Study plan

Name of study plan: Bachelor branch Knowledge Engineering, in Czech, 2018-2020

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: 157 Elective courses credits: 23 Sum of credits in the plan: 180

Note on the plan: Tato verze studijního plánu je ur ena pro ro ník, který byl p ijat ke studiu v akademickém

roce 2018/2019 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

Povinný předmět BI-SI1 se studentům bez oboru nezapisuje automaticky. Zapíší si jej Note on the group:

	individuálně podle pokynů z katedry So	ftwarového 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 Zden k Muziká (Gar.)	Z	2		Z,L	PP
BI-BEZ	Security Ji í Dostál	Z,ZK	6	2P+2C	L	PP
BI-CAO	Digital and Analog Circuits Martin Kohlík	Z,ZK	5	2P+2C	Z	PP
BI-DBS	Database Systems Ji í Hunka	Z,ZK	6	2P+2R+1L	Z,L	PP
BI-DPR	Document., Presentation, Rhetorics Ond ej Guth	KZ	4	2P+2C	Z,L	PP
BI-LIN	Linear Algebra Daniel Dombek	Z,ZK	7	4P+2C	L	PP
BI-MLO	Mathematical Logic Kate ina Trlifajová	Z,ZK	5	2P+1C	Z	PP
BI-OSY	Operating Systems Ladislav Vagner	Z,ZK	5	2P+1R+1L	L	PP
BI-PSI	Computer Networks Jan Fesl	Z,ZK	5	2P+1R+1C	L	PP
BI-PST	Probability and Statistics Petr Novák	Z,ZK	5	2P+1R+1C	Z	PP
BI-PA1	Programming and Algorithmics 1 Ladislav Vagner	Z,ZK	6	2P+2R+2C	Z	PP
BI-PA2	Programming and Algorithmics 2 Ladislav Vagner	Z,ZK	7	2P+1R+2C	L L	PP
BI-PS1	Programming in Shell 1 Zden k Muziká	KZ	5	2P+2C	Z	PP

BI-SAP Computer Structure and Architecture Z.ZK 6 PH-RRC L PP		Software Engineering I	Z,ZK	5	2P+1C	Z,L	PP
Planta Nubations of Discrete Mathematics		Ji í Mlejnek, Zden k Rybola Zden k Rybola Ji í Mlejnek (Gar.) Computer Structure and Architecture	·			-	
BLZMA Elements of Claculus A. De Per Control Elements of Claculus B. B. B. B. Control Elements of Control Elements of Claculus B. B. B. B. B. Control Elements of Control Elements of Claculus B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. Control Elements of Control Elements of Claculus B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. B. B. B. B. Control Elements of Claculus B. B. B. B. B. Control Elements of Claculus B. B. Control Elements of Claculus B. B. Control Elements of Claculus B. Control Elements of Claculus B. B. Control	BI-ZDM	Elements of Discrete Mathematics	·				
The Peter Note of the courses of this group of Study Plan: Code=BI-PP.2015 Name=Compulsory Courses of Bachelor Study Progr. notromatics, Presented in Crooch, Version 2015 BAG1			·			7	
Formatics, Presented in Czech, Version 2015 BH-AG1 Algorithms and Graphs 1 The course covers the basics of efficient algorithm design, data structures, and graph theory, belonging to the core involvidagle of very computing curriculum. It links and partelly detected to the control of the course of the cours	DI-ZIVIA	Ivo Petr	Z,ZN	0	35 +20		PP
BHAG1 Algorithms and Graphs 1 for course covers the tracks of efficient algorithm design, dain structures, and graph theory, belonging to the core knowledge of every computing curticulum. It likes and particulty develope the knowledge from the course BF-DML 21, in which students acquire the knowledge and salid in combinationics necessary for evaluating the time and space complexly or adjorithms. The course also follows up knowledge from BHAM 21, the persodes usage of asymptotic methodics: necessary for evaluating the time and space complexly or adjorithms. The course are for the course BF-DML 21, in which students are formed and based the more field and implementation principles of the following topics: construction, use and mutual transformations of finite automation, and particularly and the personal automation, including any particular and including and and particularly and use and such control and particularly and the personal automation, including any particular and particularly and use and such control and particularly and the personal automation, including any particularly and the personal automation, including any particularly and the personal automation and particularly and the personal automation and particularly and the personal automation and particularly and part			:Compulsory	Courses	of Bach	elor Stu	ıdy Progr
The course covers the basics of efficient algorithm design, data structures, and graph theory, belonging to the cont knowledge of error competing curriculum. It lists and partially developes the moveledge from the course also follows up knowledge from the Course of the Children of the					1 7	71/	
BHAAG Automata and Grammas Students are introduced to base thereeficial and implementation principles of the following topics: construction, use and mutual transformations of first automata, required and implementation principles of the following topics: construction, use and mutual transformations of the automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between formal languages and automata, consciousness, translation fruits automata, possible and pushdown automata, hierarchy of formal languages, Relationships between formal languages and automata consciousness, translation fruits and escape of algorithms for searching in text, data compression, simple parsing and translation, and design of digital crossible. BHBAP Bachelor Thesis Bachelor propried Z 1 4 Bachelor Thesis Bachelor propried Z 2, Z 7 Z 2, K 5 BHBBC Security Substitutes in which the automata and automata consciousness of the propried and the functions. They also learn the fundamentals of excess programping manufactures and propried propried propried propried propried propried propried propried propried propriedus and propriedus and the fundamentals of excess propriedus and propri	The course covers the develops the knowled	e basics of efficient algorithm design, data structures, and graph theory, belonging to the core Ige from the course BI-DML.21, in which students acquire the knowledge and skills in combin	atorics necessary	for evaluat	ng curricului ing the time	m. It links a	and partially
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Scowledge acquired through the modulus is applicable in designs of algorithms for searching in text, data compression, ample paraing and translation, and design of digital circuits. BI-BPR Bachelor project Z 2 2 Security S 2 2 Security S 2 2 2 Security S 2 2 Security S 2 2 2 2 Security S 2 2 2	_		and mutual trans	formations			_
Bit-BPR Bachelor Thesis	and regular grammars	s, translation finite automata, construction and use of pushdown automata, hierarchy of formal	languages, Relat	ionships bet	ween forma	languages	s and automa
Bi-BER Security	Knowledge acquired t	through the module is applicable in designs of algorithms for searching in text, data compress	sion, simple parsi	ng and trans	slation, and o	design of d	igital circuits
B-BEZ Subsets to understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric captography and have an observe of current cryptographic algorithms and applications: symmetric and asymmetric captography and basel functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptographic primitives and systems that are based on these primitives. BEICAO Digital and Analog Circuis Students are situation understand Analog Circuis Students are introductions. They are able to design simple circuits did all systems. They understand the basic theoretical models and principles of introduction of electronic devices. BI-DBS Database Systems Sudents are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases including integrity constraints) using a conceptual model and implement them in a relational database configure or constraints of the database model. They learn them in a relational database configure constraints) using a conceptual model and implement them in a relational database configure constraints is using a conceptual model and implement them in a relational database configure from a failure. They are understand the fundamental concepts of transact processing, controlling parallel user access to a single data source, as well assessed as expected assesses with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of database systems, data stores, as the subject is aimed to the professional communication and writing of the scientific texts (suchelor's and diploma thesis). Students will also learn to writing of the scientific texts (suchelor's and diploma thesis). Students will learn to create and prepare interactive presentation of presenting before an audience. Students will also le	BI-BAP	Bachelor Thesis				Z	14
Students understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric cryptosystem in chash functions. They also learn the fundamentals of ascera programming and IT security, the fundamentals of designing and using modern cryptosystems robe may be to use properly and securely cryptographic primitives and systems that are based on these primitives. Page 18	BI-BPR	Bachelor project				Z	2
and hash functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptosystems for computer system. They are able to use properly and security cryptogramphic primitives and systems that are based on these primitives. BLCAO Digital and Analog Circuits Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of translators, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital not of electronic devices. BLDBS Database Systems Database Systems Database Systems Database Systems Database Systems Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases in the control constraints using a conceptual model and implement them in a relational database engine. They get at hands-on experience with the SCL language, as well as v is theoretical foundation - the relational database model. They learn the principles of normalizing a relational database engine consessing, controlling parallel user access to a single data sorrore, as well as v is theoretical foundation - the relational database model. They learn the principles of normalizing a relational database so not cover: Administration of database systems, data story of the solicity of the solicit	BI-BEZ	Security			Z	,ZK	6
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BI-LIN Linear Algebra The course is taught in Czech. Students will also learn to write technical reports and scientific texts. BI-LIN Linear Algebra The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependence among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of lineaquations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes. BI-MILO Mathematical Logic The course seminary is taught in Czech. BI-OSY Operating Systems 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 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 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 students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on 2, Z, X 5 Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on 2, Z, X 5 Students understand the basic of probability and Statistics BI-PST Probability and Statistics The students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and configure a simple network. BI-PST Probability and Statistics The students will learn the basics of probabilistic thinking, the ability to synthesize prior and pos	optimizing database a BI-DPR	applications, distributed database systems, data stores.					
The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependence among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of line quantions. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes. BI-MLO Mathematical Logic Z,ZK 5 BI-MLO Mathematical Logic Z,ZK 5 BI-MS V Operating Systems 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 exernels, processes and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and deadlooks, 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. BI-PSI Computer Networks Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on and the 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 Probability and Statistics The students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variables. They will be able to perfore sestimations of unknown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the statistical dependence of two more random variables. BI-PA1 Programming and Algorithmics 1 Students gain th	This subject is aimed to	Document., Presentation, Rhetorics	sis) Students will l	earn to crea	1		•
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The property of the property o	and presenting before BI-LIN The course is taught in among components a equations. They can a BI-MLO The course seminary BI-OSY Students understand the kernels, processes an amanagement of virtua BI-PSI Students understand the layer of the network application are basic models of rando estimations of unknown more random variable BI-PA1 Students gain the abil statements, functions, with linked lists. BI-PA2 Students know the instable). They can imple with all C++ features research and components of the statements	Document., Presentation, Rhetorics to the professional communication and writing of the scientific texts (bachelor's and diploma these an audience. Students will also learn to write technical reports and scientific texts. Linear Algebra In Czech. Students understand the theoretical foundation of algebra and mathematical principate only linear. They know the basic methods for operating with matrices and linear spaces. The apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They will also be in the dassical theory of operating systems (OS) in addition to the knowledge gained in the most the classical theory of operating systems (OS) in addition to the knowledge gained in the most differency, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They are able to design memory, principles and architectures of disks, RAID and file systems. They will also be introduced as a simple distribution and solve applied probabilistic problems in informatics and computer will distributional parameters from random sample characteristics. They will also be introduced as a programming and Algorithmics 1 lift to formulate algorithms for solving basic problem	les of linear mode ey are able to per understand the er understand the er understand the er understand in the er understand in the er understand in the methods of the understand data of fundamental algorithms.	els of system form matrix ror-detection and the system of	te and prepa Z Ins around us operations a g and error-or or o	re interactions received by the second of th	ye presentation 7 e dependency yetems of lincodes. 5 wledge of OS ues of the second on the a simple 5 able to to apable to perform dence of two d
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	and presenting before BI-LIN The course is taught in among components a equations. They can a BI-MLO The course seminary BI-OSY Students understand to kernels, processes an amanagement of virtua BI-PSI Students understand to 2nd to 4th layer of the network application ar BI-PST The students will learn basic models of rando estimations of unknow more random variable BI-PA1 Students gain the abil statements, functions, with linked lists. BI-PA2 Students know the instable). They can imple with all C++ features r BI-PS1 Students become known and successions and successions are applications.	Document., Presentation, Rhetorics to the professional communication and writing of the scientific texts (bachelor's and diploma these an audience. Students will also learn to write technical reports and scientific texts. Linear Algebra in Czech. Students understand the theoretical foundation of algebra and mathematical princip are only linear. They know the basic methods for operating with matrices and linear spaces. The apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They will also the classical theory of operating systems (OS) in addition to the knowledge gained in the mond threads implementations. They understand the problems of race conditions, thread schedulal memory, principles and architectures of disks, RAID and file systems. They are able to design a memory, principles and architectures of disks, RAID and file systems. They are able to design and configure a simple network. Probability and Statistics In the basics of probabilistic thinking, the ability to synthesize prior and posterior information as a material distributions and solve applied probabilistic problems in informatics and computer and distributional parameters from random sample characteristics. They will also be introduced as. Programming and Algorithmics 1 lity to formulate algorithms for solving basic problems and write them in the C language. They is, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know the programming and Algorithmics 2 struments of object-oriented programming and are able to use them for specifying and implementation of the programming in Shell 1	les of linear mode ey are able to per understand the er understand the er understand the er understand in the enterprise of the less of th	els of system form matrix ror-detection and the system of the statistica of determining types (simporithms for lata types (sile of program operating system).	te and prepa Z Ins around us operations a g and error-order Z They get a deadlocks, the company of the topics and ents will be company of the statist Z Induction then they the statist Z Induction then the statist Z Induction	re interactions re interactions re interactions recting a solid known he technique pplications reprimarily able to write r	ye presentation 7 e dependency ystems of lincodes. 5 wledge of OS uses of the sign of th

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-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.

BI-SAP | 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

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 6

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

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 29

The role of the block: PO

Code of the group: BI-PO-ZI.2018

Name of the group: Compulsory Courses of Bachelor Branch Knowledge Engineering, in Czech, Version

2018

Requirement credits in the group: In this group you have to gain 29 credits

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

Credits in the group: 29 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-BIG	DB Technologies for Big Data Jan Matoušek	KZ	4	2P+2C	Z	РО
BI-PAI	Law and Informatics Zden k Ku era	ZK	3	2P	Z	РО
BI-PJV	Programming in Java Miroslav Balík, Jan Blizni enko Miroslav Balík Miroslav Balík (Gar.)	Z,ZK	4	2P+2C	Z,L	РО
BI-VWM	Searching the Web and Multimedia Databases Tomáš Skopal	Z,ZK	5	2P+1C	L	РО
BI-VZD	Data Mining Karel Klouda, Daniel Vašata Daniel Vašata Pavel Kordík (Gar.)	Z,ZK	4	2P+2C	L,Z	РО
BI-ZUM	Artificial Intelligence Fundamentals Pavel Surynek	Z,ZK	4	2P+2C	L	РО
BI-ZNS	Knowledge-based Systems Marcel Ji ina	Z,ZK	5	2P+2C	Z	РО

Characteristics of the courses of this group of Study Plan: Code=BI-PO-ZI.2018 Name=Compulsory Courses of Bachelor Branch Knowledge Engineering, in Czech, Version 2018

Milowicage Engi	noching, in Ozeon, version zoro		
BI-BIG	DB Technologies for Big Data	KZ	4
This course is present	ed in Czech.		'
BI-PAI	Law and Informatics	ZK	3
This course is present	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		'
BI-PJV	Programming in Java	Z,ZK	4
This course is present	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		'
BI-VWM	Searching the Web and Multimedia Databases	Z,ZK	5
Students get basic over	erview about search techniques in the web environment that is interpreted as a very large distributed and heterogeneous store	age of documents	. In particular,
students acquire infor	mation about search techniques in text and hypertext documents (the web pages themselves) and about feature extraction fro	m web pages. The	ey get detailed
knowledge of similarity	γ search in multimedia databases (generally in collections of unstructured data). They also learn techniques for programming well	search engines f	or the mentioned
data types (document	s).		
D1 \ /7D	- · · · · ·	: /	4

BI-VZD Data Mining Z,ZK 4

Students are introduced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, 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-ZUM Artificial Intelligence Fundamentals

Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical tasks from the areas of state space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithms and the neural networks, will be presented as well.

Z,ZK

BI-ZNS Knowledge-based Systems

Z.ZK

7K

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.

Name of the block: Povinné ekonomické Minimal number of credits of the block: 4

The role of the block: PE

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

Name of the group: Compulsory Economics and Management Bachelor Courses, in Czech, Version 2015

Requirement credits in the group: In this group you have to gain 4 credits

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

Credits in the group: 4

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

individuálně podle pokynů z katedry Softwarového inženýrství.

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

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

BI-EMP | Economics and Management Principles | KZ | 4
This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically 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	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	Z,ZK	4	2P+2C	Z	VE
BI-PRP	Law and business	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

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

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

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-ASL. -- Předmět BI--ANG1 si zapisují studenti, kteří se na zkoušku připravovali samostatně. Tito studenti musí před vlastní zkouškou absolvovat zápočtovou písemku.

Code	(in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-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	Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG				

Name of the block: Povinná t lesná výchova, sportovní kurzy

Minimal number of credits of the block: 0

The role of the block: PT

Code of the group: BI-PT.2015

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

2015

Requirement credits in the group:

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

Credits in the group: 0 Note on the group:

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

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

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

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

Name of the block: Compulsory elective humanities courses

Minimal number of credits of the block: 2

The role of the block: VH

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

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

Version 2015

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6)

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

Credits in the group: 2

Note on the group:

Faculty guarantees the availability of these modules.

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

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

Distriction Distriction	71/	
FI-FIL Philosophy see A0B16	ZK	2
	7.714	
BI-HMI History of Mathematics and Informatics	Z,ZK	3
This course is presented in Czech.		
FI-HTE History of Technology and Economics	ZK	2
The course introduces the scientific disciplines of history and technology , economic and soci	al history of the Czech lands and Czechoslovakia in comparison with the	development of
the European region 19 to 21 century .		
FI-HPZ Humanities subject from a study abroad	Z	3
A "Humanities subject that has been studied abroad" is covered by the Humanities subject from		he curriculum.
The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the re	equest of the student.	
FI-MPL Managerial Psychology	ZK	2
BI-EHD Introduction to European Economic History	Z,ZK	3
This course is presented in Czech. However, there is an English variant in the program Inform	natics (B1801 / 4753).	
FI-KSA Cultural and Social Anthropology	ZK	2
		_
The one-semester course aims to acquaint students with the basics of social and cultural anti		_
	hropology as a scientific discipline dealing with the diversity of the world	examples from
The one-semester course aims to acquaint students with the basics of social and cultural anti	hropology as a scientific discipline dealing with the diversity of the world	examples from
The one-semester course aims to acquaint students with the basics of social and cultural antharmonological research from our "exotic" cultures (topics: kinship, religion, social exclusion,	hropology as a scientific discipline dealing with the diversity of the world	examples from
The one-semester course aims to acquaint students with the basics of social and cultural antl anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, shown. The course is an interesting alternative to other humanities, taught at FIT.	hropology as a scientific discipline dealing with the diversity of the world - migration, globalization, , material culture, language, health, history, deat	examples from h, etc) will be
The one-semester course aims to acquaint students with the basics of social and cultural antl anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, shown. The course is an interesting alternative to other humanities, taught at FIT. BI-KSA Cultural and Social Anthropology	hropology as a scientific discipline dealing with the diversity of the world - migration, globalization, , material culture, language, health, history, deat ZK hropology as a scientific discipline dealing with the diversity of the world -	examples from h, etc) will be
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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-ZI-VO.2017

Name of the group: Elective Vocational Courses for a Bachelor Branch BI-ZI, 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

Note on the grot	Jp. Vaccinity povining predifferly (bora a zamore	,,,, o v y j.,	iiitoa toi	1010 00010	
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ADU.1	Unix Administration Zden k Muziká	Z,ZK	5	2P+2C	L	V
BI-ADW.1	Windows Administration Ji í Kašpar, Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
BI-AG2	Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V
BI-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	2P+2C	Z	V
BI-BEK	Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	V
BI-HWB	Hardware Security Ji í Bu ek	Z,ZK	5	2P+2C	Z	V
BI-JPO	Computer Units Alois Pluhá ek	Z,ZK	5	2P+2C	Z	V
BI-KOM	Conceptual Modelling Robert Pergl	Z,ZK	5	2P+2C	Z	V
BI-MGA	Multimedia and Graphics Applications Ji í Chludil	Z,ZK	5	2P+2C	Z	V
BI-OOP	Object-Oriented Programming Filip K ikava	Z,ZK	4	2P+2C	Z	V
BI-PGR.1	Computer graphics programming	Z,ZK	5	2P+2C	L	V
BI-PNO	Practical Digital Design Martin Novotný	KZ	5	2P+2C	Z	V
BI-PRP	Law and business	Z,ZK	4	2P+1R	L	V

BI-PJP	Programming Languages and Compilers Jan Janoušek	Z,ZK	5	2P+1C	L	V
BI-PPA	Programming Paradigms Jan Janoušek	Z,ZK	5	2P+2R	Z	٧
BI-PGA	Programming of graphic applications Radek Richtr	Z,ZK	5	2P+2C	Z	٧
BI-PYT	Python Programming	Z,ZK	4	2P+2C	L	V
BI-SI2.3	Software Engineering 2 Martin Hlavatý Zden k Rybola Martin Hlavatý (Gar.)	Z,ZK	3	2P	Z	V
BI-SP1.21	Team Software Project 1 Zden k Rybola	KZ	5	2C	L	V
BI-SP1	Team Software Project 1 Ji í Mlejnek	KZ	4	2C	L	٧
BI-SP2	Team Software Project 2 Ji í Mlejnek	KZ	6	2C	Z	٧
BI-SP2.1	Team Software Project 2 Ji í Mlejnek	KZ	4	2C	Z	٧
BI-SSB	System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-SRC	Real-time systems Jaroslav Borecký	KZ	4	2P+2C	Z	٧
BI-XML	XML Technology Jan Mokrý	Z,ZK	4	2P+2C	L,Z	٧
BI-TIS	Information Systems Design	Z,ZK	5	2P+1C	Z	V
BI-TUR	User Interface Design Jan Schmidt	Z,ZK	4	2P+2C	L	٧
BI-TWA.1	Web Application Design Filip Glazar	Z,ZK	5	2P+2C	Z	V
BI-VES	Embedded Systems Miroslav Skrbek	Z,ZK	5	2P+2C	L	V
BI-ZRS	Basics of System Control Kate ina Hyniová	Z,ZK	4	2P+2C	Z	٧

Characteristics of the courses of this group of Study Plan: Code=BI-ZI-VO.2017 Name=Elective Vocational Courses for a Bachelor Branch BI-ZI. Version 2017

Z.ZK

4

BI-PRP

This course is presented in Czech.

Law and business

BI-ADU.1	Unix Administration	Z,ZK	5			
Students will learn the internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They will understand the differences						
between user and admir	nistrator roles. They will get theoretical and practical knowledge of user management and administration, of users access righ	nts, file systems, o	lisk subsystems,			
processes, memory, net	work services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the k	nowledge from th	e lectures on			
specific examples from	practice.					
BI-ADW.1	Windows Administration	Z,ZK	4			
This course is presented	d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	•				
BI-AG2	Algorithms and Graphs 2	Z,ZK	5			
This course, presented	n Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulso	ry course BI-AG1	. It further delves			
into advances data struc	ctures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English ve	ersion of the cour	se see BIE-AG2.			
BI-APS.1	Architectures of Computer Systems	Z,ZK	5			
Students will learn the d	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 pro	cessing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the p	orinciples of instru	ction processing			
not only in scalar proces	sors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of	the sequential mo	del of programs.			

The course further elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and consistency in such systems.

BI-BEK Secure Code Z,ZK The students will learn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting familiar with the threat modeling

theory, students gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every program needs to run with administrator privileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing data and the relationships 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 them.

BI-HWB Hardware Security

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

BI-JPO Computer Units Z.ZK

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).

DILICOLA			
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		
· · · · · · · · · · · · · · · · · · ·	rn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data repres		
	enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEM se is designed with the respect to continuation in software implementations.	O method and the	BPMN notation
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
	d with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for wo will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to		
• .	n 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
	mming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together		-
handing, refactoring an	e of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software deve d design patterns	eiopment including	g testing, error
BI-PGR.1	Computer graphics programming	Z,ZK	5
	ogram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to		
·	surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in		
	netric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid f	-	-
BI-PNO	PU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface	KZ	visualisation. 5
	Practical Digital Design we of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand t		- 1
•	chnologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern,		
tools.			_
BI-PJP	Programming Languages and Compilers	Z,ZK	5
	methods of implementation of common high-level programming languages. They get experience with the design and implement		
· · · -	ng language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that he	=	- 1
•	ler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, sing text in a language defined by a LL(1) grammar.	but exterios to all	other programs
BI-PPA	Programming Paradigms	Z,ZK	5
	pasic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of part	' '	
programming paradigm	and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming	. The principles ar	re demonstrated
	d on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern main	stream programm	ning languages
such as C++ and Java.		7 71/	
BI-PGA This course is presente	Programming of graphic applications di Czech only.	Z,ZK	5
BI-PYT	Duthon Drogramming		
	Python Programming	Z,ZK	4
The course is taught in	Czech.	· '	·
The course is taught in BI-SI2.3	Czech. Software Engineering 2	Z,ZK	3
The course is taught in BI-SI2.3 This course is presented	Czech. Software Engineering 2 d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	3
The course is taught in BI-SI2.3 This course is presente BI-SP1.21	Czech. Software Engineering 2 In Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Team Software Project 1	Z,ZK KZ	3
The course is taught in BI-SI2.3 This course is presente BI-SP1.21 Students gain hands-or	Czech. Software Engineering 2 d in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK KZ e BIE-SWI course	3 5 e that runs
The course is taught in BI-SI2.3 This course is presente BI-SP1.21 Students gain hands-or concurrently and that te	Czech. Software Engineering 2 Id in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). Team Software Project 1 In experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the	Z,ZK KZ e BIE-SWI course	3 5 that runs of the team and
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BI-TUR User Interface Design

Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where software and other products do not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of the methods that bring users into the development process to ensure optimal communication with a user.

Web Application Design

The basic course of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properties of language describing the structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, which will be demonstrated in modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony 2, Doctrine 2. Developments on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.

BI-VES Embedded Systems Z,ZK

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.

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.

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

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	Z,ZK	4	2P+1C	L	V
BI-AVI.21	Algorithms visually Lud k Ku era Lud k Ku era (Gar.)	Z,ZK	4	2P+1C	L	V
BI-A2L	English language, preparation for the B2 level exam Kate ina Valentová Kate ina Valentová (Gar.)	Z	2	2C	L	V
BI-APJ	Aplication Programming in Java Ji í Dan ek	Z,ZK	4	2P+1R+1C	Z	V
NI-AFP	Applied Functional Programming Robert Pergl	KZ	5	2P+1C	L	V
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek	Z,ZK	4	2P+2C	L	V
BI-BLE	Blender Lukáš Ba inka	Z,ZK	4	2P+2C	L	V
NI-DSP	Database Systems in Practes	Z,ZK	4	2P+1C	L	V
BI-STO	Storage and Filesystems	Z,ZK	4	2P+2C	L,Z	V

NI-DZO	Digital Image Processing	Z,ZK	4	2P+1C	L	V
NI-DDM	Distributed Data Mining Tomáš Borovi ka	KZ	4	3C	L	V
BI-EP1	Effective programming 1 Martin Ka er Martin Ka er (Gar.)	Z	4	2P+2C	Z	V
BI-EP2	Efficient Programming 2 Martin Ka er	KZ	4	2P+2C	L	V
BI-EJA	Enterprise Java Ji í Dan ek	Z,ZK	4	2P+2C	L	V
BI-FMU	Financial and Management Accounting David Buchtela	Z,ZK	5	2P+2C	Z	V
BI-HAM	HW accelerated network traffic monitoring	KZ	4	2P+1C	L	V
BI-ARD	Tomáš ejka Interactive applications on Arduino	KZ	4	3C	L	V
NI-IAM	Robert Hülle Internet and Multimedia	Z,ZK	4	2P+1C	L	V
BIE-IMA2	Ji í Melnikov Introduction to Mathematics 2		2	1C	Z	V
BI-CS2	Karel Klouda C# language and data access	KZ	4	0P+3C	 	V
BI-CS3	Pavel Št pán Pavel Št pán Pavel Št pán (Gar.) Language C# - design of web applications	KZ	4	3C	Z	V
	Pavel Št pán Language SQL, advanced				_	-
BI-SQL.1	Michal Valenta	KZ	4	3C	L	V
BI-QAP	Quantum algorithms and programming Ivo Petr, Tomáš Kalvoda Ivo Petr Ivo Petr (Gar.)	KZ	5	1P+2C	Z	V
NI-LSM	Statistical Modelling Lab Kamil Dedecius	KZ	5	3C	L	V
NI-MPL	Managerial Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P	Z,L	V
NI-MSI	Mathematical Structures in Computer Science Jan Starý	Z,ZK	4	2P+1C	L	V
BI-MPP.21	Methods of interfacing peripheral devices Miroslav Skrbek Miroslav Skrbek Miroslav Skrbek (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MIT	Mikrotik technologies Jan Fesl Jan Fesl (Gar.)	KZ	3	1P+2C	Z	V
NI-MOP	Modern Object-Oriented Programming in Pharo Marek Skotnica, Jan Blizni enko Robert Pergl Robert Pergl (Gar.)	KZ	4	3C	Z	V
BI-MVT.21	Modern Visualisation Technologies Ji í Chludil, Petr Pauš Petr Pauš (Gar.)	Z,ZK	5	2P+2C	Z	V
BI-MMP	Multimedia team project Zde ka echová Zde ka echová Zde ka echová (Gar.)	KZ	4	3C	Z,L	V
NI-OLI	Linux Drivers Jaroslav Borecký	Z,ZK	4	2P+2C	L	V
BI-ACM	Programming Practices 1	KZ	5	4C	L	V
BI-ACM2	Programming Practices 2	KZ	5	4C	Z	V
BI-ACM3	Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.) Programming Practices 3	KZ	5	4C	L	V
BI-ACM4	Programming Practices 4	KZ	5	4C	Z	V
BI-AND.21	Tomáš Valla, Ond ej Suchý Tomáš Valla Ond ej Suchý (Gar.) Programming for the Android Operating System	KZ	4	3C	L	V
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 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 i Dan ek	Z,ZK	4	2P+2C	L	V
NI-PSL	Programming in Scala	Z,ZK	4	2P+1C	Z	V
BI-PMA	Ji í Dan ek Ji í Dan ek Ji í Dan ek (Gar.) Programming in Mathematica Zdan k Duk Zdan k Buk (Zdan k Buk (Car.)	Z,ZK	4	2P+2C	Z,L	V
BI-PHP.1	Zden k Buk Zden k Buk Zden k Buk (Gar.) 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 Josef Kokeš Josef Kokeš (Gar.)	Z,ZK	5	1P+2C	Z	V
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
BI-SCE2	Computer Engineering Seminar II Hana Kubátová	Z	4	2C	L,Z	V
BI-ST1	Network Technology 1 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	٧
BI-ST2	Network Technology 2 Alexandru Moucha	Z	3	3C	L	V
BI-ST3	Network Technology 3 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	V
BI-ST4	Network Technology 4 Alexandru Moucha Alexandru Moucha	Z	3	2C	L	V
BI-SOJ	Machine Oriented Languages	Z,ZK	4	2P+2C	L	V
BI-SVZ	Machine vision and image processing Marcel Ji ina	Z,ZK	5	2P+2C	L,Z	V
NI-SYP	Parsing and Compilers Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	2P+1C	Z	V
BI-GIT	Version control system GIT Petr Pulc	KZ	2	16P	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV	Physical education	Z	0	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2	Physical Education	Z	0	0+2	L	V
TV2K1	Physical Education 2	Z	1		L,Z	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
BI-TS1	Theoretical Seminar I Dušan Knop, Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	٧
BI-TS2	Theoretical Seminar II Dušan Knop, Tomáš Valla, Ond ej Suchý Tomáš Valla Ond ej Suchý (Gar.)	Z	4	2C	L	٧
BI-TS3	Theoretical Seminar III Tomáš Valla, Ond ej Suchý Tomáš Valla Tomáš Valla (Gar.)	Z	4	2C	Z	٧
BI-TS4	Theoretical Seminar IV Tomás Valla	Z	4	2C	L	٧
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	٧
BI-CCN	Compiler Construction	Z,ZK	5	3P	L	V
BI-TEX	TeX and Typography Petr Olšák	Z,ZK	4	2P+1C	L	٧
BI-ULI	Introduction to Linux Zden k Muziká, Jan Ž árek, Dana ermáková, Petr Zemánek Zden k Muziká Zden k Muziká (Gar.)	Z	2	4D	Z	V
BI-OPT	Introduction to Optical Networks Pavel Tvrdík	Z,ZK	4	2P+1C	Z	V
NI-VCC	Virtualization and Cloud Computing Tomáš Vondra	Z,ZK	5	2P+1C	L	V
BI-VHS	Virtual game worlds Radek Richtr	ZK	4	2P+2C	Z	V
BI-VR1	Virtual reality I Petr Klán Petr Klán (Gar.)	KZ	4	2P+2C	L,Z	V
BI-VR2	Virtual reality II Petr Klán	KZ	3	1P+2C	L	V
BI-VAK.21	Selected Applications of Combinatorics Tomáš Valla	Z	3	2R	L	V
BI-VMM	Selected Mathematical Methods Tomáš Kalvoda	Z,ZK	4	2P+2C	L	V
NI-VYC	Computability Jan Starý	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	٧
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	KZ	4	1P+2C	L	٧

BI-ZNF	PHP Framework Nette - basics	KZ	3	2P+1C	L	V
	Ji í Chludil Basics of System Control				 	
BI-ZRS	Kate ina Hyniová	Z,ZK	4	2P+2C		V
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad Rostislav Babá ek, Igor Rosocha Martin P Ipitel Martin P Ipitel (Gar.)	2C	Z	V		
BI-ZWU	Introduction to Web and User Interfaces Lukáš Ba inka	Z,ZK	4	2P+2C	L	V
BI-3DT.1	3D Printing	KZ	4	3C	L	V
haracteristics of I, Version 2017	of the courses of this group of Study Plan: Code=BI-V.2017 Name=P	urely Electiv	ve Cours		helor Pro	gramme 4
his course is presen	ted in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).			<u>'</u>		
V1	Physical Education				Z	0
TVV	Physical education				Z	0
TVV0	Physical education				Z	0
V2	Physical Education				Z	0
TVKZV	Physical Education Course				<u>Z</u>	0
TVKLV BI-ZRS	Physical Education Course Basics of System Control				Z ,ZK	<u>0</u> 4
ontrol of engineering asic linear dynamic snodel, the basic linear	introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving and physical systems. We will provide basic information from the feedback control of linear disystems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Student dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy of stability in control systems, single and continuous adjustment of the controller parameters, and PI C control.	ynamical SISO sudents will learn controllers. Atte	systems, de the method ention is als	scription meth s of creating a o given to ser	nods of system description asors and ac	em models, of the syste tuators in
BI-ALO	Algebra and Logic			Z	,ZK	4
	and deepens the study of topics touched upon in the basic course in logic.			7	71/	
BI-AVI.21	Algorithms visually ents other algorithms for all this particular important algorithms for the solution of the	rom difforant field	ds of the se	1	,ZK	4 d substantia
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BI-A2L The content of the conditive part in the languests with the success class of the term. BI-APJ This course is presenther is enowadays and the rise nowadays and rise nowadays and rise nowadays	English language, preparation for the B2 level exam urse corresponds to the preparation for the English exam at the B2 level. Requirements for co- uage instructionMeet the requirements for writing assignments - Summary, Abstract, Argum is rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Fi Aplication Programming in Java ted in Czech. Advanced technologies in Java. Applied Functional Programming ted in Czech. Functional programming represents one of the traditional programming paradig d the functional paradigm becomes an important construct of traditionally imperative language de of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals ed to the fundamental problems in the Artificial Intelligence, and the basic methods for their so gent systems, game theory, planning, and machine learning. Modern soft-computing methods Blender moveledge of opensource program Blender from Bl-MGA (Multimedia and Graphics Applicatio complete and practically oriented introduction to Blender environment. Students may continue Database Systems in Practes ted in Czech. Storage and Filesystems principles and current solutions of storage systems architecture. The module explains principl gh availability. Digital Image Processing a comprehensive overview of modern methods for interactive editing of digital images and vic an interesting theoretical basis. Visually attractive applications provide better understanding of the sisning. This course will introduce algorithms solving the following practical applications: edge- astraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digit -possible image deformation, free-form image registration, texture synthesis, interactive segm Distributed Data Minning ate-of-the-art approaches for distributed data mining and parallelization of machine learning a sework Apache Spark and with existing distributed DM / ML algorithms. They will learn principle slize other algorithms. The co	ms. Traditional a es (C++, C#, Jav. Iving. It focuses is, including the ens) course. It is to BI-PGA (Proes of data store, lee. It mainly deals asked theoretical aware editing, to all photo-montaguentation, colorizal gorithms. Stude	demic Achie -Succeed ir -Succeed ir Il be specific Ind novel fur va). As such mainly on the volutionary intended for gramming gr	evement - stude to both the mided by individual and the mi	Z dents are du term and the al teachers of ,ZK	2 e to: -Take e final term during the fi 4 5 guages are becomes a 4 areas of stanetworks, v 4 aphics and rise. 4 orage scalin 4 ooth easy to de the domalurring in enhancementating. 4 th large scal
BI-A2L The content of the control to the control to the languests with the success class of the term. BI-APJ This course is present the rise nowadays and	English language, preparation for the B2 level exam urse corresponds to the preparation for the English exam at the B2 level. Requirements for collage instructionMeet the requirements for writing assignments - Summary, Abstract, Argum is rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). For the Aplication Programming in Java and ted in Czech. Advanced technologies in Java. Applied Functional Programming ted in Czech. Functional programming represents one of the traditional programming paradigm of the functional paradigm becomes an important construct of traditionally imperative language are of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals are to the fundamental problems in the Artificial Intelligence, and the basic methods for their so gent systems, game theory, planning, and machine learning. Modern soft-computing methods are learned by the practical problems in the Artificial Intelligence, and the basic methods for their so gent systems, game theory, planning, and machine learning. Modern soft-computing methods are learned by the practically oriented introduction to Blender environment. Students may continue Database Systems in Practes ted in Czech. Storage and Filesystems principles and current solutions of storage systems architecture. The module explains principle and availability. Digital Image Processing a comprehensive overview of modern methods for interactive editing of digital images and vicin interesting theoretical basis. Visually attractive applications provide better understanding of basing. This course will introduce algorithms solving the following practical applications: edge-straction, hybrid images, gradient domain editing, seamless image stitching and cloning, digit-possible image deformation, free-form image registration, texture synthesis, interactive segments are provided by the processing are of-the-art approaches for distributed data mining and parallelization of machine learning allework Apac	ms. Traditional a es (C++, C#, Jav. Iving. It focuses is, including the ens) course. It is to BI-PGA (Proes of data store, lee. It mainly deals asked theoretical aware editing, to all photo-montaguentation, colorizal gorithms. Stude	demic Achie -Succeed ir -Succeed ir Il be specific Ind novel fur va). As such mainly on the volutionary intended for gramming gr	pevement - stude of both the midded by individual and by individua	Z dents are du term and the al teachers of ZK Z amming languis paradigm ZK sks from the d the neural dent dent dent dent dent dent dent dent	2 e to: -Take e final term during the f 4 5 guages are becomes a 4 areas of st networks, 4 aphics and rse. 4 orage scalii 4 ooth easy to de the dom lurring in enhanceme natting. 4 th large scalie to propos
BI-A2L The content of	English language, preparation for the B2 level exam urse corresponds to the preparation for the English exam at the B2 level. Requirements for co- uage instructionMeet the requirements for writing assignments - Summary, Abstract, Argum is rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Fi Aplication Programming in Java ted in Czech. Advanced technologies in Java. Applied Functional Programming ted in Czech. Functional programming represents one of the traditional programming paradig d the functional paradigm becomes an important construct of traditionally imperative language de of a software engineer: the theory and especially the practice. Artificial Intelligence Fundamentals ed to the fundamental problems in the Artificial Intelligence, and the basic methods for their so gent systems, game theory, planning, and machine learning. Modern soft-computing methods Blender moveledge of opensource program Blender from Bl-MGA (Multimedia and Graphics Applicatio complete and practically oriented introduction to Blender environment. Students may continue Database Systems in Practes ted in Czech. Storage and Filesystems principles and current solutions of storage systems architecture. The module explains principl gh availability. Digital Image Processing a comprehensive overview of modern methods for interactive editing of digital images and vic an interesting theoretical basis. Visually attractive applications provide better understanding of the sisning. This course will introduce algorithms solving the following practical applications: edge- astraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digit -possible image deformation, free-form image registration, texture synthesis, interactive segm Distributed Data Minning ate-of-the-art approaches for distributed data mining and parallelization of machine learning a sework Apache Spark and with existing distributed DM / ML algorithms. They will learn principle slize other algorithms. The co	ms. Traditional a es (C++, C#, Jav. Iving. It focuses is, including the emission of the the emission	demic Achie -Succeed ir -Succeed ir Il be specific Ind novel fur /a). As such mainly on the volutionary intended for gramming	pevement - student both the mided by individual and by individual	Z dents are du term and the al teachers of ZK Z amming languis paradigm ZK sks from the d the neural detection 3D gr (actions) courted in 3D gr (actions) co	2 e to: -Take e final term during the f 4 5 guages are becomes a 4 areas of st networks, 4 aphics and rse. 4 orage scali 4 ooth easy to de the dom lurring in enhanceme natting. 4 th large scali e to proposite

BI-EJA	Enterprise Java	Z,ZK	4
	ced technologies in the Java programming language. The focus is on technologies for development of enterprise information	systems which ar	e connected to
a database and are acc BI-FMU	ressed through the web interface. Financial and Management Accounting	Z,ZK	5
_	Financial and Management Accounting s 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 modifica	•	• .
•	based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of management of the Czech Republic control	gement accounting	g are base of
	oduls in Business information systems.		
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. I datory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as	•	•
	of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network t		
	ir practical abilities in this field.		
BI-ARD	Interactive applications on Arduino	KZ	4
The subject is designed	for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple appl	ications for moder	n programmable
-	peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded	-	
not only on display of a Software Engineering s	PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefor	e is suitable even	for vveb and
NI-IAM	Internet and Multimedia	Z,ZK	4
	princement and within regia ocused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes a	1 ' 1	
	als (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practic	-	
-	ns. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the		
	of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording	g the scene up to	the presentation
or audience.			-
BIE-IMA2	Introduction to Mathematics 2		2
Students refresh and ex examples.	tend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a	re able to apply th	iem in particular
BI-CS2	C# language and data access	KZ	4
	C# language and data access lata access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Mic		•
	id to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current te	•	
-	and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQI	-	
and LINQ to SQL). And	ther objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data	a using domain-sp	ecific objects
	course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Mo	odel, Storage Mod	el and Mapping
(XML description).	Language OV design of such applicati	177	4
BI-CS3 The students will be intr	Language C# - design of web applications	KZ	4
	oduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overvi Ill learn to create WebAPI and to use it by client programs.	ew or the developr	neni possibilities
BI-SQL.1	Language SQL, advanced	KZ	4
	p Earnguage Sec., advanced wledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. I		•
	es, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the po	-	
structures like indexes,	clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan	and possibilities	of its. changes
	res will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS.	acle DBMS and pa	artially on
PostgreSQL.	Output in a large with the country of the second state of the seco	1/7	
BI-QAP	Quantum algorithms and programming tudents hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanic	KZ	5
	ms showing advantages and limitations of quantum computing. During tutorials students work in open-source software devel		
	nowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VI	•	
	No previous knowledge of physics is assumed.	•	•
NI-LSM	Statistical Modelling Lab	KZ	5
The subject is oriented	on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is		ve use of the
	d its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms,	and analyses of t	heir properties.
	t is on the border of own research and may result in the topic of final work (diploma or bachelor thesis).		_
NI-MPL	Managerial Psychology	ZK	2
NI-MSI	Mathematical Structures in Computer Science	Z,ZK	4
	s of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Sco	tt model of lambda	a calculus.
ntroduction to category		7 71/	-
BI-MPP.21 The course is focused o	Methods of interfacing peripheral devices on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Univ	Z,ZK	5 ISB) The course
	on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is locused on techniques based on only and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of t	•	-
	on development, and APIs of selected devices.	-,	
BI-MIT	Mikrotik technologies	KZ	3
The main motivation of	the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are	commonly used by	y the small and
	providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the	=	
	and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer that the local part of the OCL and of the Course of the OCL and of the OCL	er networks conce	pts like protocols
	data-link, network and transport layer of the OSI model.		
NI-MOP	Modern Object-Oriented Programming in Pharo	KZ	4
	nming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, who modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the s		
•	thiodern applications. In this course, we build on the knowledge acquired in the course Bi-OOF and aim to further deepen the sidern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development	•	•
	bject programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to wo		
· -	f semestral 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		visualization on
$high\ resolution\ displays\ (e.g.,\ SAGE\ and\ video\ mapping)\ and\ their\ applications\ in\ practice.\ Several\ lectures\ deal\ with\ the\ content\ creation\ for\ the\ measuremath{measuremath{nessuremath{ne$	entioned technologie	es, namely fractal
and procedural visualization, scientific data visualization, and 3D model scanning.		
BI-MMP Multimedia team project	KZ	4
This course is presented in Czech.		,
NI-OLI Linux Drivers	Z,ZK	4
The Linux operating system is an important operating system for personal computer and also for embedded systems. Systems on chip and combin		
increase the variability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver develop course provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practical experien		tudents. The
	KZ	5
BI-ACM Programming Practices 1 This course is presented in Czech.	NZ	5
BI-ACM2 Programming Practices 2	KZ	5
This course is presented in Czech.	112	1 3
BI-ACM3 Programming Practices 3	KZ	5
This course is presented in Czech.	1 112	1
BI-ACM4 Programming Practices 4	KZ	5
This course is presented in Czech.	1	1
BI-AND.21 Programming for the Android Operating System	KZ	4
This course is presented in Czech.	1	
BI-CS1 Programming in C#	KZ	4
The goal of the course is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundament	1	nes of variables,
operators, arrays, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class	definition and class	instancing,
constructors, methods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debug	gging and exception	processing, as
well as work with files are emphasized.		
BI-PJS.1 JavaScript Programming	KZ	4
Main goal of the course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development of the course is an introduction to Javascript programming.	nent in Javascript. Th	ne 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 registe	er for this course in the	neir 4th semester
of study.		
BI-KOT Programing in Kotlin	Z,ZK	4
Kotlin is a modern, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of a		
The language is fully Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development	of a modern, object	t-functional way
with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages).		T
NI-PSL Programming in Scala	Z,ZK	4
The course introduces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language for	- ·	_
advance standard library. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful framewor	ks and libraries e.g.	Play, Cassandra,
Scalaz, etc.	7.71/	
BI-PMA Programming in Mathematica	Z,ZK	4
Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional projects), how to greate dynamic interactive applications and visualizations and propositions and propositions.	gramming, rule-base	ea programming,
etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.	1/7	
BI-PHP.1 Programing in PHP	KZ	4
The course is taught in Czech Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practice		
development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to regist register for this course in their 3rd semester of study.	erior bie-TWA.T. II	riey srioulu
BI-PS2 Programming in shell 2	Z,ZK	4
Students gain a general overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In		I
into shell and some other particular scripting languages and will get practical experience with shell script programming.	addition, they gain o	deeper maight
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	1 '	1
time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems in individual projects - e.g., extraction of characteristic problems - e.g., extraction of characteristic problems - e.g., extraction of characterist		•
pages.		
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 happen		
is called. Students will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is called.		
applications written in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be	e dedicated to debug	ggers: 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 comp	puter malware scend	e. The focus of
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 resista	ance 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	•	
articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar to	eachers. The topics	are new for each
semester.		
BI-SCE2 Computer Engineering Seminar II	Z	4
The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance approached individually within the subject. Each student or group of students solves some interesting topic with the solvest subject.		
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 to	· ·	
semester.	Jaonera. The topics	are new ioi eacil
	Z	3
BI-ST1 Network Technology 1 The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acre-	1	_
CCNA1 - R&S Introduction to Networks.		

BI-ST2 Network Technology 2 This course is presented in Czech.	Z	3
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 present	ed during BI-ST1 and BI	ST2 courses will
get further extended in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficie	ncy, predictability, extens	ion beyond a
simple topology, security, etc.	7	
BI-ST4 Network Technology 4	Z	3
Students will further enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and BI-ST2 courses got further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increases.	- -	_
beyond a simple topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a co		=
Broadcast Multiple Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router a		,
recoveries, and emergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the	ne mitigation ways while	maintaining the
network running.		
BI-SOJ Machine Oriented Languages	Z,ZK	4
Students of the course will gain an ability to create their own programs in the assembly language of the most common PC platform focusing or	•	
and efficient cooperation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application poi	nt of view linked to higher	level languages.
This knowledge will be used during reverse engineering, optimization, and evaluation of code security. Machine vision and image presenting	7 71/	
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	Z,ZK	on The course
introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on p	-	
problems of practice that the graduates may encounter.	radioar add or damera dy	otomo for corving
NI-SYP Parsing and Compilers	Z,ZK	5
The module builds upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of fundamentals of automata theory, formal language and formal translation theories.	1 '	-
of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing.	-	
BI-GIT Version control system GIT	KZ	2
Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically	and practically. In this p	articular system
even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as G	it server administrators.	
TV2K1 Physical Education 2	Z	1
BI-TS1 Theoretical Seminar I	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is most	tly a classical reading gro	up. The students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the	course is a work with scie	ntific papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		1
BI-TS2 Theoretical Seminar II	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is most		- ·
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.	course is a work with scie	munc papers and
BI-TS3 Theoretical Seminar III	7	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is most	-	1
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the or		- ·
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		
BI-TS4 Theoretical Seminar IV	Z	4
Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mos	tly a classical reading gro	up. The students
are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the	course is a work with scie	ntific papers and
other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar.		,
BI-TDA Test driven architecture	KZ	4
The course is focused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and mo		•
world. This course has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples tha		
NI-TSP Testing and Reliability Students will gain knowledge about girault testing and about methods for increasing reliability and ecourity. They will get practical skills to be	Z,ZK	5
Students will gain knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be the intuitive path sensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systematic test generation.		-
will be able to compute, analyze, and control the reliability and availability of the designed circuits.	and with bank in oon tool	oquipmont: They
BI-CCN Compiler Construction	Z,ZK	5
This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic p		1
understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarchin	g theme of the class.	
BI-TEX TeX and Typography	Z,ZK	4
This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second		s on typographic
rules.		
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	I become familiar with ba	sic commands
and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal).		1
BI-OPT Introduction to Optical Networks	Z,ZK	4
Students get basic overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures of optical network technology, and on their columns are provided the history of optical communications, an every internet provided the history of optical communications, an every internet provided the history of optical communications, and on their columns are provided to the history of optical communications.		
of optical network technology and on their solutions. The course will include the history of optical communications, an overview of passive conditions dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmissions).		
the most up-to-date topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new application		
ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their par		
from practice.		
NI-VCC Virtualization and Cloud Computing	Z,ZK	5
Students will gain knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of compa	nies and organizations. T	hey will get
acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, are		
performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the mo		=
management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practand development tools (Continuous integration and development).	tical skills in the use of m	odern integration
and development tools (Continuous integration and UEVGIOPHIGH).		

BI-VHS Virtual game worlds	ZK	4
The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,).	This current students knowled	lge 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.		
BI-VR1 Virtual reality I	KZ	4
Introduction to Virtual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and	requirements of virtual world	s communication.
The course focuses on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. I	It improves computational thir	nking, empathy
and shared social activities.		
BI-VR2 Virtual reality II	KZ	3
Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of a	avatars. The objective is to dev	elop applications
for computer science and gamification in various social metaverse and desktop engines.		
BI-VAK.21 Selected Applications of Combinatorics	Z	3
The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contract, the course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics.	contrast to the basic courses,	we approach the
issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introd	duce some basic data structu	res. Furthermore,
with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only	theoretical) informatics. Area	s from which we
will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algor	rithms, optimization and more	e. Students will
also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		
BI-VMM Selected Mathematical Methods	Z,ZK	4
We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform	orm (DFT) and its fast implement	entation (FFT).
Further we deal with differential calculus of functions involving multiple variables. We present methods for the localization of extreme val	lues of functions. For this purp	poses, 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 op-	ptimization and duality. The lin	ear programming
and the Simplex method is analyzed in more detail.		
NI-VYC Computability	Z,ZK	4
Classical theory of recursive functions and effective computability.	·	
BI-ZS10 Bachelor internship abroad for 10 credits	Z	10
Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scie	entific and/or research instituti	on. 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	of the professional asstant and	d extent of the
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List of courses of this pass:

Code	Name of the course	Completion	Credits
BI-3DT.1	3D Printing	KZ	4

BI-A2L	English language, preparation for the B2 level exam	Z	2
The content of the	course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achievement -	students are due	to: -Take an
active part in the I	anguage instructionMeet the requirements for writing assignments - Summary, Abstract, Argumentation PaperSucceed in both the	e midterm and the	final term
tests with the succe	ess rate set at 70%80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by indi	vidual teachers du	ring the first
	class of the term.		•
BI-AAG	Automata and Grammars	Z,ZK	6
	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 for		
	ed through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation,		
BI-ACM	Programming Practices 1	KZ	5
	This course is presented in Czech.		ſ
BI-ACM2	Programming Practices 2	KZ	5
	This course is presented in Czech.		
BI-ACM3	Programming Practices 3	KZ	5
	This course is presented in Czech.		
BI-ACM4	Programming Practices 4	KZ	5
	This course is presented in Czech.		,
BI-ADU.1	Unix Administration	Z,ZK	5
Students will learn t	he internal structure of the UNIX operating system, with the administration of its basic subsystems and with the security principles. They	will understand the	differences
between user and a	administrator roles. They will get theoretical and practical knowledge of user management and administration, of users access rights,	file systems, disk s	subsystems,
processes, memo	ory, network services and remote access, and in the areas of system deployment and virtualization. In the labs, they will verify the kno	owledge from the le	ectures on
	specific examples from practice.		
BI-ADW.1	Windows Administration	Z,ZK	4
'	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		ı
BI-AG1	Algorithms and Graphs 1	Z,ZK	6
	rs the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing cur		d partially
	rledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the		
algo	rithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asym	ptotic notation.	
BI-AG2	Algorithms and Graphs 2	Z,ZK	5
	nted in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory c	,	rther delves
	structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English versic		
BI-ALO	Algebra and Logic	Z,ZK	4
	The course extends and deepens the study of topics touched upon in the basic course in logic.	. —,—-	•
BI-AND.21	Programming for the Android Operating System	KZ	4
D171110.21	This course is presented in Czech.	112	•
BI-ANG	English Language, Internal Certificate	ZK	2
Dirato	Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-AN		_
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2
BI-APJ		Z,ZK	4
DI-APJ	Aplication Programming in Java This course is presented in Czech. Advanced technologies in Java.	Z,ZK	4
DI ADO 4		7.71/	_
BI-APS.1	Architectures of Computer Systems	Z,ZK	5
	n the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec	-	
1 ' '	n processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the princ ocessors, 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	•	
		KZ	
BI-ARD	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 applicat	l	4
	ried peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded s	· ·	-
	by of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore		
not only on diopic	Software Engineering students.	io dallabio ovoit ioi	TTOD and
BI-AVI.21	Algorithms visually	Z,ZK	4
	ments other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer sc		l
	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&l		-
landinidago procento	that make understanding the principles of algorithms easy.	.,p.,,a.go	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
BI-BAP	Bachelor Thesis	Z	14
		Z,ZK	5
BI-BEK	Secure Code arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fa		-
	gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		_
	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		
BI-BEZ	Security	Z,ZK	6
	Occurry		l
	d the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications; symmetric a		ntoeveteme
i and hash functions	d the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a . They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	and asymmetric cry	
and hash functions	. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	and asymmetric cry	
	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.	and asymmetric cry ystems for comput	er systems.
BI-BIG	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. DB Technologies for Big Data	and asymmetric cry	
BI-BIG	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. DB Technologies for Big Data This course is presented in Czech.	and asymmetric cry ystems for comput KZ	er systems.
BI-BIG BI-BLE	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. DB Technologies for Big Data This course is presented in Czech. Blender	and asymmetric cry ystems for comput KZ Z,ZK	er systems.
BI-BIG BI-BLE The course exten	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. DB Technologies for Big Data This course is presented in Czech. Blender ds knowledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those in	and asymmetric cry ystems for comput KZ Z,ZK nterested in 3D gra	4 4 aphics and
BI-BIG BI-BLE The course exten	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. DB Technologies for Big Data This course is presented in Czech. Blender	and asymmetric cry ystems for comput KZ Z,ZK nterested in 3D gra	4 4 aphics and

BI-CAO	Digital and Analog Circuits	Z,ZK	5
•	fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw		, ,
	of electronic devices.		
BI-CCN	Compiler Construction	Z,ZK	5
	actory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles		
	nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching		
BI-CS1	Programming in C# urse is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental co	KZ	4
-	s, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class def		
	ods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging		·
,	well as work with files are emphasized.		3,
BI-CS2	C# language and data access	KZ	4
	and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Micros		tudents will
get to know objects	s used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current techr	nologies such as L	INQ - a set
-	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	-	- 1
(ORM). This part of	the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model (XML description).	, Storage Model ar	nd Mapping
DI CC2	· · · · · · · · · · · · · · · · · · ·	KZ	
BI-CS3	Language C# - design of web applications introduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overview of		4
The students will be	on thisplatform. They will learn to create WebAPI and to use it by client programs.	or the development	possibilities
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 p	,	
_	ns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and		
of income, consum	ption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well as	s information abou	t important
	taxpayers' formal duties towards public administration.		
BI-DBS	Database Systems	Z,ZK	6
	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn	-	
	constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the		
	ation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda	•	
-	ling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced t ases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of datab		-
iii rolational databa	optimizing database applications, distributed database systems, data stores.	oddo dydiomio, dob	agging and
BI-DPR	Document., Presentation, Rhetorics	KZ	4
	d to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and pr		esentations
	and presenting before an audience. Students will also learn to write technical reports and scientific texts.		
BI-EHD	Introduction to European Economic History	Z,ZK	3
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-EJA	Enterprise Java	Z,ZK	4
The course is on a	dvanced technologies in the Java programming language. The focus is on technologies for development of enterprise information sys a database and are accessed through the web interface.	stems which are co	onnected to
DLEMD		1/7	4
BI-EMP	Economics and Management Principles ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	KZ	4 nundation
	nto state economic environment (CR), management of property and capital structure, business transaction records keeping during ar	-	
3	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination		,
BI-EP1	Effective programming 1	Z	4
'	The course is taught in Czech.	'	
BI-EP2	Efficient Programming 2	KZ	4
Continuation of Eff	ficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual	dual problems are	discussed,
	with the aim to choose the best one and avoid implementation errors.		
BI-FMU	Financial and Management Accounting	Z,ZK	5
	rse is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the par	_	•
•	unts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modificatio ations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of manager		
or economic open	Business Inteligence moduls in Business information systems.	ment accounting a	ie base oi
BI-FTR.1	Financial Markets	Z,ZK	5
2	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	_,	
BI-GIT	Version control system GIT	KZ	2
	roduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and practi		
even the ir	nplementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git s	server administrato	rs.
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	_	- 1
	mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a s		
for analysis). The goals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traffic on a hardware and software			
DI FIVII	level and to develop their practical abilities in this field.	7 71/	2
BI-HMI	History of Mathematics and Informatics This course is presented in Czech.	Z,ZK	3
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 with		
	lles, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vo		-

including side-chan	inel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tecan and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of		applications
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad 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 commi	=	
· ·	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		1
	cify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struc		=
	learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent	J	
· ·	ns of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO n		=
	will be taught. The course is designed with the respect to continuation in software implementations.	netriod drid trie Br	MITTIOLATION
DI KOT		7 71/	1
BI-KOT	Programing in Kotlin	Z,ZK	4
	n, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advar		
The language is iu	Illy Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a result of the project		ictional way
D1 1/0 A	with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages)		
BI-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversit	=	-
anthropological res	earch from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health	n, history, death, e	etc) will be
5	shown. The course is presented in Czech.		
BI-LIN	Linear Algebra	Z,ZK	7
	nt in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems aroun		•
	s are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operation		
	ey can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and		1
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
	This course is presented in Czech.		T
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
	uainted with multimedia technologies and applications for 2D/3D bitmap and vector graphics. During the course, current tools for wor		
٠ .	ttion will be introduced. Students learn several basic techniques of creation and editing content in computer graphics, introduction to gra	•	•
	y learn to use multimedia transmission and representation systems, including real-time multimedia processing. They understand the processing transmission and representation systems, including real-time multimedia processing.		ion and use
	of graphics processing cards. They gain a number of practical skills, such as vectorizing raster images, retouching photos, or creating		
BI-MIK	Fundamentals of Microeconomics	Z,ZK	4
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BI-MIT	Mikrotik technologies	KZ	3
	on of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are con		
	vice providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the m		
and now to adminis	trate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer ne	etworks concepts i	ike protocois
DIMIO	and technologies of the data-link, network and transport layer of the OSI model.	7 71/	
BI-MLO	Mathematical Logic	Z,ZK	5
DLMMD	The course seminary is taught in Czech.	1/7	1
BI-MMP	Multimedia team project	KZ	4
	This course is presented in Czech.		
BI-MPP.21	Methods of interfacing peripheral devices	Z,ZK	5
	sed on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universa		
includes both PC s	side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USE	devices, Linux a	na vvinaows
DIAN/TO4	drivers, simple application development, and APIs of selected devices.	7.71	
BI-MVT.21	Modern Visualisation Technologies	Z,ZK	5
	urse is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augm	•	
nign resolution alsp	lays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentione	ea tecnnologies, n	amely fractal
DI 00D	and procedural visualization, scientific data visualization, and 3D model scanning.	7.71	
BI-OOP	Object-Oriented Programming	Z,ZK	4
	rogramming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together		_
course we look at	some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software develo	pment including to	esting, error
	handing, refactoring and design patterns.		
BI-OPT	Introduction to Optical Networks	Z,ZK	4
_	overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on poss	-	
· · · · · · · · · · · · · · · · · · ·	technology and on their solutions. The course will include the history of optical communications, an overview of passive components		-
	sators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission system	,	
•	e topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such as		
uitiastable freque	ncy transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters.	Students WIII SOIVE	tear lasks
DI OSV	from practice.	7 71/	
BI-OSY	Operating Systems	Z,ZK	5 odgo of OS
	and the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They ses and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and dead	-	-
•	ies and threads implementations. They understand the problems of face conditions, thread scheduling, resource allocation and dead nt of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple mult	-	
l manayemen	in a final manary, principles and architectures of dians, the and the systems. They are able to design and implement simple mult	поачеч аррііса	

BI-PA1							
	Programming and Algorithmics 1	Z,ZK	6				
	ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structure)						
statements, function	ons, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searchi	ng, sorting, and m	anipulating				
	with linked lists.						
BI-PA2	Programming and Algorithmics 2	Z,ZK	7				
Students know the	e instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, o	, lueue, enlargeable	array, set,				
table). They can imp	plement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in	n C++, students are	e introduced				
	with all C++ features needed to achieve the main objective (operator overloading, templates).						
BI-PAI	Law and Informatics	ZK	3				
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).						
BI-PGA	Programming of graphic applications	Z,ZK	5				
	This course is presented in Czech only.	2,21	3				
DI DOD 4		7 71/					
BI-PGR.1	Computer graphics programming	Z,ZK	5				
	o program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textu						
	ke wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in						
• • • • •	peometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fund						
development, e.g.	for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surface	s, and scientific vis	sualisation.				
BI-PHP.1	Programing in PHP	KZ	4				
The course is ta	ught in Czech Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices a	and will use tool th	at eases				
development in F	PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register I	for BIE-TWA.1. The	ey should				
	register for this course in their 3rd semester of study.						
BI-PJP	Programming Languages and Compilers	Z,ZK	5				
	isic methods of implementation of common high-level programming languages. They get experience with the design and implementat		_				
	imming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has						
	mpiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but	•	•				
lonn and write a co	for parsing and processing text in a language defined by a LL(1) grammar.	caterias to all other	or programs				
DI DIO 4		1/7	4				
BI-PJS.1	JavaScript Programming	KZ	4				
	course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development	•					
recommended for s	tudents of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for the	nis course in their 4	th semester				
	of study.						
BI-PJV	Programming in Java	Z,ZK	4				
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).						
BI-PKM	Introduction to mathematics	Z	4				
	This course is presented in Czech.	_	•				
BI-PMA	Programming in Mathematica	Z,ZK	4				
	· · · · · · · · · · · · · · · · · · ·	,					
Students will be wo		iiig, ruie-baseu pi	Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional programming, rule-based programming,				
DI DNO	etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.	1/7					
BI-PNO	Practical Digital Design	KZ	5				
Students get an ov	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the	basics of the VHD	L language,				
Students get an ov	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in	basics of the VHD	L language,				
Students get an over and implementation	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools.	basics of the VHD	L language, AD design				
Students get an ov	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in	basics of the VHD	L language,				
Students get an over and implementation BI-PPA	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools.	basics of the VHD dustry-standard C	L language, AD design				
Students get an ow and implementation BI-PPA The course deals	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools. Programming Paradigms	basics of the VHD dustry-standard C	L language, AD design 5				
Students get an own and implementation BI-PPA The course deals programming parado	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools. Programming Paradigms with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of particular designs.	basics of the VHD dustry-standard C Z,ZK cular approaches. In	L language, AD design 5 Functional emonstrated				
Students get an own and implementation BI-PPA The course deals programming parado	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools. Programming Paradigms with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of partic digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The	basics of the VHD dustry-standard C Z,ZK cular approaches. In	L language, AD design 5 Functional emonstrated				
Students get an overall and implementation and implementation BI-PPA The course deals programming paradon lambda calculus	Practical Digital Design erview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the on technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, in tools. Programming Paradigms with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of partic digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The sand on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstrated as C++ and Java.	basics of the VHD idustry-standard C Z,ZK cular approaches. I ne principles are de eam programming	L language, AD design 5 Functional emonstrated languages				
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on Python language. Knowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VMM and experience with Python might be an advantage. No previous knowledge of physics is assumed. BI-SAP Computer Structure and Architecture Z.ZK 6 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. Computer Engineering Seminar I The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. Computer Engineering Seminar II BI-SCE2 The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. **BI-SEP** World Economy and Business Z.ZK 4 This course is presented in Czech. The course introduces students of technical university to the international business. It does that predominantly by comparing individual countries and key regions of world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedom, corruption and economic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of discussions based on individual readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. BI-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. BI-SI2.3 Software Engineering 2 3 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). BI-SOJ Machine Oriented Languages Z,ZK 4 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 use of microprocessor's features and efficient cooperation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view linked to higher level languages. This knowledge will be used during reverse engineering, optimization, and evaluation of code security. BI-SP1 Team Software Project 1 ΚZ 4 Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the BEI-SWI course that runs concurrently and that teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the role of the team and project leader, regularly consults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be further developed and finished in the BEI-SP2 course. BI-SP1.21 Team Software Project 1 Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the BIE-SWI course that runs concurrently and that teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teacher, in the role of the team and project leader, regularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software artefact will be further developed and finished in the BIE-SP2 course. BI-SP2 Team Software Project 2 K7 Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result of the BEI-SP1 course project. However, this time, the functionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6 people. The teacher, in the role of the team and project leader, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of their solution. The BEI-SI2 course that runs concurrently will provide the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the software product. BI-SP2.1 Team Software Project 2 ΚZ 4 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). BI-SQL.1 Language SQL, advanced ΚZ 4 Module is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites, triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL. BI-SRC Real-time systems K7 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-SSB** System and Network Security Z,ZK 5 This course is focused on selected areas of computer networks and computer systems in terms of cyber security BI-ST1 Network Technology 1 Ζ 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 acredited under the Cisco Netacad -CCNA1 - R&S Introduction to Networks. BI-ST2 Network Technology 2 3 Ζ This course is presented in Czech. BI-ST3 Ζ Network Technology 3 3 Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during BI-ST1 and BI-ST2 courses will get further extended in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predictability, extension beyond a simple topology, security, etc.

BI-ST4 Network Technology 4 3 Students will further enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switching presented during BI-ST1 and BI-ST2 courses got further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predictability, extension beyond a simple topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a completely other type of network (Non Broadcast Multiple Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and switch firmware, perform password recoveries, and emergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitigation ways while maintaining the network running. **BI-STO** Storage and Filesystems The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archiving, as so as storage scaling, load balancing and high availability. 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 image information. The course introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical use of camera systems for solving problems of practice that the graduates may encounter. Test driven architecture The course is focused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that are well known in the DevOps world. This course has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occur in the semester project. **BI-TEX** TeX and Typography This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of the course focuses on typographic rules. Information Systems Design Z,ZK 5 Students know various types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customers) with applications of existing technologies (databases, programming languages, GUI etc.). BI-TS1 Theoretical Seminar I Ζ Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. BI-TS2 Theoretical Seminar II Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. BI-TS3 Theoretical Seminar III Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. Theoretical Seminar IV Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. User Interface Design Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where software and other products do not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of the methods that bring users into the development process to ensure optimal communication with a user. BI-TWA.1 Web Application Design The basic course of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properties of language describing the structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, which will be demonstrated in modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony 2, Doctrine 2. Developments on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS. BI-ULI Introduction to Linux 7 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 familiar with basic commands and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal). BI-VAK.21 Selected Applications of Combinatorics Ζ 3 The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the basic courses, we approach the issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic data structures. Furthermore, with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) informatics. Areas from which we will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimization and more. Students will also try to implement solutions to the studied problems with a special focus on the effective use of existing tools. **BI-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 BI-VMM 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. BI-VR2 ΚZ Virtual reality II 3 Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The objective is to develop applications for computer science and gamification in various social metaverse and desktop engines. Searching the Web and Multimedia Databases 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 4 Students learn to make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX, DOM). An emphasis will be given to language XPath which enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics of XSLT programming. XSLT and XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies. Z,ZK BI-ZDM Elements of Discrete Mathematics 5 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. Intelligent Embedded System Fundamentals 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. Elements of Calculus BI-7MA 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. **BI-ZNF** PHP Framework Nette - basics 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-ZNS** Z,ZK 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-ZPI 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. Bachelor internship abroad for 10 credits Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/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 Ζ 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 exceeds the academic year's dead-line. BI-ZS30 Bachelor internship abroad for 30 credits 30 Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or research 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-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
	uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical		
space search, multi	i-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithms be presented as well.	s and the neural ne	etworks, will
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
DI-ZVVO	This course is presented in Czech.	۷,۷۱۲	, ,
BIE-EEC	English language external certificate	Z	4
	se can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English	sh comparable to c	r exceeding
	the B2 level of the Common European Framework of Reference for Languages.		
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh ar	nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a	ble to apply them	in particular
BIE-ZUM	examples.	7.71/	4
	Artificial Intelligence Fundamentals uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classica	Z,ZK	eas of state
	i-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithms		
•	be presented as well.		
FI-FIL	Philosophy	ZK	2
	see A0B16		
FI-GNO	Introduction to Gnoseology	ZK	2
-	uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi p írodními a humánními obory, v do		
•	lenkových proud 20. století jsou ukázány prom ny paradigmat a p evrat k postmodernismu, analýzou paralelism ve v d a um ní o osti na teorii p írodních jazyk a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém p ehledu nastín na hlediska este	•	•
•	ely 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.	·	,
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities sub	pject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that	is required in the	curriculum.
	The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.		
FI-HTE	History of Technology and Economics	ZK	2
The course introdu	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.	arison with the dev	elopment of
FI-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity		l
	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	ZK	2
FI-VEZ	This course is presented in Czech. economic-managerial course from a study abroad	Z	4
	ject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that	_	1
	The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.	•	
NI-AFP	Applied Functional Programming	KZ	5
	ented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional programming paradigms.		
the rise nowadays	and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, master	ing this paradigm b	becomes a
NI-DDM	necessary competence of a software engineer: the theory and especially the practice. Distributed Data Mining	KZ	4
	Distributed Data Willining state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands o		l
	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.		
NI-DSP	Database Systems in Practes	Z,ZK	4
	This course is presented in Czech.		
NI-DZO	Digital Image Processing	Z,ZK	4
· · · · · · · · · · · · · · · · · · ·	ents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical alg e an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is als		-
-	processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDR		
	abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray conv	· ·	_
interactive as-riç	gid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, ac	lding depth, alpha	matting.
NI-IAM	Internet and Multimedia	Z,ZK	4
	se is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acq	-	
•	signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical u nissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effe		
	ncy of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the	-	
	for audience.		
NI-LSM	Statistical Modelling Lab	KZ	5
	ented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is p		
available information	on and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms, and 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	-	properties.
NI-MOP	Modern Object-Oriented Programming in Pharo	KZ	4
_	pgramming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, where i		l
	plex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the skills	-	
of object systems	in modern pure chiect system Pharo (https://pharo.org). The course focuses on individual approach to students, their dayslopment or	node 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 ZK NI-MSI Mathematical Structures in Computer Science Z,ZK Mathematical semantics of programming languages. Data types as continuous lattices, Scott topology. Procedures as continuous mappings. The Scott model of lambda calculus. Introduction to category theory. NI-OLI Linux Drivers 7.7K 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 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 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. Reverse Engineering 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 Z.ZK 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 Z Physical Education 2 1

TVK1 Physical Education Ζ 1 **TVKLV** Physical Education Course Ζ 0 Z TVKZV Physical Education Course 0 TVV 7 0 Physical education TVV0 Physical education 0

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 2024-09-19, time 14:45.