Study plan

Name of study plan: Bachelor branch Computer Engineering, in Czech, 2015-2020

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Informatics, valid until 2024

Type of study: Bachelor full-time

Required credits: 159 Elective courses credits: 21 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 Soft	warového inž	enýrství.			
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 (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 (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
BI-PA2	Programming and Algorithmics 2 Ladislav Vagner	Z,ZK	7	2P+1R+2C	L	PP

BI-PS1 Programming in Shell 1 Zden k Muziká	KZ	5	2P+2C	Z	PP
BI-SI1.2 Software Engineering I Ji í Mlejnek, Zden k Rybola Zden k Rybola Ji í Mlejnek (Gar.,	Z,ZK	5	2P+1C	Z,L	PP
BI-SAP Computer Structure and Architecture Hana Kubátová	Z,ZK	6	2P+1R+2C	L	PP
BI-ZDM Elements of Discrete Mathematics Ji ina Scholtzová, Jan Legerský Ji ina Scholtzová Josef Kolá	(Gar.) Z,ZK	5	2P+2C	Z	PP
BI-ZMA Elements of Calculus Ivo Petr Ivo Petr Tomáš Kalvoda (Gar.)	Z,ZK	6	3P+2C	Z	PP
Characteristics of the courses of this group of Study Plan: Code=BI-PP.20 Informatics, Presented in Czech, Version 2015)15 Name=Compulsory	Courses	of Bache	elor Stud	y Progra
BI-AG1 Algorithms and Graphs 1			Z,	ZK	6
The course covers the basics of efficient algorithm design, data structures, and graph theory, belong		-	-		
levelops the knowledge from the course BI-DML.21, in which students acquire the knowledge and s algorithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic	•		•	and space o	omplexity of
BI-AAG Automata and Grammars	, matriematics, in particular, the	asymptotic		ZK	6
Students are introduced to basic theoretical and implementation principles of the following topics: cor	nstruction, use and mutual trans	sformations			_
and regular grammars, translation finite automata, construction and use of pushdown automata, hiera				_	-
Knowledge acquired through the module is applicable in designs of algorithms for searching in text, or	data compression, simple parsir	ng and trans	lation, and d	esign of dig	ital circuits.
BI-BAP Bachelor Thesis				Z	14
BI-BPR Bachelor project				Z	2
BI-BEZ Security			Z,	ZK	6
Students understand the mathematical fundamentals of cryptography and have an overview of current cr		-		-	
and hash functions. They also learn the fundamentals of secure programming and IT security, the fun	• •	ing modern	cryptosysten	ns for comp	uter system
They are able to use properly and securely cryptographic primitives and systems that are based on t	inese primitives.			71/	
BI-CAO Digital and Analog Circuits	The course de moterne of the entire of the	stinal II		ZK	5
Students get the fundamental understanding of technologies underlying electronic digital systems. The ransistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circu	•				-
disistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit felectronic devices.	ni parameters. They understand	the different	ces between	analog and	uigitai mou
BI-DBS Database Systems			7	ZK	6
tudents are introduced to the database engine architecture and typical user roles. They are briefly in			-	-	
including integrity constraints) using a conceptual model and implement them in a relational databas					
ts theoretical foundation - the relational database model. They learn the principles of normalizing a rela	•				
processing, controlling parallel user access to a single data source, as well as recovering a database		=	-	-	_
n relational databases with respect to speed of access to large quantities of data. This introductory-liptimizing database applications, distributed database systems, data stores.	evel course does not cover: Adr	ministration (or database s	systems, ae	bugging and
BI-DPR Document., Presentation, Rhetorics				ζZ	4
his subject is aimed to the professional communication and writing of the scientific texts (bachelor's an	nd dinloma thesis). Students will le	earn to creat			•
nd presenting before an audience. Students will also learn to write technical reports and scientific te		oarr to oroat	o ana propan	o ii itoraotivo	procontation
BI-LIN Linear Algebra			Z.	ZK	7
he course is taught in Czech. Students understand the theoretical foundation of algebra and mather	matical principles of linear mode	els of system			dependencie
mong components are only linear. They know the basic methods for operating with matrices and line	ear spaces. They are able to per	form matrix	operations a	nd solve sys	tems of line
quations. They can apply these mathematical principles to solving problems in 2D or 3D analytic ge	ometry. They understand the er	ror-detecting	g and error-c	orrecting co	des.
BI-MLO Mathematical Logic The course seminary is taught in Czech.			Z,	ZK	5
BI-OSY Operating Systems			7.	ZK	5
Students understand the classical theory of operating systems (OS) in addition to the knowledge gai	ined in the module "Programmir	ng in Shell 1'	1 '	1	
ernels, processes and threads implementations. They understand the problems of race conditions, to	thread scheduling, resource allo	cation and	deadlocks, th	e technique	s of the
nanagement of virtual memory, principles and architectures of disks, RAID and file systems. They are	re able to design and implement	t simple mul	tithreaded ap	plications.	
BI-PSI Computer Networks			1 '	ZK	5
Students understand the basic common techniques, protocols, technologies, and algorithms necessary	•				
2nd to 4th layer of the ISO OSI model. They also get a basic understanding of communication media	, security, and network administ	tration. Stud	ents will be a	ible to write	a simple
network application and configure a simple network.			7	7K	
BI-PST Probability and Statistics The students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior	r information and learn to work	with random		ZK	5 ble to to ann
pasic models of random variable distributions and solve applied probabilistic problems in informatics				-	
estimations of unknown distributional parameters from random sample characteristics. They will also	·			-	-
			Z,	ZK	6
nore random variables.				nointoro)	-
nore random variables. BI-PA1 Programming and Algorithmics 1	anguage. They understand data	types (simp	ie, structured	i, pointers),	_
nore random variables. BI-PA1 Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C la					expression
nore random variables. BI-PA1 Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C la statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complex vith linked lists.			searching, so	orting, and r	expressions nanipulating
BI-PA1 Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C la statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complex with linked lists. BI-PA2 Programming and Algorithmics 2	xity. They know fundamental alg	orithms for s	searching, so	orting, and r	expressions nanipulating
BI-PA1 Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C last attements, functions, concept of recursion. They learn to analyse simple cases of algorithm complex with linked lists. BI-PA2 Programming and Algorithmics 2 Students know the instruments of object-oriented programming and are able to use them for specifying the solution of the control of the con	xity. They know fundamental alg	orithms for s	z, tack, queue,	ZK enlargeable	expressions nanipulating 7 e array, set,
BI-PA1 Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C last attements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity with linked lists. BI-PA2 Programming and Algorithmics 2 Students know the instruments of object-oriented programming and are able to use them for specifying able). They can implement linked structures. They learn these skills using the programming language of the structures.	xity. They know fundamental alg	orithms for s	z, tack, queue,	ZK enlargeable	expressions nanipulating 7 e array, set,
Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C latatements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexith linked lists. BI-PA2 Programming and Algorithmics 2 Students know the instruments of object-oriented programming and are able to use them for specifying able). They can implement linked structures. They learn these skills using the programming language with all C++ features needed to achieve the main objective (operator overloading, templates).	xity. They know fundamental alg	orithms for s	Z, tack, queue, mming in C+-	ZK enlargeable	expressions nanipulating 7 e array, set, are introduce
BI-PA1 Programming and Algorithmics 1 tudents gain the ability to formulate algorithms for solving basic problems and write them in the C la tatements, functions, concept of recursion. They learn to analyse simple cases of algorithm complex ith linked lists. BI-PA2 Programming and Algorithmics 2 tudents know the instruments of object-oriented programming and are able to use them for specifyi able). They can implement linked structures. They learn these skills using the programming language of	ing and implementing abstract d	orithms for s	Z, tack, queue, mming in C+-	ZK enlargeable students	expression: nanipulating 7 e array, set, are introduc

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 data.

RI-SI1 2 Software Engineering I Students learn the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get practical skill thanks to applying hands-on analysis and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE tools and UML for modelling and solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and testing processes

Computer Structure and Architecture

Students understand basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inputs, outputs, data storage and transfer. In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital design tools. The subject teaches basic knowledge of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connections to higher programming languages

BI-ZDM **Elements of Discrete Mathematics** Z,ZK

Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, tools for solving recurrent equations, and basics of graph theory.

BI-ZMA Elements of Calculus Z,ZK

Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions.

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 31

The role of the block: PO

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

Name of the group: Compulsory Courses of Bachelor Branch Computer Engineering, Presented in Czech,

Version 2015

Requirement credits in the group: In this group you have to gain 31 credits

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

Credits in the group: 31 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-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	2P+2C	Z	РО
BI-JPO	Computer Units Alois Pluhá ek	Z,ZK	5	2P+2C	Z	РО
BI-PNO	Practical Digital Design Martin Novotný Martin Novotný (Gar.)	KZ	5	2P+2C	Z	РО
BI-PAI	Law and Informatics Zden k Ku era	ZK	3	2P	Z	РО
BI-SRC	Real-time systems Jaroslav Borecký, Hana Kubátová Jaroslav Borecký Hana Kubátová (Gar.)	KZ	4	2P+2C	Z	РО
BI-VES	Embedded Systems Miroslav Skrbek	Z,ZK	5	2P+2C	L	РО
BI-ZRS	Basics of System Control Kate ina Hyniová	Z,ZK	4	2P+2C	Z	РО

Characteristics of the courses of this group of Study Plan: Code=BI-PO-PI.2015 Name=Compulsory Courses of Bachelor Branch Computer Engineering, Presented in Czech, Version 2015

BI-APS.1 Architectures of Computer Systems Z,ZK 5 Students will learn the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Special emphasis is given on the pipelined instruction processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the principles of instruction processing not only in scalar processors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the sequential model of programs. The course further elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and consistency in such systems.

BI-JPO Computer Units

Students deepen their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail with the internal structure and organization of computer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using appropriate codes for implementation of multiplication. The organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, including codes for error detection and correction for parallel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of communication of the processor with the environment and the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational microprogrammed processor simulator and programmable hardware design kits (FPGA).

BI-PNO Practical Digital Design

Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools.

Law and Informatics

This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).

BI-SRC Real-time systems

Students obtain the basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla knowledges from lectures will be experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore the used design kits are the same as in BI-VES subject and FPGA.

BI-VES Embedded Systems

Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools

BI-ZRS Basics of System Control

The course gives an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focus our attention particularly on control of engineering and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description methods of system models, basic linear dynamic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creating a description of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also given to sensors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial implementation of continuous and digital controllers and PLC control.

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

Povinný předmět BI-EMP se studentům bez oboru nezapisuje automaticky. Zapíší si jej Note on the group:

individuálně podle pokynů z katedry Softwarového inženýrství.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-EMP	Economics and Management Principles David Buchtela, 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

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

Name of the block: Compulsory elective economic-management courses

Minimal number of credits of the block: 4

The role of the block: VE

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

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

Czech, Ver. 2015

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 12)

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

Credits in the group: 4

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-DAN	Taxes for non-Economists Savina Finardi, Tereza Ji íková Tereza Ji íková Savina Finardi (Gar.)	Z,ZK	4	2P+2C	Z	VE
FI-VEZ	economic-managerial course from a study abroad Miroslav Balík	Z	4	0+0	Z,L	VE
BI-FTR.1	Financial Markets Pavla Vozárová	Z,ZK	5	2P+2C	L	VE
BI-MEK	Macroeconomic Context of Domestic and World Economy Ivo Straka Ivo Straka (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 (Gar)	Z,ZK	4	2P+2C	L	VE

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 way ho	w a significant portion of GDP	s redistribute
his course conce	erns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fund	damentals and shows how they	affect taxation
f income, consun	nption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institu	tions as well as information ab	out important
axpayers´formal	duties towards public administration.		
FI-VEZ	economic-managerial course from a study abroad	Z	4
"Humanities sub	oject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanitie	es Module that is required in th	e curriculum
he 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
his course is pre	sented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	1 '	
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is pre		1 , 1	
BI-PRP	Law and business	Z,ZK	4
This course is pre	sented in Czech.	1 '	
BI-PRR	Project management	KZ	4
his course is pre		1	
BI-SEP	World Economy and Business	Z,ZK	4
his course is pre-	sented in Czech. The course introduces students of technical university to the international business. It does that predo	minantly by comparing individ	ual countries
nd key regions of	world economy. Students get to know about different religions and cultures, necessary for doing business in diverse soci	eties as well as indexes of ecor	nomic freedo
orruption and eco	onomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge i	n the form of discussions base	d on individu
eadings. It is advi	ised to take bachelor level of this course BIE-SEP as a prerequisite.		
BI-MIK	Fundamentals of Microeconomics	Z,ZK	4
his 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:

Ze skupiny je nutné absolvovat jeden ze dvou předmětů, představujících interní zkoušku z angličtiny. -- Předmět BI-ANG si zapisují studenti, kteří absolvovali přípravné kurzy z angličtiny a mají zápočet z

předmětu BI-A2L. -- Předmět BI--ANG1 si zapisují studenti, kteří se na zkoušku připravovali samostatně.

Tito studenti musí před vlastní zkouškou absolvovat zápočtovou písemku.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ANG1	English Language Examination without Preparatory Courses 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 (Gar.)	ZK	2		Z,L	PJ

Characteristics of the courses of this group of Study Plan: Code=BI-ZKA Name=English Language, Internal Certifica

BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2				
BIE-EEC	English language external certificate	Z	4				
The BIE-ECC course ca	n be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in E	nglish comparable	e to or exceeding				
the B2 level of the Com	mon European Framework of Reference for Languages.						
BI-ANG	English Language, Internal Certificate	ZK	2				
Course information and	purse 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.

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

FI-GNO	Introduction to Gnoseology Ivo Janoušek		ZK	2	2+0	L	VH
	f the courses of this group of Study Plan: C		me=Compul	sory Ele	ctive Hum	anity Co	urses of
FI-FIL	Philosophy					ZK	2
see A0B16							
BI-HMI	History of Mathematics and Informatics				Z	,ZK	3
This course is prese	ed in Czech.						
FI-HTE	History of Technology and Economics					ZK	2
The course introduce	the scientific disciplines of history and technology, econom	nic and social history of the Czec	h lands and Cze	choslovakia	in compariso	on with the d	evelopment o
the European region	9 to 21 century .						
FI-HPZ	Humanities subject from a study abroad					Z	3
A "Humanities subje	that has been studied abroad" is covered by the Humanities	s subject from a study abroad in	Compulsory Hur	manities Mo	dule that is re	quired in the	e curriculum.
The substitution is a	roved by the Vice-Dean for study affairs on behalf of the De	an 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 prese	ed in Czech. However, there is an English variant in the pro	gram Informatics (B1801 / 4753).			1	, ,	
FI-KSA	Cultural and Social Anthropology					ZK	2
The one-semester co	rse aims to acquaint students with the basics of social and	cultural anthropology as a scient	ific discipline dea	aling with the	e diversity of	the world - e	xamples fron
	ch from our "exotic" cultures (topics: kinship, religion, social	exclusion, migration, globalization	on, , material cult	ture, langua	ge, health, his	story, death,	etc) will b
	an interesting alternative to other humanities, taught at FIT.						
BI-KSA	Cultural and Social Anthropology				1	ZK	2
	rse aims to acquaint students with the basics of social and	,	•	•	•		•
	ch from our "exotic" cultures (topics: kinship, religion, social	exclusion, migration, globalization	on, , material cult	ture, langua	ge, health, his	story, death,	etc) will be
shown. The course is							
FI-ULI	Introduction to Linguistics for Computer					ZK	2
This course is prese	ed in Czech.						
FI-GNO	Introduction to Gnoseology				;	ZK	2
•	dí do teorie poznání, systémovým pohledem nahlíží na pole		•		•		•
-	kových proud 20. století jsou ukázány prom ny paradigmat					-	-
	na teorii pírodních jazyk a sémiotiky je vedena diskuze i o k		•				
	spojitých pírodních soustav a systém, v záv ru pednášek	c je pozornost v nována filozofii v	v dy a otázkám	udržitelného	rozvoje. P e	dm tpedná	iší a garantu
Ing. Ivo Janoušek CS	•						

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

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

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group: Volitelné předměty, které nejsou povinnými v programu ani žádného oboru či

zaměření

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ALO	Algebra and Logic Jan Starý Jan Starý Jan Starý (Gar.)	Z,ZK	4	2P+1C	L	V
BI-AVI.21	Algorithms visually Lud k Ku era Lud k Ku era Lud k Ku era (Gar.)	Z,ZK	4	2P+1C	L	V
BI-A2L	English language, preparation for the B2 level exam Kate ina Valentová Kate ina Valentová (Gar.)	Z	2	2C	L	V
BI-APJ	Aplication Programming in Java Ji i Dan ek	Z,ZK	4	2P+1R+1C	, z	V
NI-AFP	Applied Functional Programming Marek Suchánek, Robert Pergl, Daniel N mec Robert Pergl Robert Pergl (Gar.)	KZ	5	2P+1C	L	V
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek 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	KZ	4	3C	L	V
BI-EP1	Effective programming 1 Martin Ka er Martin Ka er Martin Ka er (Gar.)	Z	4	2P+2C	Z	V
BI-EP2	Efficient Programming 2 Martin Ka er Martin Ka er (Gar.)	KZ	4	2P+2C	L	V
BI-EJA	Enterprise Java 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 (Gar.)	KZ	4	2P+1C	L	V
BI-ARD	Interactive applications on Arduino Ji í Cvr ek, Robert Hülle, Vojt ch Miškovský, Jan ezní ek Robert Hülle Robert Hülle (Gar.)	KZ	4	3C	L	V
NI-IAM	Internet and Multimedia Ji i 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.)	KZ	4	3C	Z	V
BI-SQL.1	Language SQL, advanced Michal Valenta Michal Valenta (Gar.)	KZ	4	3C	L	V
BI-QAP	Quantum algorithms and programming Tomáš Kalvoda, Ivo Petr Ivo Petr (Gar.)	KZ	5	1P+2C	Z	V
NI-LSM	Statistical Modelling Lab Kamil Dedecius Kamil Dedecius (Gar.)	KZ	5	3C	L	V
NI-MPL	Managerial Psychology Jan Fiala Jan Fiala (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.)	KZ	3	1P+2C	Z	V
NI-MOP	Modern Object-Oriented Programming in Pharo Marek Skotnica, Jan Blizni enko Robert Pergl Robert Pergl (Gar.)	KZ	4	3C	Z	V
BI-MVT.21	Modern Visualisation Technologies Ji í Chludil, Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MMP	Multimedia team project Zde ka echová Zde ka echová (Gar.)	KZ	4	3C	Z,L	V
NI-OLI	Linux Drivers Jaroslav Borecký, Miroslav Skrbek Jaroslav Borecký Miroslav Skrbek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ACM	Programming Practices 1 Tomáš Valla, Ond ej Suchý 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-ACM3	Programming Practices 3 Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	KZ	5	4C	L	V

BI-ACM4	Programming Practices 4 Tomáš Valla, Ond ej Suchý (Gar.)	KZ	5	4C	Z	V
BI-AND.21	Programming for the Android Operating System Jan Mottl, Jan Vep ek, Marek Kodr Jan Mottl Marek Kodr (Gar.)	KZ	4	3C	L	V
BI-CS1	Programming in C# Pavel Št pán, Helena Wallenfelsová Helena Wallenfelsová Pavel Št pán (Gar.)	KZ	4	3C	L,Z	V
BI-PJV	Programming in Java Miroslav Balík, Jan Blizni enko, Ji í Borský, Jan Zimolka Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	V
BI-PJS.1	JavaScript Programming Old ich Malec	KZ	4	3C	L	V
BI-KOT	Programing in Kotlin Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+2C	L	V
NI-PSL	Programming in Scala Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.)	Z,ZK	4	2P+1C	Z	V
BI-PMA	Programming in Mathematica Zden k Buk Zden k Buk Zden k Buk (Gar.)	Z,ZK	4	2P+2C	Z	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 (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-PKM	Introduction to mathematics Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z	4		Z	V
NI-REV	Reverse Engineering Ji í Dostál, Josef Kokeš, Róbert Lórencz Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	1P+2C	Z	V
BI-SCE1	Computer Engineering Seminar I	Z	4	2C	L,Z	V
BI-SCE2	Hana Kubátová Hana Kubátová Hana Kubátová (Gar.) Computer Engineering Seminar II	Z	4	2C	L,Z	V
BI-ST1	Hana Kubátová Hana Kubátová Hana Kubátová (Gar.) Network Technology 1	Z	3	2C	Z	V
BI-ST2	Alexandru Moucha Álexandru Moucha (Gar.) Network Technology 2	Z	3	3C	L	V
BI-ST3	Alexandru Moucha Alexandru Moucha (Gar.) Network Technology 3		3	2C	Z	V
	Alexandru Moucha Álexandru Moucha (Gar.) Network Technology 4				_	
BI-ST4	Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	L	V
BI-SOJ	Machine Oriented Languages	Z,ZK	4	2P+2C	L	V
BI-SVZ	Machine vision and image processing Lukáš Brchl, Marcel Ji ina, Jakub Novák Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	L,Z	V
NI-SYP	Parsing and Compilers Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-GIT	Version control system GIT Petr Pulc	KZ	2	16P	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV	Physical education	Z	0	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2	Physical Education	Z	0	0+2	L	V
TV2K1	Physical Education 2	Z	1		L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
BI-TS1	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 (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	Z,ZK	5	3P	L	V
BI-TEX	Christoph Kirsch Christoph Kirsch (Gar.) TeX and Typography Potr. Olšák, Potr. Olšák (Cor.)	Z,ZK	4	2P+1C	L	V
BI-ULI	Petr Olšák Petr Ölšák Petr Olšák (Gar.) Introduction to Linux Zdon k Muziká Jan Ž árak Dana ormáková Petr Zemánek Zdon k	Z	2	4D	Z	V
5, 51	Zden k Muziká , Jan Ž árek, Dana ermáková, Petr Zemánek Zden k Muziká Zden k Muziká (Gar.)			70	_	•

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 (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 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 (Gar.)	KZ	4	1P+3C	Z	V
BI-ZPI	Process engineering Robert Pergl 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

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	focus our attention p	oarticularly on
control of engineering	and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description	ription methods of sy	stem models,
basic linear dynamic	systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods o	f creating a description	on of the system
1	ar dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also g		
	of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the indu	ustrial implementation	n of continuous
and digital controllers			
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 a	and deepens the study of topics touched upon in the basic course in logic.	, ,	
BI-AVI.21	Algorithms visually	Z,ZK	4
The course complem	ents other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the comp	uter 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	n.org <http: td="" www.al<=""><td>govision.org>)</td></http:>	govision.org>)
that make understand	ling the principles of algorithms easy.		
BI-A2L	English language, preparation for the B2 level exam	Z	2
The content of the co	urse corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achieve	ment - students are	due to: -Take an
' '	uage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both		
	s rate 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
	ted in Czech. Advanced technologies in Java.		
NI-AFP	Applied Functional Programming	KZ	5
This course is preser	ted in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functi	onal programming la	anguages are on
	d the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, m	nastering this paradio	gm becomes a
	ce of a software engineer: the theory and especially the practice.		
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
	ed to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the o		
space search, multi-a	gent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary alg	orithms and the neu	ral networks, will

be presented as well.

BI-BLE	Blender	Z,ZK	4
	wledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those		
	mplete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphics	T	
NI-DSP This course is presented	Database Systems in Practes	Z,ZK	4
BI-STO	Storage and Filesystems	Z,ZK	4
	inciples and current solutions of storage systems architecture. The module explains principles of data store, protection, and an		-
load balancing and high		3,	3,
NI-DZO	Digital Image Processing	Z,ZK	4
•	comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical al	•	
•	interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is		
	ing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDR raction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray co	•	ŭ
	ossible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ad		
NI-DDM	Distributed Data Mining	KZ	4
Course focuses on state	e-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands	s on experience v	vith large scale
•	ork Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations	and will be capa	ble to propose
	e other algorithms. The course is prezented in czech language.		
BI-EP1	Effective programming 1	Z	4
The course is taught in BI-EP2	Efficient Programming 2	KZ	4
	Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indiv	1	
	he best one and avoid implementation errors.	viduai probiomo d	io diocaccoa,
BI-EJA	Enterprise Java	Z,ZK	4
The course is on advan-	ced technologies in the Java programming language. The focus is on technologies for development of enterprise information s		e connected to
a database and are acc	essed through the web interface.		
BI-FMU	Financial and Management Accounting	Z,ZK	5
	explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the		
•	and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modificat based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage	•	
· · · · · · · · · · · · · · · · · · ·	oduls in Business information systems.	oment accounting	are bace or
BI-HAM	HW accelerated network traffic monitoring	KZ	4
	students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring. The	he monitoring and	l analysis of
	latory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a		
	of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network tra-	affic on a hardwa	re and software
BI-ARD	ir practical abilities in this field.	KZ	4
	Interactive applications on Arduino for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple applic	r_	4
		cations for modern	nrogrammable
Kils and control varied p			
	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore	systems, i.e. to se	ee the results
not only on display of a Software Engineering s	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore udents.	systems, i.e. to so is suitable even f	ee the results
not only on display of a Software Engineering s	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore udents. Internet and Multimedia	systems, i.e. to so is suitable even for Z,ZK	ee the results or Web and
not only on display of a Software Engineering st NI-IAM The NI-IAM course is fo	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore udents. Internet and Multimedia cused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes according to the subject to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing varieties.	systems, i.e. to so is suitable even to significant and the suitable even to significant and s	ee the results for Web and 4 mals (input),
not only on display of a Software Engineering so NI-IAM The NI-IAM course is fo presentation of AV signs	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore rudents. Internet and Multimedia cused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acrals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical	systems, i.e. to so is suitable even for Z,ZK quisition of AV signal use case scena	ee the results for Web and 4 nals (input), rios of real-time
not only on display of a Software Engineering so NI-IAM The NI-IAM course is fo presentation of AV signal audiovisual transmission	eripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore udents. Internet and Multimedia cused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes according to the subject to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing to the subject is to show varied software approaches to control embedded processing varieties.	systems, i.e. to so is suitable even for a sui	ee the results or Web and 4 nals (input), rios of real-time omponents on
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NI-LSM Statistica	al Modelling Lab	KZ	5
	and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is	-	
	ng using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms,	and analyses of t	heir properties.
	order of own research and may result in the topic of final work (diploma or bachelor thesis).	71/	2
	rial Psychology	ZK	2
	atical Structures in Computer Science	Z,ZK	4
Introduction to category theory.	ming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Sco	tt model of lambda	a calculus.
	of interfacing peripheral devices	Z,ZK	5
	or interfacing peripheral devices or interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Univ		
	al devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of t		
drivers, simple application developm			
BI-MIT Mikrotik	technologies	KZ	3
The main motivation of the subject s	stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are o	commonly used by	y the small and
middle internet service providers (IS	SPs). The students learn how to use and create the architectures of the network solutions which are based on the	e metallic, optical	or wireless links
-	ally deploy them. The successful completion of this subject requires the previous knowledge of elementary computer	er networks conce	pts like protocols
-	etwork and transport layer of the OSI model.	147	
l l	Object-Oriented Programming in Pharo	KZ	4
	rently one of the most widespread paradigms of software creation, especially enterprise information systems, wh blications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the s		
	oject system Pharo (https://pharo.org). The course focuses on individual approach to students, their developmen	=	•
	mming skills, which are generally applicable in other OO languages, students will also gain the opportunity to wo		
	work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involved		-
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 au	igmented reality, v	visualization on
	and video mapping) and their applications in practice. Several lectures deal with the content creation for the ment	ioned technologie	s, namely fractal
and procedural visualization, scienti	fic data visualization, and 3D model scanning.		
	dia team project	KZ	4
This course is presented in Czech.			
NI-OLI Linux Dr		Z,ZK	4
	portant operating system for personal computer and also for embedded systems. Systems on chip and combining		
	subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development operating system architecture, principles of development of various types drivers, including practical experience		udents. The
	ming Practices 1	KZ	5
This course is presented in Czech.	ming Flactices 1	I\Z	5
·	ming Practices 2	KZ	5
This course is presented in Czech.	g 1 14011000 E		Ü
BI-ACM3 Program	ming Practices 3	KZ	5
This course is presented in Czech.	ŭ		
BI-ACM4 Program	ming Practices 4	KZ	5
This course is presented in Czech.		'	
BI-AND.21 Program	ming for the Android Operating System	KZ	4
This course is presented in Czech.			
, ,	ming in C#	KZ	4
_	ee .NET Framework as a multi-language development platform. Then, programming language C#, its fundamenta		
' ' ' ' ' '	and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class de static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugg		٠,
well as work with files are emphasiz		ing and exception	processing, as
	ming in Java	Z,ZK	4
	However, there is an English variant in the program Informatics (B1801 / 4753).	۷,۷۱۲	7
	pt Programming	KZ	4
	uction to Javascript programming. Students will learn also best practices and will use tool that eases developmen		
<u>-</u>	/SI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register f	· · · · · · · · · · · · · · · · · · ·	
of study.			
BI-KOT Program	ing 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 adv	anced language	constructions.
	t and allows for mixed projects that preserve existing parts written in Java, and continue with the development of	a modern, object	-functional way
·	ast but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages).		
, , ,	ming in Scala	Z,ZK	4
	programming language Scala which exploits object-functional paradigm. Scala comprises advance language feat		
Scalaz, etc.	oles to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks	and libraries e.g. i	Play, Cassandra,
	ming in Mathematica	Z,ZK	4
, ,	ming in Mathematica In technical and scientific software. Students will learn how to use different programming styles (functional progra		
<u> </u>	tive applications and visualisations, data processing and presentations.	iiiig, ruie-base	- programming,
	ing in PHP	KZ	4
	n goal of the course is an introduction to PHP - language and technology. Students will learn also best practices		· ·
<u>-</u>	recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register		
register for this course in their 3rd s			•
BI-PS2 Program	ming in shell 2	Z,ZK	4
, ,	f available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In ad		deeper insight
into shell and some other particular	scripting languages and will get practical experience with shell script programming.		

NI-PDD Data Preprocessing	Z,ZK	5
Students learn to prepare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various data for further processing and analysis. They learn what algorithms can be used to extract information from various data for further processing and analysis. They learn what algorithms can be used to extract information from various data for further processing and analysis. They learn what algorithms can be used to extract information from various data for further processing and analysis.		-
time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characte pages.	ensucs from image	s or from web
BI-PKM Introduction to mathematics	Z	4
This course is presented in Czech.		
NI-REV Reverse Engineering	Z,ZK	5
Students will get acquainted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens		
is called. Students will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is de		
applications written in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be debuggers and debugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the compu	-	
the course is on the seminars, where students will solve practically oriented tasks from the real world.		
BI-SCE1 Computer Engineering Seminar I	Z	4
The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistan		
are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	=	
articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tea semester.	criers. The topics a	are new ior each
BI-SCE2 Computer Engineering Seminar II	Z	4
The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistan	ce to failures and a	attacks. Students
are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	=	
articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tea	chers. The topics a	are new for each
BI-ST1 Network Technology 1	Z	3
The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredit		_
CCNA1 - R&S Introduction to Networks.		
BI-ST2 Network Technology 2	Z	3
This course is presented in Czech.		
BI-ST3 Network Technology 3	Z	3
Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented duri	-	
get further extended in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, pre simple topology, security, etc.	edictability, extensi	on beyond a
BI-ST4 Network Technology 4	7	3
Students will further enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switch	ing presented duri	_
BI-ST2 courses got further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased ef	ficiency, predictab	ility, extension
beyond a simple topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a complete		
Broadcast Multiple Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and swi recoveries, and emergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitig		•
network running.	gation ways write i	namaming the
BI-SOJ Machine Oriented Languages	Z,ZK	4
Students of the course will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal	al use of microprod	
and efficient cooperation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of vie		cessor's features
This knowledge will be used during reverse engineering, optimization, and evaluation of code security.	ew linked to higher	
		level languages.
BI-SVZ Machine vision and image processing	Z,ZK	level languages.
	Z,ZK te image information	level languages. 5 on. The course
BI-SVZ Machine vision and image processing Camera systems are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluate	Z,ZK te image information	level languages. 5 on. The course
BI-SVZ Machine vision and image processing Camera systems are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluation introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical problems of practice that the graduates may encounter. NI-SYP Parsing and Compilers	Z,ZK te image information use of camera system Z,ZK	5 on. The course stems for solving
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BI-SVZ Machine vision and image processing Camera systems are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluat introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical problems of practice that the graduates may encounter. NI-SYP Parsing and Compilers The module builds upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. BI-GIT Version control system GIT	Z,ZK te image information use of camera system Z,ZK of various variants	5 on. The course stems for solving 5 and applications
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NI-TSP	Testing and Reliability	Z,ZK	5
-	ledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to p	-	
•	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.	i buiit-in-seii-test e	quipment. They
BI-CCN	Compiler Construction	Z,ZK	5
	class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles	, , , , , , , , , , , , , , , , , , ,	-
	and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme	•	
BI-TEX	TeX and Typography	Z.ZK	4
	d in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of t	, , I	on typographic
rules.			
BI-ULI	Introduction to Linux	Z	2
Students become famil	ar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become	e familiar with bas	ic commands
· · · · · · · · · · · · · · · · · · ·	ix-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
=	view of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on processing the control of th	· ·	
	iology and on their solutions. The course will include the history of optical communications, an overview of passive componen rs, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission sys		
•	is, and others), and an overview of active components (optical switches and amplifiers, high-speed conferent transmission sys- ics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such	•	
	ansfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters		
from practice.			
NI-VCC	Virtualization and Cloud Computing	Z,ZK	5
	ledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and	d organizations. Th	ney will get
acquainted with virtuali	zation principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to effi	iciently operate an	d optimize the
•	s of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effect	•	
- ·	x computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skil	lls in the use of mo	dern integration
	(Continuous integration and development).		
BI-VHS	Virtual game worlds	ZK	4
	nts to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,). This current s	_	
	neory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world. I the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devices.	. The course can b	le followed by
BI-VR1	Virtual reality I	KZ	4
	eality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements		-
	the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves on		
and shared social activ		•	0, ,
BI-VR2	Virtual reality II	KZ	3
Continuation of the cou	rse Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The o	bjective is to deve	lop applications
for computer science as	nd gamification in various social metaverse and desktop engines.		
	a gammeation in various social metaverse and desktop engines.		
BI-VAK.21	Selected Applications of Combinatorics	Z	3
BI-VAK.21 The course aims to intre	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the		ve approach the
BI-VAK.21 The course aims to intri issue from applications	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic knowledge.	asic data structure	ve approach the s. Furthermore,
BI-VAK.21 The course aims to intrissue from applications with the active participations	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some batton of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) in	asic data structure informatics. Areas	we approach the s. Furthermore, from which we
BI-VAK.21 The course aims to intrissue from applications with the active participa will select problems to be	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some batton of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) is solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimises.	asic data structure informatics. Areas	we approach the s. Furthermore, from which we
BI-VAK.21 The course aims to intrissue from applications with the active participa will select problems to lalso try to implement se	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some bation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) is solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimically the studied problems with a special focus on the effective use of existing tools.	asic data structure informatics. Areas ization and more.	ve approach the s. Furthermore, from which we Students will
BI-VAK.21 The course aims to intrissue from applications with the active participa will select problems to lalso try to implement so BI-VMM	Selected Applications of Combinatorics oduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some be tion of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) is selected will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimically to the studied problems with a special focus on the effective use of existing tools. Selected Mathematical Methods	asic data structure informatics. Areas ization and more.	ve approach the s. Furthermore, from which we Students will
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BI-ZPI	Process engineering	KZ	4
Students will learn fund	amentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles	of process model	ling and they will
learn basics of the used	notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of	business process	es using modern
CASE tools. The role of	process engineering for information systems development is discussed as well as its importance in the overall context of info	ormation and busi	ness strategy of
an enterprise.			
BI-ZNF	PHP Framework Nette - basics	KZ	3
Students will gain the ba	isics 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	for the efficient creation of a web backend in PHP language.		
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
This course is presented	d in Czech.		
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
This course is presented	d in Czech.		
BI-3DT.1	3D Printing	KZ	4

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

Name of the group: Elective Vocational Courses for a Bachelor Branch BI-PI, Version 2017

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

Všechny povinné předměty oborů a zaměření s výjimkou tohoto oboru

y: Všechny povinné předměty obo	ru a zamere	ni s výjir	nkou toi	noto oboru	
Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
Unix Administration Zden k Muziká	Z,ZK	5	2P+2C	L	V
Windows Administration Ji í Kašpar, Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V
Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	V
DB Technologies for Big Data Josef Gattermayer, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.)	KZ	4	2P+2C	Z	V
Hardware Security Ji í Bu ek, Filip Kodýtek, Róbert Lórencz Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	V
Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	V
Multimedia and Graphics Applications Ji í Chludil	Z,ZK	5	2P+2C	Z	V
Object-Oriented Programming Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	V
Computer graphics programming	Z,ZK	5	2P+2C	L	٧
Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.)	Z,ZK	4	2P+1R	L	V
Programming Languages and Compilers Jan Janoušek	Z,ZK	5	2P+1C	L	V
Programming Paradigms Jan Janoušek	Z,ZK	5	2P+2R	Z	V
Programming of graphic applications Radek Richtr, Ji i Chludil Radek Richtr Radek Richtr (Gar.)	Z,ZK	5	2P+2C	Z	V
Python Programming	Z,ZK	4	2P+2C	L	V
Software Engineering 2 Martin Hlavatý Zden k Rybola Martin Hlavatý (Gar.)	Z,ZK	3	2P	Z	V
Team Software Project 1 Ji í Mlejnek	KZ	4	2C	L	V
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.)	KZ	5	2C	L	V
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
Team Software Project 2 Ji í Mlejnek	KZ	6	2C	Z	V
System and Network Security Jií Dostál Jií Dostál Jií Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V
Java Technology Ond ej Guth	Z,ZK	4	2P+2C	Z	V
	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) Unix Administration Zden k Muziká Windows Administration Ji Kašpar, Miroslav Prāgl Miroslav Prāgl (Gar.) Algorithms and Graphs 2 Ond ej Suchý Secure Code Robert Lorencz DB Technologies for Big Data Josef Gattermayer, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.) Hardware Security Ji i Bu ek, Filip Kodýtek, Röbert Lórencz Ji i Bu ek Röbert Lórencz (Gar.) Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl Robert Pergl (Gar.) Multimedia and Graphics Applications Ji i Chludil Object-Oriented Programming Filip K ikava Filip K ikava Filip K ikava (Gar.) Computer graphics programming Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.) Programming Languages and Compilers Jan Janoušek Programming Paradigms Jan Janoušek Programming of graphic applications Radek Richtr, Ji i Chludil Radek Richtr Radek Richtr (Gar.) Python Programming Software Engineering 2 Martin Havaty Zden k Rybola Martin Havatý (Gar.) Team Software Project 1 Ji i Mlejnek Team Software Project 1 Radek Richtr, Marek Suchánek, Michal Valenta, Ji i Chludil, Ji i Mlejnek, Ji i Hunka, Zden k Rybola, Ji i Borský, Jan Matoušek, Zden k Rybola Ji i Mlejnek (Gar.) Team Software Project 2 Marek Suchánek, Ji i Chludil, Robert Pergl. Marek Skotnica, Ji i Mlejnek, Ji i Team Software Project 2 Ji i Mlejnek (Gar.) Team Software Project 2 Ji i Mlejnek (System and Network Security Ji i Dostál Ji i Dostál Ji i Dostál (Gar.) Java Technology	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) Unix Administration Ziden k Muziká Windows Administration Ji kaspar, Miroslav Prägl Miroslav Prägl Miroslav Prägl (Gar.) Algorithms and Graphs 2 Ond ej Suchý Secure Code Robert Lórencz DB Technologies for Big Data Josef Gattermayer, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.) Hardware Security Ji Bu ek, Filip Kodylek, Röbert Lórencz Ji í Bu ek Röbert Lórencz (Gar.) Hardware Security Ji Bu ek, Filip Kodylek, Röbert Lórencz Ji í Bu ek Röbert Lórencz (Gar.) Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl Robert Pergl (Gar.) Multimedia and Graphics Applications Ji í Chludil Object-Oriented Programming Filip Ki ikava Filip K ikava (Gar.) Computer graphics programming Filip Ki ikava Filip K ikava (Gar.) Computer graphics programming Filip Ki ikava Filip K ikava (Gar.) Computer graphics programming Filip Ki ikava Filip K ikava (Gar.) 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Algorithms and Graphs 2 Ond ej Suchý Secure Code Róbert Lórencz Ode Róbert Lórencz Ode Róbert Lórencz Ode Róbert Lórencz DB Technologies for Big Data Josef Gatternayer, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.) Hardware Security Ji / Bu ek, Filip Kodylek, Róbert Lórencz Ji / Bu ek Róbert Lórencz (Gar.) Algorithmes escurity Ji / Bu ek, Filip Kodylek, Róbert Lórencz Ji / Bu ek Róbert Lórencz (Gar.) Multimedia and Graphics Applications Ji / Chludil Object-Oriented Programming Filip / Kikava Filip K ikava (Gar.) Computer graphics programming Law and business Zden k Ku era, Martin Samek Martin Samek Zden k Ku era (Gar.) Programming Languages and Compilers Jan Janoušek Programming Paradigms Jan Janoušek Programming of graphic applications Radek Richtt, Ji / Chludil Radek Richtr Radek Richtr (Gar.) Software Engineering 2 Martin Hlavaty Zden k Rybola Ji i Borsky, Jan Matoušek, Zden k Rybola Ji / Milejnek Team Software Project 1 Radek Richtt, Marek Suchánek, Michal Valenta, Ji i Chludil, Ji i Miejnek, Ji i Hunka, Zden k Rybola, Ji i Borsky, Jan Matoušek, Zden k Rybola Ji / Milejnek Team Software Project 1 Radek Richtt, Riraka Kybola, Ji i Borsky, Jan Matoušek, Zden k Rybola Ji / Milejnek KZ 6 System and Network Security Ji Dostál Ji i Dostál (Gar.) 7 7 K 4	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) Unix Administration Zean k Muzikä Z,ZK 5 2P+2C Windows Administration Ji Kaspar, Minoslav Prägl Miroslav Prägl (Gar.) Algorithms and Graphs 2 Ond ej Suchiy DB Technologies for Big Data Josel Cattermayer, Jan Matousek, Monika Borkovcová Jan Matousek Monika Borkovcová (Gar.) Hardware Security Ji Bu ek, Filip Kodylek, Robert Lórencz Ji í Bu ek Róbert Lórencz (Gar.) Hardware Security Ji Bu ek, Filip Kodylek, Robert Lórencz Ji í Bu ek Róbert Lórencz (Gar.) Hardware Security Ji Bu ek, Filip Kodylek, Robert Pergl Robert Pergl (Gar.) Multimedia and Graphics Applications Ji í Chludil Object-Oriented Programming Z,ZK 5 2P+2C Computer graphics programming Z,ZK 5 2P+2C Computer graphics programming Z,ZK 5 2P+2C Law and business Zedne k K ure, Martin Samek Martin Samek Zden k Ku era (Gar.) Programming Languages and Compilers Jan Janousek Programming Paradigms Jan Janousek Programming Paradigms Jan Janousek Programming of graphic applications Radek Richtr, Ji Chludil Radek Richtr Radek Richtr (Gar.) Team Software Project 1 Team Software Project 1 Team Software Project 1 Team Software Project 2 Markin Hawarity Zden k Rybola Martin Hilavatly (Gar.) Team Software Project 2 Markin Howarity Zden k Rybola Martin Marke Skotnica, Ji í Miejnek, Ji í Hulpinek Ji í Miejnek (Gar.) Team Software Project 2 Markin Hawarity Zden k Rybola, Ji Borsky, Jan Matousek, Zden k Rybola Ji í Miejnek Ji í Miejnek System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál Ji í Mejnek Ji í Mejnek System and Network Security Ji í Dostál Ji í Papare	Name of the course / Name of the group of courses (in case of groups of courses the fist of codes of their members) Tutors, authors and guarantors (gar.) Tutors, authors and guarantors (gar.) Tutors, authors and guarantors (gar.) Unix Administration Zen k Muzika Windows Administration Ji Kaspar, Minoslav Prágl Miroslav Prágl (Gar.) Algorithms and Graphs 2 Ond ej Suchy Secure Code Robert Lorencz BTechnologies for Big Data Josef Gattermaper, Jan Matoušek, Monika Borkovcová Jan Matoušek Monika Borkovcová (Gar.) Hardware Security Ji Bu ek, Filip Kodylok, Robert Lorencz Ji i Bu ek Röbert Lorencz (Gar.) Multimedia and Graphics Applications Ji i Chiludil Object-Oriented Programming Competer Graphics Programming Z,ZK Derect Code Z,ZK Der

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 (Gar.)	Z,ZK	5	2P+2C	Z	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-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	V
BI-ZNS	Knowledge-based Systems Marcel Ji ina Marcel Ji ina (Gar.)	Z,ZK	5	2P+2C	Z	V

	sion 2017	7 71/	
BI-PRP	Law and business	Z,ZK	4
This course is presen		7.71	
BI-AG2	Algorithms and Graphs 2	Z,ZK	5
	d in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsor	•	
	uctures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English ve		
BI-ADU.1	Unix Administration	Z,ZK	5
	internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. T	•	
	ninistrator roles. They will get theoretical and practical knowledge of user management and administration, of users access right	-	-
	etwork services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the k	nowledge from the	e lectures on
specific examples from			
BI-ADW.1	Windows Administration	Z,ZK	4
This course is presen	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-BEK	Secure Code	Z,ZK	5
The students will lear	how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting	ng 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	o run with
administrator privilege	s. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securin	g data and the rel	ationships of
security and database	systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	defense against th	em.
BI-BIG	DB Technologies for Big Data	KZ	4
This course is presen	ed in Czech.		
BI-HWB	Hardware Security	Z,ZK	5
	hardware resources used to ensure security of computer systems including embedded ones. The students become familiar w	· ' '	rinciples of
	s, the security features of modern processors, and storage media protection through encryption. They will gain knowledge abou		-
	attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart carc		
and related topics for	multi-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.	•	·
BI-KOM	Conceptual Modelling	Z.ZK	5
_	on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key	, ,	_
	correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological st		-
	arn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data repres	_	
	of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEM		=
	rse is designed with the respect to continuation in software implementations.		
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
	ed with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for wo		_
	n will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to		
	rn to use multimedia transmission and representation systems, including real-time multimedia processing. They understand th		
	cards. They gain a number of practical skills, such as vectorizing raster images, retouching photos, or creating 3D models.		
BI-OOP	Object-Oriented Programming	Z,ZK	4
	amming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togeth		=
Object-oriented progr			n testing error
Object-oriented progr course we look at sor	e of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software dev		g testing, error
Object-oriented progr course we look at sor handing, refactoring a	e of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devined design patterns.	elopment including	
Object-oriented progr course we look at sor handing, refactoring a BI-PGR.1	ne of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devoted design patterns. Computer graphics programming	elopment including	5
Object-oriented progr course we look at sor handing, refactoring a BI-PGR.1 Students are able to p	ne of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software deviated design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to	elopment including Z,ZK extures imitating g	5 eometric details
Object-oriented progr course we look at sor handing, refactoring a BI-PGR.1 Students are able to p and materials (like wa	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to Il surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in	Z,ZK extures imitating g	5 eometric details
Object-oriented progr course we look at sor handing, refactoring a BI-PGR.1 Students are able to p and materials (like wa graphical pipeline, geo	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to ill surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid.	Z,ZK extures imitating g computer graphic fundamentals for y	5 eometric details s, such as our professiona
Object-oriented progr course we look at sor handing, refactoring a BI-PGR.1 Students are able to p and materials (like wa graphical pipeline, ged development, e.g. for	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface.	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific	5 eometric details s, such as our professiona visualisation.
Object-oriented progressive we look at sort handing, refactoring at BI-PGR.1 Students are able to pand materials (like wagraphical pipeline, ged development, e.g. for BI-PJP	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devined design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to Il surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfal Programming Languages and Compilers	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK	5 eometric details, such as our professiona visualisation.
Object-oriented progressive we look at sor handing, refactoring at BI-PGR.1 Students are able to pand materials (like wagraphical pipeline, geodevelopment, e.g. for BI-PJP Students master basis	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming roogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface and compilers are those of implementation of common high-level programming languages. They get experience with the design and implementation.	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK ntation of individual	5 eometric details, s, such as our professiona visualisation. 5 al compiler parts
Object-oriented progressive we look at sort handing, refactoring at BI-PGR.1 Students are able to pand materials (like way graphical pipeline, geodevelopment, e.g. for BI-PJP Students master basifor a simple programmer.	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface and Compilers methods of implementation of common high-level programming languages. They get experience with the design and implementating language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that it	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK ntation of individua	5 eometric detail s, such as our professiona visualisation. 5 al compiler part ax into a target
Object-oriented progressive we look at sort handing, refactoring at BI-PGR.1 Students are able to pand materials (like was graphical pipeline, ged development, e.g. for BI-PJP Students master basifor a simple programm form and write a com-	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface in the programming Languages and Compilers are thods of implementation of common high-level programming languages. They get experience with the design and implementating language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that it iller based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages,	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK ntation of individua	5 eometric details s, such as our professiona visualisation. 5 al compiler parts ax into a target
Object-oriented progressive we look at sor handing, refactoring a BI-PGR.1 Students are able to p and materials (like wa graphical pipeline, ged development, e.g. for BI-PJP Students master basifor a simple programm form and write a comfor parsing and proces	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface in the programming Languages and Compilers are methods of implementation of common high-level programming languages. They get experience with the design and implementation graphics, subroutines, and data abstractions. Students are able to formally specify a translation of a text that be a language defined by a LL(1) grammar.	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific z,zk extends to all	5 eometric details s, such as our professiona visualisation. 5 al compiler parts ax into a target other programs
Object-oriented progressive we look at sorth handing, refactoring at BI-PGR.1 Students are able to pand materials (like was graphical pipeline, geodevelopment, e.g. for BI-PJP Students master basifor a simple programm form and write a comfor parsing and processive bi-PPA	the of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software devind design patterns. Computer graphics programming rogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to a surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in metric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface in the programming Languages and Compilers are thods of implementation of common high-level programming languages. They get experience with the design and implementating language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that it iller based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages,	Z,ZK extures imitating g computer graphic fundamentals for y ces, and scientific Z,ZK ntation of individua has a certain synta but extends to all	5 eometric details, s, such as our professiona visualisation. 5 al compiler parts ax into a target other programs

programming paradigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The principles are demonstrated on lambda calculus and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstream programming languages

such as C++ and Java.

DI DC A	Dragramming of graphic applications	7 71/	
BI-PGA This course is present	Programming of graphic applications ed in Czech only.	Z,ZK	5
SI-PYT The course is taught ir	Python Programming Czech.	Z,ZK	4
BI-SI2.3	Software Engineering 2 ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	3
BI-SP1	Team Software Project 1	KZ	4
-	n experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by		
•	eaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in		
the BEI-SP2 course	alts with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will	be fulfiller develop	eu anu misnet
3I-SP1.21	Team Software Project 1	KZ	5
tudents gain hands-c	n experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the	he BIE-SWI course	that runs
=	eaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The te		
roject leader, regularl nd finished in the BIE	y consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software	e artefact will be fu	rther develope
BI-SP2.1	Team Software Project 2	KZ	4
	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	112	7
BI-SP2	Team Software Project 2	KZ	6
tudents gain hands-o	n experience with the iterative development process while working on a large-scale software project. The first iteration is the re	sult of the BEI-SP	1 course projed
	functionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6		
	eader, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of their solution Ie the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the software		se that runs
BI-SSB	System and Network Security	Z,ZK	5
	on selected areas of computer networks and computer systems in terms of cyber security	2,213	3
I-TJV	Java Technology	Z,ZK	4
	ntroduce the programming language Java. The student gains practical experiences for smaller enterprise application program	1 '	t presents how
	nore layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestW	eb services, JNDI	etc.). At the
	able to create three layers enterprise application.		
I-XML	XML Technology	Z,ZK	4
	e and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX, Do		_
anguage XPath which	enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics		_
anguage XPath which Path programming w	enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics will be based on version 2.0. Students will gain a broad overview of XML technologies.	of XSLT programm	ing. XSLT and
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List of courses of this pass:

Code	Name of the course	Completion	Credits
BI-3DT.1	3D Printing	KZ	4
active part in the I	English language, preparation for the B2 level exam course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achievement anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both ti ess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by ind class of the term.	ne midterm and the	e final term
BI-AAG	Automata and Grammars	Z,ZK	6
and regular gramma	uced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between formal languages, relationships between formal languages.	rmal languages ar	nd automata.
	red through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation.		
BI-ACM	Programming Practices 1 This course is presented in Czech.	KZ	5
BI-ACM2	Programming Practices 2 This course is presented in Czech.	KZ	5
BI-ACM3	Programming Practices 3 This course is presented in Czech.	KZ	5
BI-ACM4	Programming Practices 4 This course is presented in Czech.	KZ	5
BI-ADU.1	Unix Administration he internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They	Z,ZK	5 e differences
between user and a	administrator roles. They will get theoretical and practical knowledge of user management and administration, of users access rights, ory, network services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the kn specific examples from practice.	file systems, disk	subsystems,
BI-ADW.1	Windows Administration This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	4
BI-AG1	Algorithms and Graphs 1	Z,ZK	6
develops the know algor	rs the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing curledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the rithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics and course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics and course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics is particular, the asymptotic mathematics and course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics are described by the course and the course are described by the co	time and space conptotic notation.	omplexity of
-	Algorithms and Graphs 2 Interest of graph theory as a follow=up on the introduction given in the compulsory of the computation of the compulsory of the computation of the		
BI-ALO	structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English versi Algebra and Logic	Z,ZK	4
DI-ALO	The course extends and deepens the study of topics touched upon in the basic course in logic.	Z,ZR	'
BI-AND.21	Programming for the Android Operating System This course is presented in Czech.	KZ	4
BI-ANG	English Language, Internal Certificate Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-AN	ZK G	2
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2
BI-APJ	Aplication Programming in Java This course is presented in Czech. Advanced technologies in Java.	Z,ZK	4
BI-APS.1	Architectures of Computer Systems	Z,ZK	5
pipelined instruction not only in scalar pr	in the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spein processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the princocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and	ciples of instruction sequential model	n processing of programs.
BI-ARD The subject is desig	Interactive applications on Arduino ned for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple applica ried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded s	KZ ions for modern pr	4 ogrammable
	by of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore Software Engineering students.		
•	Algorithms visually ments other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer so and in BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision.org& that make understanding the principles of algorithms easy.		-
BI-BAP	Bachelor Thesis	Z	14
BI-BEK	Secure Code	Z,ZK	5
theory, students administrator privi	arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting f gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every ileges. 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 the	program needs to data and the relat	run with ionships of

BI-BEZ	Security	Z,ZK	6
	Id the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a		
and hash functions	s. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	ystems for compu	ter systems.
DI DIC	They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.	V7	
BI-BIG	DB Technologies for Big Data	KZ	4
BI-BLE	This course is presented in Czech.	Z,ZK	4
	Blender ds knowledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those in		
	offers a complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graph	-	
BI-BPR	Bachelor project	Z	2
BI-CAO	Digital and Analog Circuits	Z,ZK	5
	plyital and Arialog Circuits. Indicate the basic standard in the		
-	circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between		- 1
, g,	of electronic devices.		· g
BI-CCN	Compiler Construction	Z,ZK	5
This is an introdu	uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles	of compilers for s	udents to
understa	and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching	theme of the clas	s.
BI-CS1	Programming in C#	KZ	4
The goal of the co	urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental co	nstruction, types	of variables,
	s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class def		- 1
constructors, meth	lods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging	and exception pro	cessing, as
D! 000	well as work with files are emphasized.	1/7	
BI-CS2	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
	and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Micros ts used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current techn	•	
•	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	•	
	f the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model		- 1
	(XML description).	-	
BI-CS3	Language C# - design of web applications	KZ	4
The students will be	e introduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overview of	of the development	possibilities
	on thisplatform. They will learn to create WebAPI and to use it by client programs.		
BI-DAN	Taxes for non-Economists	Z,ZK	4
_	cial insurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the way how a significant payment and a significant payment an		
	rns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and application, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well a		
or moorne, concur	taxpayers' formal duties towards public administration.	o illiorridation abov	it important
BI-DBS	Database Systems	Z.ZK	6
_	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear	,	_
(including integrity	constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the	SQL language, as	well as with
its theoretical found	lation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda	mental concepts o	f transaction
-	lling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to		- 1
in relational databa	ases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of datal	ase systems, deb	ugging and
DI DDD	optimizing database applications, distributed database systems, data stores.	1/7	
BI-DPR	Document., Presentation, Rhetorics at to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and pr	KZ	4
Triis subject is airrie	and presenting before an audience. Students will also learn to write technical reports and scientific texts.	epare interactive p	reseritations
BI-EHD	Introduction to European Economic History	Z,ZK	3
DI LIID	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	2,210	' '
BI-EJA	Enterprise Java	Z,ZK	4
	idvanced technologies in the Java programming language. The focus is on technologies for development of enterprise information systems.		1
	a database and are accessed through the web interface.		
BI-EMP	Economics and Management Principles	KZ	4
This course is ain	ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	fields: enterprise f	oundation,
enterprise putting i	nto state economic environment (CR), management of property and capital structure, business transaction records keeping during a	٠.	d, a relation
DI ED4	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination		
BI-EP1	Effective programming 1	Z	4
	The assume is to such in Oscale		
DLEDO	The course is taught in Czech.	1/7	
BI-EP2	Efficient Programming 2	KZ	discussed
	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individuals in the control of the		1
Continuation of Ef	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi- with the aim to choose the best one and avoid implementation errors.	dual problems are	discussed,
Continuation of Ef	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individuals in the control of the	dual problems are	discussed,
BI-FMU The aim of the cou	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi- with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting	Z,ZK	discussed, 5 operations,
BI-FMU The aim of the cou operations in acco	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi- with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pa	Z,ZK ticular accounting	5 operations, description
BI-FMU The aim of the cou operations in acco of economic oper	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual middle with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the paunts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification rations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage Business Inteligence moduls in Business information systems.	Z,ZK rticular accounting n of bookkeeping, ment accounting a	5 operations, description are base of
BI-FMU The aim of the cou operations in acco	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivi- with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the pa unts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification rations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage Business Inteligence moduls in Business information systems. Financial Markets	Z,ZK ticular accounting	5 operations, description
BI-FMU The aim of the cou operations in acco of economic oper	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivision with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the paunts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification rations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage Business Inteligence moduls in Business information systems. Financial Markets This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK ticular accounting n of bookkeeping, ment accounting a	5 operations, description are base of
BI-FMU The aim of the cou operations in acco of economic open BI-FTR.1 BI-GIT	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivision with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the paunts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification rations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage Business Inteligence moduls in Business information systems. Financial Markets This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Version control system GIT	Z,ZK rticular accounting n of bookkeeping, ment accounting a Z,ZK	5 operations, description are base of 5
BI-FMU The aim of the cou operations in acco of economic oper BI-FTR.1 BI-GIT Students will be in	Efficient Programming 2 fficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving indivision with the aim to choose the best one and avoid implementation errors. Financial and Management Accounting rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the paunts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification rations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manage Business Inteligence moduls in Business information systems. Financial Markets This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK ticular accounting n of bookkeeping, ment accounting a Z,ZK	discussed, 5 operations, description are base of 5 2 ular system

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. The	-	-
	mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a s		
for analysis). The g	oals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traffi level and to develop their practical abilities in this field.	c on a nardware a	na sonware
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		
	nel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec		
molading older origin	and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of		арриосионо
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad This course is presented in Czech.	KZ	4
BI-JPO	Computer Units	Z,ZK	5
•	their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail v		
-	nputer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using approp		
•	e organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, including el 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	•	
	and programmable hardware design kits (FPGA).		
BI-KOM	Conceptual Modelling	Z,ZK	5
	sed on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te		=
	cify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological structures be used to be a second of the second o	•	
	learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent s of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO n		,
learn the loundation	will be taught. The course is designed with the respect to continuation in software implementations.	lethod and the bi	viiviiotation
BI-KOT	Programing in Kotlin	Z,ZK	4
- 1	, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advar	,	structions.
The language is fu	lly Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a r	nodern, object-fun	ctional way
	with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages)		
BI-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversit earch from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health		-
antinopological res	shown. The course is presented in Czech.	i, mstory, death, e	ic) Will be
BI-LIN	Linear Algebra	7 7V	7
		∠,∠r\	7
The course is taugh	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroun	Z,ZK d us, where the de	
among components	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems arounds are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation	d us, where the de ns and solve syste	pendencies ms of linear
among components equations. The	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroung are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation by can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting an	d us, where the de ns and solve syste nd error-correcting	pendencies ms of linear codes.
among components	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroung are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation by can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and Macroeconomic Context of Domestic and World Economy	d us, where the de ns and solve syste	pendencies ms of linear
among components equations. The BI-MEK	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around a sare only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation by can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and Macroeconomic Context of Domestic and World Economy This course is presented in Czech.	d us, where the de ns and solve syste nd error-correcting Z,ZK	pendencies ms of linear codes.
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dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission systems). The course will also cover 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 as the accurate time on Internet, ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters. Students will solve real tasks from practice. **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 management of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple multithreaded applications. Programming and Algorithmics 1 Students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions, statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searching, sorting, and manipulating with linked lists. Programming and Algorithmics 2 BI-PA2 7.7K Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, queue, enlargeable array, set, table). They can implement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in C++, students are introduced with all C++ features needed to achieve the main objective (operator overloading, templates). BI-PAI ZK Law and Informatics 3 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). **BI-PGA** Programming of graphic applications Z,ZK 5 This course is presented in Czech only. BI-PGR.1 Computer graphics programming Z.ZK 5 Students are able to program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textures imitating geometric details and materials (like wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in computer graphics, such as graphical pipeline, geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fundamentals for your professional development, e.g. for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfaces, and scientific visualisation. BI-PHP1 Programing in PHP The course is taught in Czech.. Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 3rd semester of study. BI-PJP Programming Languages and Compilers 7 7K Students master basic methods of implementation of common high-level programming languages. They get experience with the design and implementation of individual compiler parts for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has a certain syntax into a target form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but extends to all other programs for parsing and processing text in a language defined by a LL(1) grammar. BI-PJS.1 JavaScript Programming ΚZ 4 Main goal of the course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development in Javascript. 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. They should register for this course in their 4th semester of study. BI-PJV Programming in Java Z,ZK 4 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). BI-PKM Introduction to mathematics Z 4 This course is presented in Czech. BI-PMA Z.ZK 4 Programming in Mathematica Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional programming, rule-based programming, etc.), how to create dynamic interactive applications and visualisations, data processing and presentations. **BI-PNO** Practical Digital Design ΚZ 5 Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools. **BI-PPA Programming Paradigms** Z,ZK 5 The course deals with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of particular approaches. Functional programming paradigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The principles are demonstrated on lambda calculus and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstream programming languages such as C++ and Java. **BI-PRP** Law and business Z.ZK 4 This course is presented in Czech. **BI-PRR** Project management ΚZ 4 This course is presented in Czech. RI-PS1 Programming in Shell 1 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, 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 data. BI-PS2 Programming in shell 2 7.7K 4 Students gain a general overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In addition, they gain a deeper 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 understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on the 2nd to 4th layer of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students will be able to write a simple network application and configure a simple network.

BI-PST	Drahability and Statistics	フフレ	
	Probability and Statistics earn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variables	Z,ZK s They will be ab	5
	andom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction	•	
	nown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the statement of the methods of the method of the methods of the methods of the method of th		-
BI-PYT	Python Programming The course is taught in Czech.	Z,ZK	4
BI-QAP	Quantum algorithms and programming	KZ	5
	ring students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanics, or	n which quantum	technologie
	gorithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software developm age. Knowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VMM might be an advantage. No previous knowledge of physics is assumed.		
BI-SAP	Computer Structure and Architecture	Z,ZK	6
_	and basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inpu		-
transfer. In the lab	os, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital design e of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connection languages.	n tools. The sub	ject teaches
BI-SCE1	Computer Engineering Seminar I	Z	4
	omputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	-	1
	ndividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the		
rticles and other p	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers semester.	s. The topics are	new for each
BI-SCE2	Computer Engineering Seminar II	Z	4
	omputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to		
	ndividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the professional literature and/or work in K. N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers		
	semester.		1
BI-SEP	World Economy and Business	Z,ZK	4
· · · · · · · · · · · · · · · · · · ·	esented in Czech. The course introduces students of technical university to the international business. It does that predominantly by co		
· -	world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as i pnomic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of dis		
	readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite.		
BI-SI1 2	readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. Software Engineering I	7 7K	5
BI-SI1.2 Students learn t	readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract	Z,ZK ical skill thanks t	5 o applying
Students learn t	Software Engineering I	ical skill thanks t	o applying
Students learn t hands-on analysis	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract	ical skill thanks t tools and UML f	o applying
Students learn t hands-on analysis	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract is and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test Software Engineering 2	ical skill thanks t tools and UML f	o applying
Students learn t hands-on analysis and BI-SI2.3	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract is and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	ical skill thanks tools and UML fing processes. Z,ZK	o applying or modelling
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BI-SP1.21 Students gain handstand the concurrently and the concurrently	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract is and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE is solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Machine Oriented Languages urse will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal use seration of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view ling this provided will be used during reverse engineering, optimization, and evaluation of code security. Team Software Project 1 Team Software Project 2 disone experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the fact teaches students mecassary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teacher will be the team (at the seminars) both the formal and material aspects of the software design. The resulting software are and finished in the BIE-SP2 course. Team Software Project 2 disone experience with the iterative development process	ical skill thanks to tools and UML fing processes. Z,ZK Z,ZK e of microprocess ked to higher levil KZ e BEI-SWI course role of the team urther developed KZ BIE-SWI course er, in the role of the fact will be furth KZ of the BEI-SP1 cole. The teacher, ne BEI-SI2 course of tware product. KZ KZ KZ KZ KZ KZ rticular stored profice DBMS and possibilities of cle DBMS and possibilities of cle DBMS and possibilities.	o applying or modelling or mode
BI-SP1.21 Students gain handstone and efficient coope BI-SP1.21 Students gain handender regularly colored leader, regularly and the concurrently and the con	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract is and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE isolving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Machine Oriented Languages urse will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal use variation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view lin This knowledge will be used during reverse engineering, optimization, and evaluation of code security. Team Software Project 1 ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the onsults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be funct teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teacher ularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software and finished in the BIE-SP2 course. Team Software Project 2 dis-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result of the functionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6 peopoject leader, regularly co	ical skill thanks to tools and UML fing processes. Z,ZK Z,ZK e of microprocess ked to higher levil KZ e BEI-SWI course role of the team urther developed KZ BIE-SWI course er, in the role of the fact will be furth KZ of the BEI-SP1 cole. The teacher, ne BEI-SI2 course of tware product. KZ KZ controlled to the teacher, ne BEI-SI2 course of tware product. KZ Controlled to the teacher, ne BEI-SI2 course of the teacher, ne BEI-SI2 cour	o applying or modelling or mode
BI-SP1.21 Students gain handstone and efficient coope BI-SP1.21 Students gain handleader, regularly and the concurrently and the concur	Software Engineering I the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract s and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test Software Engineering 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Machine Oriented Languages urse will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal use ration of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view lin This knowledge will be used during reverse engineering, optimization, and evaluation of code security. Team Software Project 1 ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the onsults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be functionally consults with the enalysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the hait teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teacher ularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software are and finished in the BIE-SP2 course. Team Software Project 2 dis-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result or the functionality, tes	ical skill thanks to tools and UML fing processes. Z,ZK Z,ZK e of microprocess ked to higher levil KZ e BEI-SWI course role of the team urther developed KZ BIE-SWI course er, in the role of the fact will be furth KZ of the BEI-SP1 cole. The teacher, ne BEI-SI2 course of tware product. KZ KZ controlled to the teacher, ne BEI-SI2 course of tware product. KZ Controlled to the teacher, ne BEI-SI2 course of the teacher, ne BEI-SI2 cour	o applying or modelling or mode

BI-ST1	Network Technology 1	Z	3
The subject is or	riented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredited CCNA1 - R&S Introduction to Networks.	l under the Cisco	Netacad -
BI-ST2	Network Technology 2 This course is presented in Czech.	Z	3
BI-ST3	Network Technology 3	Z	3
Students will further	er enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during B	I-ST1 and BI-ST2	courses will
get further exten	ded in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predic simple topology, security, etc.	ctability, extension	beyond a
BI-ST4	Network Technology 4	Z	3
	er enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switching		
_	ot further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased efficie		
	e topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a completely the Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and switch	= -	
· · · · · · · · · · · · · · · · · · ·	nergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitigation	· · · · · · · · · · · · · · · · · · ·	
	network running.	,	
BI-STO	Storage and Filesystems	Z,ZK	4
The student will lea	arn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archive	ving, as so as stor	age scaling,
	load balancing and high availability.		
BI-SVZ	Machine vision and image processing	Z,ZK	5
-	are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluate in	_	I
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 problems of practice that the graduates may encounter.	or camera system	s for solving
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 are		e DevOps
	ourse has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occur		
BI-TEX	TeX and Typography	Z,ZK	4
This course is pres	ented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of the context is the context of t	course focuses on	typographic
	rules.		
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 (customers	s) with applications	s of existing
BI-TJV	technologies (databases, programming languages, GUI etc.). Java Technology	Z.ZK	4
_	s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programmin	, ,	esents how
	e and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb		I
	course end is student able to create three layers enterprise application.		
BI-TS1	Theoretical Seminar I	Z	4
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical		
are treated individu	ually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a vector other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.	vork with scientific	papers and
BI-TS2	Theoretical Seminar II	Z	4
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical	ı	
	ually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a w		I
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS3	Theoretical Seminar III	Z	4
	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical		
are treated individu	ually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a vector other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.	vork with scientific	papers and
BI-TS4	Theoretical Seminar IV	Z	4
_	ar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical	l	
	ually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a v		
	other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-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 so	-	
not communicate v	with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students ga that bring users into the development process to ensure optimal communication with a user.	in an overview of t	ne metnoas
BI-TWA.1	Web Application Design	Z,ZK	5
	e of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properties		
	and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, v		- 1
modern libraries fa	acilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony		/elopments
	on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework Angular.		
BI-ULI	Introduction to Linux	Z	2
Students become	familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become forms and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (ter		commands
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 ba		II.
	tions to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic	-	
	ticipation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) info		I
will select probler	ms to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimize	ation and more. Stu	udents will
	also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		

BI-VES Embedded Systems Z,ZK 5 Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools. Virtual game worlds The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,...). This current students knowledge 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 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. Selected Mathematical Methods We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and its fast implementation (FFT). Further we deal with differential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functions. For this purposes, we study normed linear spaces and quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization and duality. The linear programming and the Simplex method is analyzed in more detail. BI-VR1 Virtual reality I ΚZ Introduction to Virtual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of virtual worlds communication. The course focuses on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves computational thinking, empathy and shared social activities. Virtual reality II Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The objective is to develop applications for computer science and gamification in various social metaverse and desktop engines. BI-VWM Searching the Web and Multimedia Databases Z,ZK 5 Students get basic overview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous storage of documents. In particular, students acquire information about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction from web pages. They get detailed knowledge of similarity search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming web search engines for the mentioned data types (documents). BI-VZD Data Mining Students are introduced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multidimensional data visualization, statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships between model bias and variance, and know the fundamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data mining tools to common problems (classification, regression, clustering). BI-XML XML Technology Z,ZK Students learn to make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX, DOM). An emphasis will be given to language XPath which enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics of XSLT programming. XSLT and XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies. Elements of Discrete Mathematics 7.7K Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, tools for solving recurrent equations, and basics of graph theory. **BI-ZIVS** ΚZ Intelligent Embedded System Fundamentals 4 Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of the course is to teach students modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion control, sensor reading, application interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get practical experience with these technologies. BI-ZMA Elements of Calculus Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions **BI-ZNF** PHP Framework Nette - basics 3 Students will gain the basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech popular framework. The resulting knowledge should serve for the efficient creation of a web backend in PHP language. BI-7NS Knowledge-based Systems 5 Students will become familiar with the systems based on knowledge (knowledge-based systems), which are systems that usetechniques of artificial intelligence to solve problems that require human judgment, learning and reasoning from findingsand actions. The course introduces students to the philosophy and architecture of knowledge-based systems to support decision-makingand planning. The course assumes knowledge of set theory, probability theory, artificial neural networks, and evolutionary algorithms. BI-7PI Process engineering Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of process modelling and they will learn basics of the used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of business processes using modern CASE tools. The role of process engineering for information systems development is discussed as well as its importance in the overall context of information and business strategy of an enterprise **BI-ZRS** Basics of System Control Z,ZK The course gives an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focus our attention particularly on control of engineering and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description methods of system models, basic linear dynamic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creating a description of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also given to sensors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial implementation of continuous and digital controllers and PLC control. 10 BI-ZS10 Bachelor internship abroad for 10 credits Ζ 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 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 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 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship exceeds the academic year's dead-line.

BI-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 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 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 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship					
employment with a	toreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided interpretation of the exceeds the academic year's dead-line.	o two subjects if th	ne internship		
internship the De internship. Auxiliary	Bachelor internship abroad for 30 credits nonce within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or re an of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the profession of courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits corn foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided int	nal content and exespond to 4 week	ktent of the s of full-time		
DI 71114	exceeds the academic year's dead-line.	7.71/			
	Artificial Intelligence Fundamentals luced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm be presented as well.				
BI-ZWU	Introduction to Web and User Interfaces This course is presented in Czech.	Z,ZK	4		
BIE-EEC The BIE-ECC cour	English language external certificate se can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English the B2 level of the Common European Framework of Reference for Languages.	Z sh comparable to c	4 or exceeding		
BIE-IMA2 Students refresh a	Introduction to Mathematics 2 and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a examples.	Z able to apply them	2 in particular		
	Artificial Intelligence Fundamentals luced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm be presented as well.				
FI-FIL	Philosophy see A0B16	ZK	2		
modernismu a myš	Introduction to Gnoseology uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v do slenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um ní o osti na teorii p írodních jazyk a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín na hlediska este lely spojitých p írodních soustav a systém, v záv ru p ednášek je pozornost v nována filozofii v dy a otázkám udržitelného rozvoje. Ing. Ivo Janoušek CSc.	odhaleny mechanis tického vnímání. S	smy tv r ích samostatnou		
FI-HPZ A "Humanities sub	Humanities subject from a study abroad ject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.	Z is required in the	3 curriculum.		
FI-HTE The course introdu	History of Technology and Economics ces the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in compa the European region 19 to 21 century.	ZK arison with the dev	2 relopment of		
	Cultural and Social Anthropology course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health shown. The course is an interesting alternative to other humanities, taught at FIT.	•			
FI-MPL	Managerial Psychology	ZK	2		
FI-ULI	Introduction to Linguistics for Computer This course is presented in Czech.	ZK	2		
FI-VEZ A "Humanities sub	economic-managerial course from a study abroad oject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.	Z is required in the	4 curriculum.		
	Applied Functional Programming sented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, master		- 1		
NI-DDM	necessary competence of a software engineer: the theory and especially the practice. Distributed Data Mining	KZ	4		
	s state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands of amework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations a approaches to parallelize other algorithms. The course is prezented in czech language.	•	- 1		
NI-DSP	Database Systems in Practes This course is presented in Czech.	Z,ZK	4		
implement and hav	Digital Image Processing ents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical algous ean interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is also 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 converses.	so valuable outside compression, de-l	the domain olurring in		
	gid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ac Internet and Multimedia				
The NI-IAM cours	se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u	uisition of AV signa	als (input),		

audiovisual transmissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effect of various components on the quality and latency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the scene up to the presentation for audience Statistical Modelling Lab NI-LSM 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 put on the effective use of the available information and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms, and analyses of their 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 thesis) Modern Object-Oriented Programming in Pharo Object-oriented programming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, where its ability to natural abstraction is used to build complex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the skills of design and implementation of object systems in modern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development needs and areas of interest. In addition to deepening object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to work on interesting projects and OO technologies in terms of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involvement in the Pharo Consortium. NI-MPL Managerial Psychology 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 Scott model of lambda calculus. Introduction to category theory. NI-OLI Linux Drivers Z,ZK The Linux operating system is an important operating system for personal computer and also for embedded systems. Systems on chip and combining powerful processors and FPGAs increase the variability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development for master's students. The course provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practical experience. NI-PDD **Data Preprocessing** 7.7K 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 sources, such as images, texts, time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characteristics from images or from web NI-PSL Programming in Scala Z,ZK The course introduces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language features - e.g.pattern matching and advance standard library. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks and libraries e.g. Play, Cassandra, Scalaz etc. NI-REV Reverse Engineering Z,ZK Students will get acquainted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens before and after the main function is called. Students will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dedicated to reverse engineering of applications written in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be dedicated to debuggers: how debuggers and debugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the computer malware scene. The focus of the course is on the seminars, where students will solve practically oriented tasks from the real world. NI-SYP Parsing and Compilers The module builds upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of various variants and applications of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. NI-TSP Testing and Reliability Students will gain knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to prepare a test set with the help of the intuitive path sensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with built-in-self-test equipment. They will be able to compute, analyze, and control the reliability and availability of the designed circuits. NI-VCC Virtualization and Cloud Computing Z,ZK Students will gain knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and organizations. They will get acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficiently operate and optimize the performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effective technology today for the management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills in the use of modern integration and development tools (Continuous integration and development). NI-VYC Computability Z,ZK 4 Classical theory of recursive functions and effective computability. TV₁ Physical Education Ζ 0 TV2 Physical Education Ζ 0 TV2K1 Physical Education 2 Ζ 1 Z **TVKLV** Physical Education Course 0 TVKZV 7 Physical Education Course 0 Ζ TVV Physical education 0 TVV0 Physical education Ζ

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