINQ use with Volpects, XLL and SOL (LINQ to Objects, LINQ to XML and UINO to SOL). Another objective is the Entity Framework - an object-relational mapger that enables. NET developers to work with relational data using domain-specific objects (QRM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model. Storage Model and Mapping (XLL description). 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 learn to create WebAPI and to use it by client programs. Z,ZK 4 The students will be database or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and shows how they affect taxation in concerse roward webits. The course proves p	
constructors, methods, properties, static members, Garbage Collector, inhertance and polymorphism, collections, delegates, and generics. Debugging and exception processing, as well as work with files are emphasized. KZ 4 BI-CS2 C# language and data access course objective is to introduce students several data access (atabase, XML, NoSQL - on the Microsoft platform. The students will get to know object used to reintre technologies such as LINO - a set of features for querying and updating data, integrated directly with the NET platform languages, which enable LINO use with Objects, XML and SQL (LINQ to Objects, LINQ to XML and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables. NET developers to wrick with relational data using domain-specific objects (DRM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model. Storage Model and Mapping (MLL description). BI-CS3 Language ## - design of web applications KZ 4 The students will be introduced to current technologies in web application development on the NET platform. They will enar to create WebAPI and to use it by client programs. BI-DAN Z,ZK 4 Taxes, finduding social insurance contributions, are obligatory payments plat by people or institutions to public budgets. This is the way how a significant portion of GDP is redstributed. Z,ZK 6 Students are introduced to the database engine architecture and typical user roles. They are birlely introduced to varius databases models. They learn the epriceips of transaccion oroceurse monone calculations of tax liabilities of tax ac	
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RI-EMP Economics and Manadement Principles	
This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with fields: enterprise foundation,	
enterprise putting into state economic environment (CR), management of property and capital structure, business transaction records keeping during an accounting period, a relation	
between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination.	
BI-EP1 Effective programming 1 Z 4	
The course is taught in Czech.	
BI-EP2 Efficient Programming 2 KZ 4	
Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual problems are discussed,	
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BI-GIT	Version control system GIT	KZ	2
Students will be in	troduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and pract	ically. In this partic	ular system
	mplementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git		
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 oals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traff		
for analysis). The g	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		
	ules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi		
including side-char	nel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of		applications
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
51100	This course is presented in Czech.		
BI-JPO	Computer Units	Z,ZK	5
Students deepen	their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail v	with the internal str	ucture and
-	nputer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using approp		
	e organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, including	-	
	lel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of comm d the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational micropro-		
the environment an	and programmable hardware design kits (FPGA).	granned process	
BI-KOM	Conceptual Modelling	Z,ZK	5
	ised on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te	1 [·] 1	-
categorize and spe	cify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struc	tural modeling in th	e OntoUML
-	learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent		-
learn the foundation	ns of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO r	nethod and the BPI	MN notation
	will be taught. The course is designed with the respect to continuation in software implementations.	774	4
BI-KOT Kotlin is a modern	Programing in Kotlin n, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advar	Z,ZK	
	Illy Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a		
	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	-	-
anthropological res	earch from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, healt	h, history, death, et	tc) will be
BI-LIN	shown. The course is presented in Czech. Linear Algebra	Z,ZK	7
	ht in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroun		-
•	s are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation		
equations. The	ey can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting a	nd error-correcting	codes.
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
	This course is presented in Czech.		
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
	uainted with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for wor ation will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to gra		
0	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		
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 trate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks and the subject requires the previous knowledge of elementary computer networks.		
and now to adminis	and technologies of the data-link, network and transport layer of the OSI model.	stworks concepts in	ke protocois
BI-MLO	Mathematical Logic	Z,ZK	5
Dimeo	The course seminary is taught in Czech.		Ŭ
BI-MMP	Multimedia team project	KZ	4
	This course is presented in Czech.	· · · · · · · · · · · · · · · · · · ·	
BI-MPP	Methods of interfacing peripheral devices	Z,ZK	4
	sed on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universa		
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.	5 devices, Linux an	IU VVINDOWS
BI-MPP.21	Methods of interfacing peripheral devices	Z,ZK	5
	ed on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universative of the section of	1 · · ·	
	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.		
BI-MVT.21	Modern Visualisation Technologies	Z,ZK	5
-	urse is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augn		
nigh resolution disp	plays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentione	₃a technologies, na	amely fractal
	and procedural visualization, scientific data visualization, and 3D model scanning.		

BI-OOP	Object-Oriented Programming	Z,ZK	4
	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 develo handing, refactoring and design patterns.	pment including tes	sung, enor
BI-OPT	Introduction to Optical Networks	Z,ZK	4
	overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on poss	· · ·	
of optical network	technology and on their solutions. The course will include the history of optical communications, an overview of passive components	, (optical fibres, mu	ultiplexors,
	sators, and others), and an overview 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		
	ncy transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters. from practice.	Students will solve	real tasks
BI-OSY	Operating Systems	Z,ZK	5
	and the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They		
kernels, proces	ses and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and dead	ocks, the technique	es of the
-	nt of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple mult		
BI-PA1	Programming and Algorithmics 1	Z,ZK	6
e e	ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, struc ons, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searchi		•
	with linked lists.	ig, sorung, and ma	anipulating
BI-PA2	Programming and Algorithmics 2	Z,ZK	7
	e instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, c		
table). They can im	plement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in	n C++, students are	e introduced
	with all C++ features needed to achieve the main objective (operator overloading, templates).		
BI-PAI	Law and Informatics	ZK	3
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	1/7	4
BI-PCS	C# language and data access and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Micros	KZ	4 tudopts will
	ts used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current tech	•	
	rying 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		
(ORM). This part of	f the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model	, Storage Model ar	nd Mapping
	(XML description).		_
BI-PGA	Programming of graphic applications	Z,ZK	5
BI-PGR.1	This course is presented in Czech only. Computer graphics programming	Z,ZK	5
	o program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textu		-
	ke wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in		
graphical pipeline,	geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fund	lamentals for your p	professional
	for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface		
BI-PHP.1	Programing in PHP	KZ	4
	aught in Czech Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices a PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register f		
	register for this course in their 3rd semester of study.	JI DIE-TWA.T. THE	sy should
BI-PJP	Programming Languages and Compilers	Z,ZK	5
	asic methods of implementation of common high-level programming languages. They get experience with the design and implementat		
for a simple progra	amming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has	a certain syntax ir	nto a target
form and write a co	ompiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but	extends to all othe	er programs
	for parsing and processing text in a language defined by a LL(1) grammar.	1/7	4
BI-PJS	JavaScript Programming This course is presented in Czech.	KZ	4
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	I I	
s a	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		
	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).	T	
BI-PKM	Introduction to mathematics	Z	4
	This course is presented in Czech.	7 71/	
BI-PMA	Programming in Mathematica prking with modern technical and scientific software. Students will learn how to use different programming styles (functional programm		4
	etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.	ing, rule-based pro	ogramming,
BI-PNO	Practical Digital Design	ΚZ	5
	rerview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the	I I I I I I I I I I I I I I I I I I I	-
and implementati	on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in	dustry-standard C/	AD design
	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	ular approaches. F	
Programming para			monstratad
on lambda calculu	digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. Th s and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr	e principles are de	
on lambda calculu	digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. Th is and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr such as C++ and Java.	e principles are de	
on lambda calculu BI-PRP	s and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr	e principles are de	

	Droject monogement	KZ	4
BI-PRR	Project management	ΓΛ <u>Ζ</u>	4
	This course is presented in Czech.	1/7	
BI-PS1	Programming in Shell 1	KZ	5
	knowledgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating systems		
threads, access rig	hts, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell,	basic commands, a	and filters to
	process various text data.		
BI-PS2	Programming in shell 2	Z,ZK	4
Students gain a ge	neral overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In additi	ion, they gain a dee	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
Students understar	d the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topi	cs are primarily foc	used on the
2nd to 4th layer of	of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students	will be able to write	a simple
	network application and configure a simple network.		
BI-PST	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		-
	ndom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical inducti		
	nown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the s		
	more random variables.		
		7.71/	4
BI-PYT	Python Programming The course is taught in Czech.	Z,ZK	4
BI-QAP	Quantum algorithms and programming	KZ	5
Course aims at givi	ng students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanics, c	on which quantum to	echnologies
are based, and alg	porithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software develop	ment kit Qiskit, whi	ch is based
on Python langua	ge. Knowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VMN	A and experience w	ith Python
	might be an advantage. No previous knowledge of physics is assumed.		
BI-SAP	Computer Structure and Architecture	Z,ZK	6
	nd basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inp	· ·	torage and
	s, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital desi	· · ·	0
	of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connect		
g	languages.		
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		•
	dividually within the subject. Each student or group of students solves some interesting topics of ugital design, reliability and resistance it dividually within the subject. Each student or group of students solves some interesting topics 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 teache		
a licies and other p	semester.	is. The topics are n	
		7	4
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		
	dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the		
I articles and other n			
	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher		
	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester.	rs. The topics are n	
BI-SEP	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business	rs. The topics are n	ew for each
BI-SEP This course is pre	brofessional literature and/or work in K_N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business Isented in Czech. The course introduces students of technical university to the international business. It does that predominantly by c	rs. The topics are n	ew for each 4 I countries
BI-SEP This course is pre	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business	rs. The topics are n	ew for each 4 I countries
BI-SEP This course is pre and key regions of v	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business isented 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 nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of d	rs. The topics are n Z,ZK omparing individua indexes of econom	ew for each 4 I countries nic freedom,
BI-SEP This course is pre and key regions of v	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business isented 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	rs. The topics are n Z,ZK omparing individua indexes of econom	ew for each 4 I countries nic freedom,
BI-SEP This course is pre and key regions of v	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business isented 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 nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of d	rs. The topics are n Z,ZK omparing individua indexes of econom	ew for each 4 I countries nic freedom,
BI-SEP This course is pre and key regions of corruption and eco BI-SI1.2	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester. World Economy and Business 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 nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of d readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite.	rs. The topics are n Z,ZK comparing individua s indexes of econon iscussions based c Z,ZK	ew for each 4 I countries nic freedom, n individual 5
BI-SEP This course is pre and key regions of corruption and eco BI-SI1.2 Students learn th	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachersemester. World Economy and Business 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 nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of d readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. Software Engineering I	rs. The topics are n Z,ZK comparing individua s indexes of econon iscussions based c Z,ZK ctical skill thanks to	ew for each 4 I countries nic freedom, n individual 5 applying
BI-SEP This course is pre and key regions of corruption and eco BI-SI1.2 Students learn th hands-on analysis	brofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachersemester. World Economy and Business 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 nomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of d readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. Software Engineering I he methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get prace	rs. The topics are n Z,ZK comparing individua s indexes of econon iscussions based c Z,ZK tical skill thanks to E tools and UML fo	ew for each 4 I countries nic freedom, n individual 5 applying
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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).	I	1
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 particular statements in the statement of the st		
	queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point		
	exes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan an ed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS are based on Oracle DBMS.	•	•
will be discusse	PostgreSQL.		
BI-SRC	Real-time systems	KZ	4
	basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla kr	1	tures 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 a	re the same
	as in BI-VES subject and FPGA.		1
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	Z	<u> </u>
BI-ST1	Network Technology 1 iented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredite	-	A Netacad -
	CCNA1 - R&S Introduction to Networks.		Netacaa
BI-ST2	Network Technology 2	Z	3
_	This course is presented in Czech.	1	
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 B	BI-ST1 and BI-ST2	courses will
get further exten	ded in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, pred	ictability, extensior	beyond a
	simple topology, security, etc.	7	0
BI-ST4	Network Technology 4 er enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switching	Z	3 BI-ST1 and
	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		
Broadcast Multipl	e Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and switch	n firmware, perform	n password
recoveries, and er	nergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitigati	on ways while mai	ntaining the
	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 arch load balancing and high availability.	iving, as so as stor	age scaling,
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 i	1 '	-
introduces students	s to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical use	e of camera system	ns for solving
	problems of practice that the graduates may encounter.	1	1
BI-TDA	Test driven architecture	KZ	4
	cused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that a surse 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
	ented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of the		
	rules.		<i>y</i> 1 0 1
BI-TIS	Information Systems Design	Z,ZK	5
Students know var	ious types of ISs and their practical implementation aspects and are able to match the needs of different market segments (custome	rs) with application	s 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 and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWel		
	course end is student able to create three layers enterprise application.		io.j. / it the
BI-TS1	Theoretical Seminar I	Z	4
	r is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	1	The students
are treated individu	ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a	work with scientific	papers and
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		1
BI-TS2	Theoretical Seminar II	_ Z	4
	r is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a		
	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
	r is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic	1	1
are treated individu	ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a	work with scientific	papers and
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS4	Theoretical Seminar IV		4
	r is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classic ally and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a		
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		, papero and
BI-TUR	User Interface Design	Z,ZK	4
	asic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where s		1
not communicate w	vith the user optimally, since the needs and characteristics of users are not taken into account during product development. Students g	ain an overview 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
	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,		
modern libraries f	acilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony		elopments
BI-ULI	on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework Angular.	JS. Z	2
	e familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become f	I – I	
	and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (te		ommando
BI-VAK.21	Selected Applications of Combinatorics	Z	3
	p introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the b	asic courses, we ap	-
issue from applica	tions to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic	data structures. Fu	urthermore,
	ticipation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) info		
will select proble	ms to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimize	ation and more. Stu	idents will
BI-VES	also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.	7 71/	5
	Embedded Systems lesign embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedd	Z,ZK	-
Olddenis icam to c	peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.		rintegratea
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		
	y the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world. T	-	
	the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR device	ces.	
BI-VMM	Selected Mathematical Methods	Z,ZK	4
	g geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and i	-	
	vith differential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functions		
normed linear spa	ces and quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization and c	uality. The linear pro	ogramming
	and the Simplex method is analyzed in more detail.	KZ	4
BI-VR1	Virtual reality I ual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of	1 1	-
	es on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves con		
	and shared social activities.	ip atalional timilarig	, empany
BI-VR2	Virtual reality II	KZ	3
	e course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The obje	ctive is to develop a	applications
	for computer science and gamification in various social metaverse and desktop engines.		
BI-VWM	Searching the Web and Multimedia Databases	Z,ZK	5
-	ic overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storage		
	information about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from the search is multiple data bases (search is multiple data bases (search is self-search is multiple data bases (search is self-search is search is		
knowledge of simil	arity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web sea data types (documents).	arch engines for the	menuonea
BI-VZD	Data Mining	Z.ZK	4
	Juced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multi	· · ·	-
	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	ata mining tools to	common
	problems (classification, regression, clustering).		
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)		-
language XPath V	which 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.	SLI programming.	XSLI and
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5
	h a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula ap		
g	recurrent equations, and basics of graph theory.		
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
Intelligent embedo	led system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of t		ch students
	robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion control	, 0,	
interfaces, robot n	avigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get p	ractical experience	with these
	technologies.		
BI-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 achniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the lin	-	
	sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic ex		Sgraio ana
BI-ZNF	PHP Framework Nette - basics	KZ	3
	the basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech po	I I	-
	knowledge should serve for the efficient creation of a web backend in PHP language.		
BI-ZNS	Knowledge-based Systems	Z,ZK	5
	me familiar with the systems based on knowledge (knowledge-based systems), which are systems that usetechniques of artificial inte		
	gment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of knowle		to support
	cision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutiona	· · ·	А
BI-ZPI Students will learn	Process engineering fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of p	KZ	4 nd they will
	used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of busi	-	-
	ole of process engineering for information systems development is discussed as well as its importance in the overall context of inform		-
	an enterprise.		

BI-ZRS Basics of System Control	Z,ZK	4
The course gives an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will for	us our attention part	icularly on
control of engineering and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description		
basic linear dynamic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of cre		-
model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also give control loops, issues of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industri-		
and digital controllers and PLC control.		continuous
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/or	1 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 professional content.		
internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits co	prrespond to 4 weeks	s of full-time
employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided in the student can be din the student can be divided in the student	nto two subjects if the	e 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/or		
internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profess internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits or		
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 i	•	
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	esearch institution.	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 professional content. The student must provide evidence of the professional content.		
internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits or	-	
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 i exceeds the academic year's dead-line.	nto two subjects if the	e internsnip
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 algorith		
be presented as well.		,
BI-ZWU Introduction to Web and User Interfaces	Z,ZK	4
This course is presented in Czech.		
BIE-EEC English language external certificate	Z	4
The BIE-ECC course can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates their proficiency in Englishing and the submission of a certificate certificate that demonstrates the certificate that demonstrates the submission of a certificate certificate that demonstrates the certificate the submission of a certificate that demonstrates the certificate that demonstrates the certificate the submission of a certificate that demonstrates the certificate the submission of a certificate that demonstrates the certificate the submission of a certificate that demonstrates the certificate the submission of a certificate the cer	lish comparable to o	r exceeding
the B2 level of the Common European Framework of Reference for Languages.		
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 are	able to apply them i	in particular
examples. BIE-ZUM Artificial Intelligence Fundamentals	774	4
BIE-ZUM Artificial Intelligence Fundamentals Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the class	Z,ZK	
space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorith		
be presented as well.		,
FI-FIL Philosophy	ZK	2
see A0B16	· ·	
FI-GNO Introduction to Gnoseology	ZK	2
P edm t studenty uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v		
modernismu a myšlenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um n	-	-
proces . V návaznosti na teorii p írodních jazyk a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín na hlediska es kapitolou jsou modely spojitých p írodních soustav a systém , v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozvoj		
Ing. Ivo Janoušek CSc.		a yaramuje
FI-HPZ Humanities subject from a study abroad	Z	3
A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module th		-
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 introduces the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in com	parison with the dev	elopment of
the European region 19 to 21 century .		
FI-KSA Cultural and Social Anthropology	ZK	2
The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diverse	-	
anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, hea shown. The course is an interesting alternative to other humanities, taught at FIT.	ith, history, death, et	ic) Will be
FI-MPL Managerial Psychology	ZK	2
FI-ULI Introduction to Linguistics for Computer	ZK	2
This course is presented in Czech.		2
FI-VEZ economic-managerial course from a study abroad	Z	4
A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module th		-
The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.	·	
MI-GLR Games and reinforcement learning	Z,ZK	4
The field of reinforcement learning is very hot recently, because of advances in deep learning, recurrent neural networks and general artificial intelligence of advances in deep learning.		intended to
give you both theoretical and practical background so you can participate in related research activities. Presented in Engl		
NI-AFP Applied Functional Programming	KZ	5
This course is presented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional the rise powedays and the functional paradigm becomes an important construct of traditionally important languages (C++, C#+, Iava). As such matt		-
the rise nowadays and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, mast necessary competence of a software engineer: the theory and especially the practice.	sing uns paradigm t	Jecomes a

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 of		
data processing fr	amework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations a	ind will be capable	to propose
	approaches to parallelize other algorithms. The course is prezented in czech language.	7 71/	4
NI-DSP	Database Systems in Practes	Z,ZK	4
NI 570	This course is presented in Czech.		
NI-DZO	Digital Image Processing	Z,ZK	4
	ents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical alg		-
	e an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is 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		- 1
	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	<i>'</i>	
	signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u	-	
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 comp	onents on
the quality and late	ency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the	e scene up to the p	resentation
	for audience.		
NI-LSM	Statistical Modelling Lab	KZ	5
	ented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is p		
available informati	on and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms, an	-	properties.
	At this point, the subject is on the border of own research and may result in the topic of final work (diploma or bachelor thesi	s).	
NI-MOP	Modern Object-Oriented Programming in Pharo	KZ	4
	ogramming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, where	-	
	nplex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the skills	• ·	
	in modern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development not in a chief programming a chief while here apparturity to use the course focuses of individual approach to students, their development not in a chief programming a chief while here apparturity to use the course focuses of individual approach to students, their development not individual approach to students.		
-	ing object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to work or rms of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involvem		
-			
NI-MPL	Managerial Psychology	ZK	2
NI-MSI	Mathematical Structures in Computer Science	Z,ZK	4
Mathematical s	emantics of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Scott	model of lambda	calculus.
	Introduction to category theory.	7 71/	4
NI-OLI	Linux Drivers g system is an important operating system for personal computer and also for embedded systems. Systems on chip and combining po	Z,ZK	•
	iability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development	-	
	urse provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practica		cinto. Tric
NI-PDD	Data Preprocessing	Z,ZK	5
	repare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various data s	,	-
	and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characteris		-
	pages.	Ū	
NI-PSL	Programming in Scala	Z,ZK	4
The course introd	uces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language feature	es - e.g.pattern ma	tching and
advance standard	ibrary. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks and	l libraries e.g. Play,	Cassandra,
	Scalaz, etc.		
NI-REV	Reverse Engineering	Z,ZK	5
•	equainted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens before		
	s will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dedicated		
	tten in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be de		
debuggers and de	ebugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the computer	malware scene. Th	ne tocus of
	the course is on the seminars, where students will solve practically oriented tasks from the real world.		
		7 71/	
NI-SYP	Parsing and Compilers	Z,ZK	5
	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va		
The module builds	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing.	rious variants and	applications
The module builds	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability	rious variants and Z,ZK	applications 5
The module builds NI-TSP Students will gain	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre-	rious variants and Z,ZK pare a test set with	applications 5 the help of
The module builds NI-TSP Students will gain	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu	rious variants and Z,ZK pare a test set with	applications 5 the help of
The module builds NI-TSP Students will gain the intuitive path s	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu will be able to compute, analyze, and control the reliability and availability of the designed circuits.	Z,ZK Z,ZK pare a test set with ilt-in-self-test equip	applications 5 the help of ment. They
The module builds NI-TSP Students will gain the intuitive path s NI-VCC	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu will be able to compute, analyze, and control the reliability and availability of the designed circuits. Virtualization and Cloud Computing	Z,ZK Z,ZK pare a test set with ilt-in-self-test equip Z,ZK	5 the help of ment. They 5
The module builds NI-TSP Students will gain the intuitive path s NI-VCC Students will ga	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu will be able to compute, analyze, and control the reliability and availability of the designed circuits.	Z,ZK Dare a test set with ilt-in-self-test equip Z,ZK organizations. The	5 the help of ment. They 5 y will get
The module builds NI-TSP Students will gain the intuitive path s NI-VCC Students will gain acquainted with vi	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to pre ensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu will be able to compute, analyze, and control the reliability and availability of the designed circuits. Virtualization and Cloud Computing in knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and	Z,ZK bare a test set with ilt-in-self-test equip Z,ZK organizations. The ently operate and o	5 the help of ment. They 5 y will get ptimize the
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The module builds NI-TSP Students will gain the intuitive path s NI-VCC Students will ga acquainted with vi performance pa management of co NI-VYC	Parsing and Compilers upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of va of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. Testing and Reliability knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to prefensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with bu will be able to compute, analyze, and control the reliability and availability of the designed circuits. Virtualization and Cloud Computing in knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and irtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficie arameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effecti mplex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills ir and development tools (Continuous integration and development). Computability Classical theory of recursive functions and effective computability.	Z,ZK pare a test set with ilt-in-self-test equip Z,ZK organizations. The ently operate and o ve technology toda the use of modern Z,ZK	applications 5 the help of ment. They 5 y will get potimize the ty for the n integration 4
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