Study plan

Name of study plan: Computer Engineering, Version for those who Enrolled in 2014, in Czech

Faculty/Institute/Others:
Department: Department of Digital Design
Branch of study guaranteed by the department: Computer engineering
Garantor of the study branch: doc. Ing. Hana Kubátová, CSc.
Program of study: Informatics (in Czech)
Type of study: Bachelor full-time
Required credits: 160
Elective courses credits: 20
Sum of credits in the plan: 180
Note on the plan: Tato verze studijního plánu je určena pro ročník, který byl přijat ke studiu v akademickém roce 2014/15 do prezenční formy studia bakalářského programu

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Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 122
The role of the block: PP

Code of the group: BI-PP.2014
Name of the group: Compulsory Courses of Bachelor Study Program Informatics, Presented in Czech, Version 2014
Requirement credits in the group: In this group you have to gain 122 credits
Requirement courses in the group: In this group you have to complete at least 21 courses
Credits in the group: 122
Note on the group: Povinný předmět BI-SI1 se studentům bez oboru nezapisuje automaticky. Zapíší si jej individuálně podle pokynů z katedry Softwarového inženýrství.

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BI-AAG	**Automata and Grammars** *Jan Holub, Jan Janoušek, Martin Svoboda, Radomír Polách, Ondřej Guth* ***Jan Janoušek*** *Jan Holub (Gar.)*	Z,ZK	6	2+2	Z	PP
BI-BAP	**Bachelor Thesis** ***Miroslav Balík*** *Miroslav Balík (Gar.)*	Z	14	0+0	L,Z	PP
BI-BEZ	**Security** *Róbert Lórencz, Jiří Buček, Tomáš Zahradnický, Filip Kodýtek, Jiří Dostál, Martin Jureček, Martin Jelínek Róbert Lórencz (Gar.)*	Z,ZK	6	2+2	L	PP
BI-CAO	**Digital and Analog Circuits** *Martin Novotný, Jan Kyncl, Martin Kohlík, Pavel Kubalík, Jaroslav Borecký, Martin Daňhel* ***Martin Kohlík*** *Martin Novotný (Gar.)*	Z,ZK	5	2+2	Z	PP
BI-DBS	**Database Systems** *Jiří Hunka, Michal Valenta, Karel Quast, Ivan Halaška, Cyril Černý, David Šenkýř, Oldřich Malec, Filip Glazar, Jan Blizničenko, ... Michal Valenta (Gar.)*	Z,ZK	6	2+2+1	Z,L	PP
BI-EPD.2	**Business Economics** ***David Buchtela***	KZ	5	2+2	Z,L	PP
BI-LIN	**Linear Algebra** *Luděk Kleprlík, Daniel Dombek* ***Daniel Dombek*** *Daniel Dombek (Gar.)*	Z,ZK	7	4+2	L	PP
BI-MLO	**Mathematical Logic** *Jan Starý, Kateřina Trlifajová* ***Jan Starý*** *Kateřina Trlifajová (Gar.)*	Z,ZK	5	2+1	Z	PP
BI-OSY	**Operating Systems** *Jan Trdlička, Ladislav Vagner, Michal Štepanovský, Jiří Kašpar, Michal Šoch Jan Trdlička (Gar.)*	Z,ZK	5	2+2	L	PP
BI-PSI	**Computer Networks** *Pavel Kubalík, Vladimír Smotlacha, Viktor Černý, Dana Čermáková, Ondřej Lauer, Yelena Trofimova Vladimír Smotlacha (Gar.)*	Z,ZK	5	2+2	L	PP
BI-PST	**Probability and Statistics** *Petr Novák, Daniel Vašata, Pavel Hrabák* ***Pavel Hrabák*** *Petr Novák (Gar.)*	Z,ZK	5	2+2	Z	PP

BI-PAI	**Law and Informatics** *Matěj Myška, Alžběta Krausová, Michal Matějka, Zdeněk Kučera Zdeněk Kučera (Gar.)*	ZK	3	2+0	Z	PP
BI-PA1	**Programming and Algorithmics 1** *Miroslav Balík, Ladislav Vagner, Josef Vogel* ***Ladislav Vagner*** *Ladislav Vagner (Gar.)*	Z,ZK	6	2+2+2	Z	PP
BI-PA2	**Programming and Algorithmics 2** *Ladislav Vagner, Josef Vogel, Jiří Chludil* ***Ladislav Vagner*** *Josef Vogel (Gar.)*	Z,ZK	7	2+3	L	PP
BI-PS1	**Programming in Shell 1** *Jan Trdlička, Jiří Kašpar, Michal Šoch, Viktor Černý, Dana Čermáková, Zdeněk Muzikář, Lukáš Bařinka* ***Dana Čermáková*** *Zdeněk Muzikář (Gar.)*	KZ	5	2+2	Z	PP
BI-PPR	**Project, Presentation and Rhetoric** *Ondřej Guth, Michal Valenta, Dana Vynikarová, Petra Pavlíčková* ***David Buchtela*** *Dana Vynikarová (Gar.)*	KZ	5	2+1	L,Z	PP
BI-SI1.2	**Software Engineering I** *Jiří Mlejnek, Petr Kroha, Zdeněk Rybola, Stanislav Kuznetsov, Marek Skotnica, Marek Suchánek* ***Jiří Mlejnek*** *Jiří Mlejnek (Gar.)*	Z,ZK	5	2+1	Z,L	PP
BI-SAP	**Computer Structure and Architecture** *Martin Novotný, Hana Kubátová, Petr Fišer* ***Hana Kubátová*** *Hana Kubátová (Gar.)*	Z,ZK	6	2+3	L	PP
BI-TED	**Electronic Documentation Design** *Ondřej Guth Jan Holub (Gar.)*	KZ	5	2+1	L	PP
BI-ZDM	**Elements of Discrete Mathematics** *Daniel Dombek, Petr Matyáš, Jiřina Scholtzová, Josef Kolář* ***Daniel Dombek*** *Josef Kolář (Gar.)*	Z,ZK	5	2+2	Z	PP
BI-ZMA	**Elements of Calculus** *Tomáš Kalvoda, Ivo Petr, Jitka Hrabáková* ***Jitka Hrabáková*** *Tomáš Kalvoda (Gar.)*	Z,ZK	6	3+2	Z	PP

Characteristics of the courses of this group of Study Plan: Code=BI-PP.2014 Name=Compulsory Courses of Bachelor Study Program Informatics, Presented in Czech, Version 2014

BI-AAG	Automata and Grammars	Z,ZK	6

Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite automata, regular expressions and regular grammars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between formal languages and automata. Knowledge acquired through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation, and design of digital circuits.

BI-BAP	Bachelor Thesis	Z	14
BI-BEZ	Security	Z,ZK	6

Students understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric cryptosystems, and hash functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptosystems for computer systems. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.

BI-CAO	Digital and Analog Circuits	Z,ZK	5

Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of transistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital modes of electronic devices.

BI-DBS	Database Systems	Z,ZK	6

Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases (including integrity constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the SQL language, as well as with its theoretical foundation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the fundamental concepts of transaction processing, controlling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to special ways of storing data in relational databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores.

BI-EPD.2	Business Economics	KZ	5

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

BI-LIN	Linear Algebra	Z,ZK	7

The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes.

BI-MLO	Mathematical Logic	Z,ZK	5

The course seminary is taught in Czech.

BI-OSY	Operating Systems	Z,ZK	5

Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-UOS module. They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions and principles and algorithms for critical sections, thread scheduling, resource allocation, deadlocks. They understand the techniques of the management of virtual memory, principles and architectures of disks and disk arrays, file systems, and peripheral devices. They gain basic knowledge necessary for developing system applications or for system administration. They are able to design and implement simple multithreaded applications.

BI-PSI	Computer Networks	Z,ZK	5

Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on the 2nd to 4th layer of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students will be able to write a simple network application and configure a simple network.

BI-PST	Probability and Statistics	Z,ZK	5

Students are introduced to elements of probability thinking, ability of the synthesis both prior and posterior information and use to work with random variables. They will be able to apply correctly basic models of the distribution of random variables and to solve applied probability problems in the area of informatics and computer science. Using statistical inference methods, they master methods of statistical inference to estimate unknown population parameters on the basis of sample. They get acquainted with basic methods of the determination of possible statistical dependence of two or more random variables.

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-PA1	Programming and Algorithmics 1	Z,ZK	6
Students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions, statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searching, sorting, and manipulating with linked lists.			
BI-PA2	Programming and Algorithmics 2	Z,ZK	7
Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, queue, enlargeable array, set, table). They can implement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in C++, students are introduced with all C++ features needed to achieve the main objective (operator overloading, templates).			
BI-PS1	Programming in Shell 1	KZ	5
Students become advanced and knowledgeable users of common UNIX-like operating systems. They understand the fundamental principles of the operating systems (file systems, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell, basic commands, and filters to process various text data.			
BI-PPR	Project, Presentation and Rhetoric	KZ	5
This course is presented in Czech.			
BI-SI1.2	Software Engineering I	Z,ZK	5
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	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.			
BI-TED	Electronic Documentation Design	KZ	5
Students are able to create electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to produce well-formed technical reports using configurable tools appropriate for ICT professionals. They learn the documentation of software projects, including basics of UML and documentation of source code.			
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5
Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula 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: 30
The role of the block: PO

Code of the group: BI-PO-PI.2
Name of the group: Compulsory Courses of Bachelor Branch Computer Engineering, Presented in Czech
Requirement credits in the group: In this group you have to gain 30 credits
Requirement courses in the group: In this group you have to complete at least 6 courses
Credits in the group: 30
Note on the group:

Code	**Name of the course / Name of the group of courses** ***(in case of groups of courses the list of codes of their members)*** *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BI-APS	**Architecture of Computer Systems**	Z,ZK	6	2+2	Z	PO
BI-GRA	**Graph Algorithms** *Jiří Chludil, Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	Z,ZK	5	2+2	L	PO
BI-JPO	**Computer Units** *Pavel Kubalík, Alois Pluháček* ***Alois Pluháček*** *Alois Pluháček (Gar.)*	Z,ZK	5	2+2	Z	PO
BI-PNO	**Practical Digital Design** *Martin Novotný* ***Martin Novotný*** *Martin Novotný (Gar.)*	KZ	5	2+2	Z	PO
BI-SRC	**Real-time systems** *Jaroslav Borecký, Hana Kubátová* ***Hana Kubátová*** *Hana Kubátová (Gar.)*	KZ	4	2+2	Z	PO
BI-VES	**Embedded systems** *Miroslav Skrbek* ***Miroslav Skrbek*** *Miroslav Skrbek (Gar.)*	Z,ZK	5	2+2	L	PO

Characteristics of the courses of this group of Study Plan: Code=BI-PO-PI.2 Name=Compulsory Courses of Bachelor Branch Computer Engineering, Presented in Czech

BI-APS	Architecture of Computer Systems	Z,ZK	6
Students understand architectures of uniprocessor computers at the level of machine instructions, with emphasis to instruction pipelining and memory hierarchy. They know the main concepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the techniques that today's processors use to increase the program execution speed. They have a basic knowledge allowing them to optimise their programs to fully exploit the processors. They get an idea about the trends in the area of computer architectures and how will they affect software. They also understand the architectures of vector processors, their use in todays microprocessors. They understand the principles of shared-memory multiprocessor system architectures and the issues of memory consistency.			
BI-GRA	Graph Algorithms	Z,ZK	5
Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the programming techniques presented in the BI-EFA module. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of complex problems, matching problems). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and NP-hardness.			
BI-JPO	Computer Units	Z,ZK	5
Students get knowledge of the internal structure and organization of computer or processor components and their interfacing with the environment, the organization of main memory and other internal memories (addressable, LIFO, FIFO, and CAM) and with design methodology for the control unit and controllers, basic principles of communication with peripheral devices and buses.			
BI-PNO	Practical Digital Design	KZ	5
Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools.			
BI-SRC	Real-time systems	KZ	4
Students obtain the basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla knowledges from lectures will be experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore the used design kits are the same as in BI-VES subject and FPGA.			
BI-VES	Embedded systems	Z,ZK	5
Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and mebedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.			

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
Name of the group: Compulsory Elective Economical Courses of Bachelor Program Informatics, presented in Czech
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** *Lucie Kábelová, Savina Finardi* ***Michal Valenta*** *Savina Finardi (Gar.)*	Z,ZK	4	2+2	Z	VE
BI-FTR	**Financial Markets** ***Pavla Vozárová***	Z,ZK	4	2+2	Z,L	VE
BI-MEK	**Macroeconomic Context of Domestic and World Economy** *Ivo Straka* ***Michal Valenta*** *Ivo Straka (Gar.)*	Z,ZK	4	2+2	Z	VE
BI-PRP	**Law and business** *Zdeněk Kučera Zdeněk Kučera (Gar.)*	Z,ZK	4	2+1	L	VE
BI-PRR	**Project management** *Martin Půlpitel* ***Martin Půlpitel*** *Martin Půlpitel (Gar.)*	KZ	4	2+2	Z	VE
BI-TIS	**Information Systems Design** *Pavel Náplava* ***Michal Valenta*** *Pavel Náplava (Gar.)*	Z,ZK	5	2+1	Z	VE
BI-FIP	**Accounting and Corporate Finance** ***David Buchtela***	Z,ZK	5	2+2	Z	VE
BI-MIK	**Fundamentals of Microeconomics** *Pavla Vozárová* ***Pavla Vozárová*** *Pavla Vozárová (Gar.)*	Z,ZK	4	2+2	Z	VE

Characteristics of the courses of this group of Study Plan: Code=BI-PV-EM Name=Compulsory Elective Economical Courses of Bachelor Program Informatics, presented in Czech

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 significant portion of GDP is redistributed. This course concerns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and shows how they affect taxation of income, consumption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well as information about important taxpayers´ formal duties towards public administration.			
BI-FTR	Financial Markets	Z,ZK	4
Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduates from technical schools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of financial markets. The Financial Markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.			

BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is presented in Czech.			
BI-PRP	Law and business	Z,ZK	4
This course is presented in Czech.			
BI-PRR	Project management	KZ	4
This course is presented in Czech.			
BI-TIS	Information Systems Design	Z,ZK	5
Students know various types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customers) with applications of existing technologies (databases, programming languages, GUI etc.).			
BI-FIP	Accounting and Corporate Finance	Z,ZK	5
The aim of the course is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the particular accounting operations, operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification of bookkeeping, description of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of management accounting are base of Business Inteligence moduls in Business information systems.			
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).			

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

Code of the group: BI-PP-TV
Name of the group: Compulsory Physical Education of Bachelor Program Informatics, Presented in Czech
Requirement credits in the group:
Requirement courses in the group: In this group you have to complete at least 2 courses
Credits in the group: 0
Note on the group:

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

Characteristics of the courses of this group of Study Plan: Code=BI-PP-TV Name=Compulsory Physical Education of Bachelor Program Informatics, Presented in Czech

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

Name of the block: Povinná zkouška z angličtiny
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 2 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 2
Note on the group: Ze skupiny je nutné absolvovat jeden ze dvou předmětů, představujících interní zkoušku z angličtiny. Předmět BI-ANG si zapisují studenti, kteří absolvovali přípravné kurzy z angličtiny a mají zápočet z předmětu BI-A2L. Předmět BI--ANG1 si zapisují studenti, kteří se na zkoušku připravovali samostatně. Tito studenti musí před vlastní zkouškou absolvovat zápočtovou písemku.

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BI-ANG1	**English Language Examination without Preparatory Courses** *Kateřina Valentová* ***Kateřina Valentová*** *Kateřina Valentová (Gar.)*	Z,ZK	2	0+0	L	PJ
BI-ANG	**English Language, Internal Certificate** *Kateřina Valentová* ***Kateřina Valentová*** *Kateřina Valentová (Gar.)*	ZK	2	0+0	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
BI-ANG	English Language, Internal Certificate	ZK	2

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
Name of the group: Compulsory Elective Humanity Courses of Bachelor Study Program Informatics, in Czech, Version 2012
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 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* ***Michal Valenta*** *Peter Zamarovský (Gar.)*	ZK	2	2+0	Z,L	VH
BI-HMI	**History of Mathematics and Informatics** *Alena Šolcová* ***Alena Šolcová*** *Alena Šolcová (Gar.)*	Z,ZK	3	2+1	L	VH
FI-HTE	**History of Technology and Economics** *Marcela Efmertová* ***Michal Valenta*** *Marcela Efmertová (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, Marek Procházka* ***Jan Fiala*** *Jan Fiala (Gar.)*	ZK	2	2+0	Z,L	VH
FI-KSA	**Cultural and Social Anthropology** *Alena Libánská, Tomáš Houdek* ***Tomáš Houdek*** *Alena Libánská (Gar.)*	ZK	2	2+0	L,Z	VH
FI-ULI	**Introduction to Linguistics for Computer** *Václav Cvrček* ***Michal Valenta*** *Václav Cvrček (Gar.)*	ZK	2	2+0	L	VH
FI-GNO	**Introduction to Gnoseology** *Ivo Janoušek* ***Michal Valenta*** *Ivo Janoušek (Gar.)*	ZK	2	2+0	L	VH

Characteristics of the courses of this group of Study Plan: Code=BI-PV-HU Name=Compulsory Elective Humanity Courses of Bachelor Study Program Informatics, in Czech, Version 2012

FI-FIL	Philosophy	ZK	2
see A0B16			
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 social history of the Czech lands and Czechoslovakia in comparison with the development of the European region 19 to 21 century .			
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities subject 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-MPL	Managerial Psychology	ZK	2
FI-KSA	Cultural and Social Anthropology	ZK	2
The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity of the world - examples from anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health, history, death, etc ...) will be shown. The course is an interesting alternative to other humanities, taught at FIT.			
FI-ULI	Introduction to Linguistics for Computer	ZK	2
This course is presented in Czech.			

FI-GNO	Introduction to Gnoseology	ZK	2

Předmět studenty uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi přírodními a humánními obory, vědou a uměním. Rozborem dějin modernismu a myšlenkových proudů 20. století jsou ukázány proměny paradigmat a převrat k postmodernismu, analýzou paralelismů ve vědě a umění odhaleny mechanismy tvůrčích procesů. V návaznosti na teorii přírodních jazyků a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém přehledu nastíněna hlediska estetického vnímání. Samostatnou kapitolou jsou modely spojitých přírodních soustav a systémů, v závěru přednášek je pozornost věnována filozofii vědy a otázkám udržitelného rozvoje. Předmět přednáší a garantuje Ing. Ivo Janoušek CSc.

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

Code of the group: BI-V
Name of the group: Elective Courses of Bachelor Program Informatics, Presented in Czech
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
Note on the group: Vedle zde uvedených předmětů si jako volitelný můžete zapsat kterýkoliv předmět, který se nabízí v rámci vašeho studijního programu a formy studia, který jste si nezapsal(a) jako povinný předmět programu, povinný předmět oboru nebo povinně volitelný předmět.

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** *Zdeněk Muzikář, Jan Žďárek **Zdeněk Muzikář** Zdeněk Muzikář (Gar.)*	Z,ZK	5	2+2	L	v
BI-ADW.1	**Windows Administration** *Jiří Kašpar, Miroslav Prágl **Miroslav Prágl** Miroslav Prágl (Gar.)*	Z,ZK	4	2+1	Z	v
BI-ADS	**Network Administration** *Jiří Smítka **Viktor Černý** Jiří Smítka (Gar.)*	Z,ZK	5	2+2	Z	v
BI-ALO	**Algebra and Logic** *Jan Starý **Jan Starý** Jan Starý (Gar.)*	Z,ZK	4	2+1	L	v
BI-A2L	**English Language for IT** ***Kateřina Valentová** Kateřina Valentová (Gar.)*	Z	2	0+2	L	v
BI-A0L	**English Language 0-2** ***Kateřina Valentová***	Z	0	0+2	L	v
BI-A1L	**English Language 1-2** ***Kateřina Valentová***	Z	0	0+2	L	v
BI-A2Z	**English Language 2-1** ***Kateřina Valentová** Kateřina Valentová (Gar.)*	Z	0	0+2	Z	v
BI-APJ	**Aplication Programming in Java** *Jiří Daněček **Michal Valenta** Jiří Daněček (Gar.)*	Z,ZK	4	2+2	Z	v
BI-APS	**Architecture of Computer Systems**	Z,ZK	6	2+2	Z	v
BIE-ZUM	**Artificial Intelligence Fundamentals** *Pavel Surynek Pavel Surynek (Gar.)*	Z,ZK	4	2+2	L	v
BI-DAN	**Taxes for non-Economists** *Lucie Kábelová, Savina Finardi **Michal Valenta** Savina Finardi (Gar.)*	Z,ZK	4	2+2	Z	v
BI-STO	**Storage and Filesystems** *Jiří Kašpar **Tomáš Zahradnický** Jiří Kašpar (Gar.)*	Z,ZK	4	2+2	L,Z	v
BI-BIG	**DB Technologies for Big Data** *Josef Gattermayer **Josef Gattermayer** Josef Gattermayer (Gar.)*	KZ	4	2+2	Z	v
BI-EFA	**Efficient Algorithms**	Z,ZK	5	2+2	Z	v
BI-EIA	**Efficient implementation of algorithms** *Ivan Šimeček **Ivan Šimeček** Ivan Šimeček (Gar.)*	Z,ZK	5	2+1	Z	v
BI-EP1	**Effective programming 1** *Martin Kačer **Martin Kačer** Martin Kačer (Gar.)*	Z	4	1+2	Z	v
BI-EP2	**Efficient Programming 2** *Martin Kačer **Martin Kačer** Martin Kačer (Gar.)*	KZ	4	2+2	L	v
BI-EMP	**Economics and Management Principles** *Petra Pavlíčková, Pavla Vozárová, David Buchtela **David Buchtela** David Buchtela (Gar.)*	KZ	4	2+2	Z,L	v
BI-EJA	**Enterprise Java** *Jiří Daněček **Zdeněk Troníček** Jiří Daněček (Gar.)*	Z,ZK	4	2+2	L	v
BI-EHA	**Ethical Hacking** *Jiří Dostál, Jakub Růžička, Jan Kuběna, Tomáš Stefan, Jakub Ács, Simona Buchovecká **Jakub Růžička** Jakub Růžička (Gar.)*	Z,ZK	5	2+2	L	v
BI-FTR	**Financial Markets** ***Pavla Vozárová***	Z,ZK	4	2+2	Z,L	v
MI-GLR	**Games and reinforcement learning** *Juan Pablo Maldonado Lopez **Pavel Kordík** Juan Pablo Maldonado Lopez (Gar.)*	Z,ZK	4	2+2	L	v

BI-GRA	**Graph Algorithms** *Jiří Chludil, Josef Kolář* ***Josef Kolář*** *Josef Kolář (Gar.)*	Z,ZK	5	2+2	L	v
BI-ARD	**Interactive applications on Arduino** *Robert Hülle, Jaroslav Borecký, Janusz Piotr Wijas, Ivo Háleček, David Labský, Jiří Cvrček, Jan Říha, Gabriela Hánová* ***Hana Kubátová*** *Ivo Háleček (Gar.)*	KZ	4	0+3	L	v
BI-PCS	**C# language and data access** ***Michal Valenta***	KZ	4	0+3	L	v
BI-SQL.1	**Language SQL, advanced** *Michal Valenta, Ivan Halaška* ***Michal Valenta*** *Michal Valenta (Gar.)*	KZ	4	0+3	L	v
BI-JPO	**Computer Units** *Pavel Kubalík, Alois Pluháček* ***Alois Pluháček*** *Alois Pluháček (Gar.)*	Z,ZK	5	2+2	Z	v
BI-MEK	**Macroeconomic Context of Domestic and World Economy** *Ivo Straka* ***Michal Valenta*** *Ivo Straka (Gar.)*	Z,ZK	4	2+2	Z	v
BI-MPP	**Methods of interfacing peripheral devices** *Miroslav Skrbek* ***Miroslav Skrbek*** *Miroslav Skrbek (Gar.)*	Z,ZK	4	2+2	Z	v
BI-MGA	**Multimedia and Graphics Applications** *Radek Richtr, Jiří Chludil, Jan Buriánek* ***Radek Richtr*** *Jan Buriánek (Gar.)*	Z,ZK	5	2+2	Z	v
BI-MMP	**Multimedia team project** *Zdeňka Čechová* ***Michal Valenta*** *Zdeňka Čechová (Gar.)*	KZ	4	0+3	L	v
BI-OOP	**Object-Oriented Programming** *Jan Blizničenko, Robert Pergl, Stéphane Ducasse, Filip Křikava* ***Robert Pergl*** *Robert Pergl (Gar.)*	Z,ZK	4	2+2	Z	v
BI-OMO	**Object Modelling** *Robert Pergl, Marek Suchánek, Nikola Rytířová* ***David Buchtela*** *Robert Pergl (Gar.)*	Z,ZK	5	2+2	Z	v
BI-PGR	**Computer Graphics** *Petr Felkel* ***Michal Valenta*** *Petr Felkel (Gar.)*	Z,ZK	6	2+2	Z	v
BI-PNO	**Practical Digital Design** *Martin Novotný* ***Martin Novotný*** *Martin Novotný (Gar.)*	KZ	5	2+2	Z	v
BI-PRP	**Law and business** *Zdeněk Kučera Zdeněk Kučera (Gar.)*	Z,ZK	4	2+1	L	v
BI-PJP	**Programming Languages and Compilers** *Jan Janoušek* ***Jan Janoušek*** *Jan Janoušek (Gar.)*	Z,ZK	5	2+1	L	v
BI-ACM	**Programming Practices 1** *Ondřej Suchý, Tomáš Valla* ***Ivan Šimeček*** *Ondřej Suchý (Gar.)*	KZ	5	0+4	L	v
BI-ACM2	**Programming Practices 2** *Ondřej Suchý, Tomáš Valla* ***Ivan Šimeček*** *Ondřej Suchý (Gar.)*	KZ	5	0+4	Z	v
BI-ACM3	**Programming Practices 3** *Ondřej Suchý, Tomáš Valla* ***Ivan Šimeček*** *Tomáš Valla (Gar.)*	KZ	5	0+4	L	v
BI-AND	**Programming for the Android Operating System** *Michal Havryluk, Ondřej Čermák, Vladislav Skoumal, Filip Havlíček* ***Michal Havryluk*** *Michal Havryluk (Gar.)*	Z,ZK	4	2+2	L	v
BI-PJV	**Programming in Java** *Miroslav Balík, Filip Glazar, Jan Blizničenko, Martin Podloucký, Vojtěch Knaisl* ***Miroslav Balík*** *Miroslav Balík (Gar.)*	Z,ZK	4	2+2	Z	v
BI-PJS	**JavaScript Programming** ***Michal Valenta***	KZ	4	0+3	L	v
BI-PJS.1	**JavaScript Programming** *Vojtěch Jirkovský, Martin Vondrák* ***Vojtěch Jirkovský*** *Vojtěch Jirkovský (Gar.)*	KZ	4	0+3	L	v
BI-PMA	**Programming in Mathematica** *Zdeněk Buk Zdeněk Buk (Gar.)*	Z,ZK	4	2+2	Z	v
BI-DNP	**Programming in .NET** ***Michal Valenta***	KZ	4	0+3	Z	v
BI-PYT	**Python Programming** *Jiří Znamenáček* ***Michal Valenta*** *Jiří Znamenáček (Gar.)*	Z,ZK	4	2+2	L	v
BI-PRR	**Project management** *Martin Půlpitel* ***Martin Půlpitel*** *Martin Půlpitel (Gar.)*	KZ	4	2+2	Z	v
BI-PKM	**Introduction to mathematics** ***Karel Klouda*** *Karel Klouda (Gar.)*	Z	4		Z	v
BI-SM	**Shell Minimum** ***Tomáš Zahradnický***	Z	2	0	Z	v
BI-ST1	**Network Technology 1** ***Alexandru Moucha*** *Alexandru Moucha (Gar.)*	Z	3	0+2	Z	v
BI-ST2	**Network Technology 2** ***Alexandru Moucha*** *Alexandru Moucha (Gar.)*	Z	3	0+3	L	v
BI-ST3	**Network Technology 3** ***Alexandru Moucha*** *Alexandru Moucha (Gar.)*	Z	3	0+2	Z	v
BI-ST4	**Network Technology 4** ***Alexandru Moucha*** *Alexandru Moucha (Gar.)*	Z	3	0+2	L	v
BI-SP1	**Team Software Project 1** *Jiří Hunka, Michal Valenta, Josef Vogel, Jiří Chludil, Jiří Mlejnek, Zdeněk Rybola, Jan Chrastina, Petr Špaček, Ivan Ryant, ...* ***Jan Baier*** *Jiří Mlejnek (Gar.)*	KZ	4	0+2	L	v
BI-SP2	**Team Software Project 2** ***Jiří Mlejnek***	KZ	6	0+2	Z	v

BI-SOJ	**Machine Oriented Languages** *Pavel Cimbál **Pavel Cimbál** Pavel Cimbál (Gar.)*	Z,ZK	4	2+2	L	v
BI-SEP	**World Economy and Business** *Tomáš Evan **Tomáš Evan** Tomáš Evan (Gar.)*	Z,ZK	4	2+2	L	v
BI-GIT	**Version control system GIT** *Petr Pulc, Robin Obůrka **Petr Pulc** Petr Pulc (Gar.)*	KZ	2	16+0	Z,L	v
BI-SRC	**Real-time systems** *Jaroslav Borecký, Hana Kubátová **Hana Kubátová** Hana Kubátová (Gar.)*	KZ	4	2+2	Z	v
BI-XML	**XML Technology** *Miloslav Nič, Jan Mokrý **Jan Mokrý** Miloslav Nič (Gar.)*	Z,ZK	4	2+2	L	v
BI-TS1	**Theoretical Seminar I** ***Jan Janoušek** Ondřej Suchý (Gar.)*	Z	4	0+2	Z	v
BI-TS2	**Theoretical Seminar II** ***Tomáš Valla** Ondřej Suchý (Gar.)*	Z	4	0+2	L	v
BI-TS3	**Theoretical Seminar III** ***Tomáš Valla** Ondřej Suchý (Gar.)*	Z	4	0+2	Z	v
BI-TS4	**Theoretical Seminar IV** *Ondřej Suchý, Tomáš Valla **Jan Janoušek** Tomáš Valla (Gar.)*	Z	4	0+2	L	v
BI-TIS	**Information Systems Design** *Pavel Náplava **Michal Valenta** Pavel Náplava (Gar.)*	Z,ZK	5	2+1	Z	v
BI-TUR	**User Interface Design** *Jan Schmidt **Tomáš Zahradnický** Jan Schmidt (Gar.)*	Z,ZK	4	2+2	L	v
BI-TEX	**TeX and Typography** *Petr Olšák **Petr Olšák** Petr Olšák (Gar.)*	Z,ZK	4	2+1	L	v
BI-EHD	**Introduction to European Economic History** *Tomáš Evan **Tomáš Evan** Tomáš Evan (Gar.)*	Z,ZK	3	2+1	Z	v
BI-ULI	**Introduction to Linux** *Dana Čermáková, Zdeněk Muzikář **Zdeněk Muzikář** Zdeněk Muzikář (Gar.)*	Z	2	0+2	Z	v
BI-VES	**Embedded systems** *Miroslav Skrbek **Miroslav Skrbek** Miroslav Skrbek (Gar.)*	Z,ZK	5	2+2	L	v
BI-VMM	**Selected Mathematical Methods** *Tomáš Kalvoda, František Štampach **František Štampach** Tomáš Kalvoda (Gar.)*	Z,ZK	4	2+2	L	v
BI-VWM	**Searching the Web and Multimedia Databases** *Tomáš Skopal, Jiří Novák **Michal Valenta** Tomáš Skopal (Gar.)*	Z,ZK	5	2+1	L	v
BI-VZD	**Data Mining** *Daniel Vašata, Karel Klouda **Daniel Vašata** Pavel Kordík (Gar.)*	Z,ZK	4	2+2	Z	v
BI-WT1	**Web Technology I**	Z,ZK	5	2+2	Z	v
BI-ZIVS	**Intelligent Embedded System Fundamentals** *Miroslav Skrbek **Miroslav Skrbek** Miroslav Skrbek (Gar.)*	KZ	4	1+3	Z	v
BI-MIK	**Fundamentals of Microeconomics** *Pavla Vozárová **Pavla Vozárová** Pavla Vozárová (Gar.)*	Z,ZK	4	2+2	Z	v
BI-ZPI	**Process engineering** *Robert Pergl **Robert Pergl** Robert Pergl (Gar.)*	KZ	4	1+2	L	v
BI-ZRS	**Basics of System Control** *Kateřina Hyniová **Kateřina Hyniová** Kateřina Hyniová (Gar.)*	Z,ZK	4	2+2	Z	v
BI-ZSI	**Introduction to Software Engineering** ***Jiří Mlejnek***	Z,ZK	5	2+1	Z	v
BI-ZUM	**Artificial Intelligence Fundamentals** *Pavel Surynek Pavel Surynek (Gar.)*	Z,ZK	4	2+2	L	v
BI-IOS	**Fundamentals of iOS Application Development for iPhone and iPad** *Martin Půlpitel, Dominik Veselý Martin Půlpitel (Gar.)*	KZ	4	0+2	Z	v
BI-ZWU	**Introduction to Web and User Interfaces** *Lukáš Bařinka, Jiří Pavelka, Jakub Klímek **Jiří Pavelka** Jakub Klímek (Gar.)*	Z,ZK	4	2+2	L	v
BI-3DT.1	**3D Printing** *Janusz Piotr Wijas, Jiří Hanuš, Marián Hlaváč, Tomáš Sýkora, Miroslav Hrončok, Jakub Průša, Tomáš Sýkora Miroslav Hrončok (Gar.)*	KZ	4	0+3	L	v

Characteristics of the courses of this group of Study Plan: Code=BI-V Name=Elective Courses of Bachelor Program Informatics, Presented in Czech

BI-APS	Architecture of Computer Systems	Z,ZK	6

Students understand architectures of uniprocessor computers at the level of machine instructions, with emphasis to instruction pipelining and memory hierarchy. They know the main concepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the techniques that today's processors use to increase the program execution speed. They have a basic knowledge allowing them to optimise their programs to fully exploit the processors. They get an idea about the trends in the area of computer architectures and how will they affect software. They also understand the architectures of vector processors, their use in todays microprocessors. They understand the principles of shared-memory multiprocessor system architectures and the issues of memory consistency.

BI-GRA	Graph Algorithms	Z,ZK	5

Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the programming techniques presented in the BI-EFA module. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of complex problems, matching problems). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and NP-hardness.

BI-JPO	Computer Units	Z,ZK	5

Students get knowledge of the internal structure and organization of computer or processor components and their interfacing with the environment, the organization of main memory and other internal memories (addressable, LIFO, FIFO, and CAM) and with design methodology for the control unit and controllers, basic principles of communication with peripheral devices and buses.

BI-PNO	Practical Digital Design	KZ	5
Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools.			
BI-SRC	Real-time systems	KZ	4
Students obtain the basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla knowledges from lectures will be experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore the used design kits are the same as in BI-VES subject and FPGA.			
BI-VES	Embedded systems	Z,ZK	5
Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and mebedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.			
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 significant portion of GDP is redistributed. This course concerns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and shows how they affect taxation of income, consumption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well as information about important taxpayers´ formal duties towards public administration.			
BI-FTR	Financial Markets	Z,ZK	4
Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduates from technical schools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of financial markets. The Financial Markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.			
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is presented in Czech.			
BI-PRP	Law and business	Z,ZK	4
This course is presented in Czech.			
BI-PRR	Project management	KZ	4
This course is presented in Czech.			
BI-TIS	Information Systems Design	Z,ZK	5
Students know various types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customers) with applications of existing technologies (databases, programming languages, GUI etc.).			
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-ADU.1	Unix Administration	Z,ZK	5
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).			
BI-ADW.1	Windows Administration	Z,ZK	4
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).			
BI-ADS	Network Administration	Z,ZK	5
Students acquire basic skills needed to administrate computer networks, networking technologies, services, and to ensure their security. They understand and are able practically use Ethernet technology, VLAN, authorisation, security architecture of computer networks, routing protocols and backbone routing mechanisms, directory and naming services and addressing, administration of networking equipment, secure client connections and secure data transfer, flow control mechanisms, and service availability monitoring.			
BI-ALO	Algebra and Logic	Z,ZK	4
The course extends and deepens the study of topics touched upon in the basic logic course. Using the unification algorithm and the resolution method we show the link to logic programming. Using set theory, arithmetics, and simple algebraic theories as examples, we present applications of mathematical logic in mathematics and computer science.			
BI-A2L	English Language for IT	Z	2
BI-A0L	English Language 0-2	Z	0
BI-A1L	English Language 1-2	Z	0
This course is opened in every summer semester. It is designed for students attending the bachelor degree programme, whose language knowledge and skills are on a pre-intermediate or intermediate level. Students enroll on this course predominantly in 1st, eventually 2nd or 3rd year of study. The output level of this course corresponds to Level B1 within the Common European Framework of Reference for Languages (CEFR). On completion of this course students are supposed to enroll on the course BI-A2Z in the following winter semester and then on BI-A2L in the following summer semester, followed by a compulsory examination on Level B2 within CEFR. To choose the right course level the student should consider how many semesters he/she needs to prepare for the examination properly. Course objective: The course focuses on practising basic grammar issues (morphology including the entire tense system; basic sentence constructions) and building communicative skills applied to both everyday and professional topics.			
BI-A2Z	English Language 2-1	Z	0
BI-APJ	Aplication Programming in Java	Z,ZK	4
This course is presented in Czech. Advanced technologies in Java.			
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the 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.			
BI-STO	Storage and Filesystems	Z,ZK	4
The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archiving, as so as storage scaling, load balancing and high availability.			
BI-BIG	DB Technologies for Big Data	KZ	4
This course is presented in Czech.			
BI-EFA	Efficient Algorithms	Z,ZK	5
Students get an overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dynamically changing data sets. Students are able to design and implement such algorithms, to use methods for analysing their computational and memory complexity. They understand the sorting algorithms with O(n.log n) time complexity, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the efficient dynamic data structures, such as hash tables, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dynamic programming.			
BI-EIA	Efficient implementation of algorithms	Z,ZK	5
Student learn to combine their SW skills (efficient algorithms) and HW knowledge (utilization of all available features of the particular processor and memory architecture). Students learn the basics of code tuning.			

BI-EP1	Effective programming 1	Z	4
The course is taught in Czech.			
BI-EP2	Efficient Programming 2	KZ	4
Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual problems are discussed, with the aim to choose the best one and avoid implementation errors.			
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.			
BI-EJA	Enterprise Java	Z,ZK	4
The course is on advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information systems which are connected to a database and are accessed through the web interface.			
BI-EHA	Ethical Hacking	Z,ZK	5
The course gives a professional and academic introduction to computer and information security using the ethical hacking approach, which enables improved defence thanks to adopting an attacker mindset when discovering vulnerabilities, hands-on experience with different attacks, facilitates linking theory and practice in significant areas of one's digital literacy, and can therefore be utilized by (future) security professionals, (informed) decision-makers, (savvy) users and developers alike. This course is taught in English.			
MI-GLR	Games and reinforcement learning	Z,ZK	4
The field of reinforcement learning is very hot recently, because of advances in deep learning, recurrent neural networks and general artificial intelligence. This course is intended to give you both theoretical and practical background so you can participate in related research activities. Presented in English.			
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 applications for modern programmable kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded systems, i.e. to see the results not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore is suitable even for Web and Software Engineering students.			
BI-PCS	C# language and data access	KZ	4
The C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Microsoft platform. The students will get to know objects used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current technologies such as LINQ - a set of features for querying and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQL (LINQ to Objects, LINQ to XML and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data using domain-specific objects (ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model, Storage Model and Mapping (XML description).			
BI-SQL.1	Language SQL, advanced	KZ	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-MPP	Methods of interfacing peripheral devices	Z,ZK	4
The course is focused on methods interfacing peripheral devices. Interfacing of real devices is included with stress to Universal serial bus (USB). The course includes either PC side or attached devices. Labs are practically oriented. Students gain gain experience in implementation relevant parts of USB device, Linux and Windows drivers, simple application development, and APIs of selected devices.			
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
Students gain practical experience with applications for 2D/3D graphics and DTP, as well as with basic methods of creating and editing computer graphics. Students learn theoretical fundamentals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphics and DTP.			
BI-MMP	Multimedia team project	KZ	4
This course is presented in Czech.			
BI-OOP	Object-Oriented Programming	Z,ZK	4
Students will learn the pure object-oriented paradigm, being a tool for effective implementation of quality, evolvable business software systems. They will understand fundamentals and they will learn how to apply it for solving typical implementation tasks. Students will learn syntax and programming fundamentals of a pure OO open-source technology Pharo. Various other modern programming languages utilising the OO concepts will be introduced in the subject, as well.			
BI-OMO	Object Modelling	Z,ZK	5
Students will practically master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Students will learn fundamentals of pure object-oriented paradigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to transform a conceptual model to object-oriented implementation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database. Students will learn to formulate rules and queries upon the object database. Studenti prakticky zvládnou konceptuální modelování struktur businessu, naučí se základy notace a metodiky OntoUML. Dále se studenti naučí základům čistého objektového paradigma, tj. pojmy objekt, metoda, zpráva, třída, instance třídy, skládání, dědění, kolekce. Studenti se naučí konceptuální model transformovat na implementační objektově-orientovaný model a základy čistě objektově-orientované implementace v jazyku Smalltalk s použitím čistě objektové databáze. Studenti se naučí formulovat pravidla a dotazy nad čistě objektovou databází.			
BI-PGR	Computer Graphics	Z,ZK	6
Students are able to program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textures imitating geometric details and materials (like wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in computer graphics, such as graphical pipeline, geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fundamentals for your professional development, e.g. for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfaces, and scientific visualisation.			
BI-PJP	Programming Languages and Compilers	Z,ZK	5
Students master basic methods of implementation of common high-level programming languages. They get experience with the design and implementation of individual compiler parts for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has a certain syntax into a target form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but extends to all other programs for parsing and processing text in a language defined by a LL(1) grammar.			
BI-ACM	Programming Practices 1	KZ	5
This course is presented in Czech.			
BI-ACM2	Programming Practices 2	KZ	5
This course is presented in Czech.			

BI-ACM3	Programming Practices 3	KZ	5
This course is presented in Czech.			
BI-AND	Programming for the Android Operating System	Z,ZK	4
This course is presented in Czech.			
BI-PJV	Programming in Java	Z,ZK	4
The course is taught in Czech.			
BI-PJS	JavaScript Programming	KZ	4
This course is presented in Czech.			
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 in Javascript. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 4th semester of study.			
BI-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 programming, rule-based programming, etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.			
BI-DNP	Programming in .NET	KZ	4
The goal of the course is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental construction, types of variables, operators, 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. Debugging and exception processing, as well as work with files are emphasized.			
BI-PYT	Python Programming	Z,ZK	4
The course is taught in Czech.			
BI-PKM	Introduction to mathematics	Z	4
This course is presented in Czech.			
BI-SM	Shell Minimum	Z	2
This module covers selected elementary programming skills in Bourne Again shell.			
BI-ST1	Network Technology 1	Z	3
The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredited under the Cisco Netacad - CCNA1 - R&S Introduction to Networks.			
BI-ST2	Network Technology 2	Z	3
This course is presented in Czech.			
BI-ST3	Network Technology 3	Z	3
Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented 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	Z	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-SP1	Team Software Project 1	KZ	4
Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the BEI-SI1 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-SP2	Team Software Project 2	KZ	6
Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first 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-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-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-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 particular system even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git server administrators.			
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.			
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 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	Z	4
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	Z	4
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-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 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-TUR	User Interface Design	Z,ZK	4
Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where software and other products do not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of the methods that bring users into the development process to ensure optimal communication with a user.			
BI-TEX	TeX and Typography	Z,ZK	4
This course is presented in Czech.			
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-ULI	Introduction to Linux	Z	2
Students become familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become 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-VMM	Selected Mathematical Methods	Z,ZK	4
We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and 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-VWM	Searching the Web and Multimedia Databases	Z,ZK	5
Students gain basic knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogenous data repository. In particular, the students shall understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they shall be aware of similarity retrieval methods focused on heterogenous multimedia databases (unstructured data collections, respectively).			
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-WT1	Web Technology I	Z,ZK	5
Students learn the presentation side of web technologies. They understand the principles of proper (X)HTML, CSS, XML, and JavaScript design. They are able to use the multimedia elements that can be used on the Web, such as raster graphics, video and 3D graphics. They gain a professional-level ability to design and implement the complete presentation side of a web application.			
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of the course is to teach students modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion control, sensor reading, application interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get practical experience with these technologies.			
BI-ZPI	Process engineering	KZ	4
Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of 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	4
Optional subject Basics of System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to the field of automatic control will be definitely evaluated by our graduates in the industrial practice. 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. We will teach you description methods of system models, basic linear dynamic systems analysis and design verification, simple PID feedback, PSD and fuzzy controllers. This is a survey course in which 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. The themes of lectures are accompanied by a number of useful examples and practical industrial implementations.			
BI-ZSI	Introduction to Software Engineering	Z,ZK	5
Students learn to understand formalized descriptions of analytic and design models in UML. To a limited extent, they take part in creating such models in seminars, where they perform small team projects. Students should be able to discuss the models with other members of a software development team. This experience and skills enable the students to participate in such teams as members.			
BI-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical tasks from 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.			
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
This course is presented in Czech.			
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
This course is presented in Czech.			
BI-3DT.1	3D Printing	KZ	4

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** *Ondřej Suchý, Tomáš Valla **Josef Kolář** Ondřej Suchý (Gar.)*	Z,ZK	5	2+2	L	V

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

BI-AG2	Algorithms and Graphs 2	Z,ZK	5

This course, presented in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory course BI-AG1. It further delves into advances data structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English version of the course see BIE-AG2.

List of courses of this pass:

Code	Name of the course	Completion	Credits
BI-3DT.1	3D Printing	KZ	4
BI-A0L	English Language 0-2	Z	0
BI-A1L	English Language 1-2	Z	0
This course is opened in every summer semester. It is designed for students attending the bachelor degree programme, whose language knowledge and skills are on a pre-intermediate or intermediate level. Students enroll on this course predominantly in 1st, eventually 2nd or 3rd year of study. The output level of this course corresponds to Level B1 within the Common European Framework of Reference for Languages (CEFR). On completion of this course students are supposed to enroll on the course BI-A2Z in the following winter semester and then on BI-A2L in the following summer semester, followed by a compulsory examination on Level B2 within CEFR. To choose the right course level the student should consider how many semesters he/she needs to prepare for the examination properly. Course objective: The course focuses on practising basic grammar issues (morphology including the entire tense system; basic sentence constructions) and building communicative skills applied to both everyday and professional topics.			
BI-A2L	English Language for IT	Z	2
BI-A2Z	English Language 2-1	Z	0
BI-AAG	Automata and Grammars	Z,ZK	6
Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite automata, regular expressions and regular grammars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between formal languages and automata. Knowledge acquired through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation, and design of digital circuits.			
BI-ACM	Programming Practices 1 This course is presented in Czech.	KZ	5
BI-ACM2	Programming Practices 2 This course is presented in Czech.	KZ	5
BI-ACM3	Programming Practices 3 This course is presented in Czech.	KZ	5
BI-ADS	Network Administration	Z,ZK	5
Students acquire basic skills needed to administrate computer networks, networking technologies, services, and to ensure their security. They understand and are able practically use Ethernet technology, VLAN, authorisation, security architecture of computer networks, routing protocols and backbone routing mechanisms, directory and naming services and addressing, administration of networking equipment, secure client connections and secure data transfer, flow control mechanisms, and service availability monitoring.			
BI-ADU.1	Unix Administration This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	5
BI-ADW.1	Windows Administration This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	Z,ZK	4
BI-AG2	Algorithms and Graphs 2	Z,ZK	5
This course, presented in Czech, introduces basic algorithms and concepts of graph theory as a follow=up on the introduction given in the compulsory course BI-AG1. It further delves into advances data structures and amortized complexity analysis. It also includes a very light introduction to approximation algorithms. For English version of the course see BIE-AG2.			
BI-ALO	Algebra and Logic	Z,ZK	4
The course extends and deepens the study of topics touched upon in the basic logic course. Using the unification algorithm and the resolution method we show the link to logic programming. Using set theory, arithmetics, and simple algebraic theories as examples, we present applications of mathematical logic in mathematics and computer science.			
BI-AND	Programming for the Android Operating System This course is presented in Czech.	Z,ZK	4
BI-ANG	English Language, Internal Certificate	ZK	2
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2

BI-APJ	Aplication Programming in Java	Z,ZK	4
	This course is presented in Czech. Advanced technologies in Java.		
BI-APS	Architecture of Computer Systems	Z,ZK	6
	Students understand architectures of uniprocessor computers at the level of machine instructions, with emphasis to instruction pipelining and memory hierarchy. They know the main concepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the techniques that today's processors use to increase the program execution speed. They have a basic knowledge allowing them to optimise their programs to fully exploit the processors. They get an idea about the trends in the area of computer architectures and how will they affect software. They also understand the architectures of vector processors, their use in todays microprocessors. They understand the principles of shared-memory multiprocessor system architectures and the issues of memory consistency.		
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 applications for modern programmable kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded systems, i.e. to see the results not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore is suitable even for Web and Software Engineering students.		
BI-BAP	Bachelor Thesis	Z	14
BI-BEZ	Security	Z,ZK	6
	Students understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric cryptosystems, and hash functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptosystems for computer systems. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.		
BI-BIG	DB Technologies for Big Data	KZ	4
	This course is presented in Czech.		
BI-CAO	Digital and Analog Circuits	Z,ZK	5
	Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of transistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital modes of electronic devices.		
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 significant portion of GDP is redistributed. This course concerns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and shows how they affect taxation of income, consumption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well as information about important taxpayers´ formal duties towards public administration.		
BI-DBS	Database Systems	Z,ZK	6
	Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases (including integrity constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the SQL language, as well as with its theoretical foundation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the fundamental concepts of transaction processing, controlling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to special ways of storing data in relational databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores.		
BI-DNP	Programming in .NET	KZ	4
	The goal of the course is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental construction, types of variables, operators, 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. Debugging and exception processing, as well as work with files are emphasized.		
BI-EFA	Efficient Algorithms	Z,ZK	5
	Students get an overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dynamically changing data sets. Students are able to design and implement such algorithms, to use methods for analysing their computational and memory complexity. They understand the sorting algorithms with O(n.log n) time complexity, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the efficient dynamic data structures, such as hash tables, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dynamic programming.		
BI-EHA	Ethical Hacking	Z,ZK	5
	The course gives a professional and academic introduction to computer and information security using the ethical hacking approach, which enables improved defence thanks to adopting an attacker mindset when discovering vulnerabilities, hands-on experience with different attacks, facilitates linking theory and practice in significant areas of one's digital literacy, and can therefore be utilized by (future) security professionals, (informed) decision-makers, (savvy) users and developers alike. This course is taught in English.		
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-EIA	Efficient implementation of algorithms	Z,ZK	5
	Student learn to combine their SW skills (efficient algorithms) and HW knowledge (utilization of all available features of the particular processor and memory architecture). Students learn the basics of code tuning.		
BI-EJA	Enterprise Java	Z,ZK	4
	The course is on advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information systems which are connected to a database and are accessed through the web interface.		
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.		
BI-EP1	Effective programming 1	Z	4
	The course is taught in Czech.		
BI-EP2	Efficient Programming 2	KZ	4
	Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual problems are discussed, with the aim to choose the best one and avoid implementation errors.		
BI-EPD.2	Business Economics	KZ	5
	This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with fields: enterprise foundation, enterprise putting into state economic environment (CR), management of property and capital structure, business transaction records keeping during an accounting period, a relation between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination.		

BI-FIP	Accounting and Corporate Finance	Z,ZK	5
The aim of the course is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the particular accounting operations, operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification of bookkeeping, description of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of management accounting are base of Business Inteligence moduls in Business information systems.			
BI-FTR	Financial Markets	Z,ZK	4
Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduates from technical schools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of financial markets. The Financial Markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.			
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 particular system even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git server administrators.			
BI-GRA	Graph Algorithms	Z,ZK	5
Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the programming techniques presented in the BI-EFA module. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of complex problems, matching problems). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and NP-hardness.			
BI-HMI	History of Mathematics and Informatics	Z,ZK	3
This course is presented in Czech.			
BI-IOS	Fundamentals of iOS Application Development for iPhone and iPad	KZ	4
This course is presented in Czech.			
BI-JPO	Computer Units	Z,ZK	5
Students get knowledge of the internal structure and organization of computer or processor components and their interfacing with the environment, the organization of main memory and other internal memories (addressable, LIFO, FIFO, and CAM) and with design methodology for the control unit and controllers, basic principles of communication with peripheral devices and buses.			
BI-LIN	Linear Algebra	Z,ZK	7
The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes.			
BI-MEK	Macroeconomic Context of Domestic and World Economy	Z,ZK	4
This course is presented in Czech.			
BI-MGA	Multimedia and Graphics Applications	Z,ZK	5
Students gain practical experience with applications for 2D/3D graphics and DTP, as well as with basic methods of creating and editing computer graphics. Students learn theoretical fundamentals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphics and DTP.			
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-MLO	Mathematical Logic	Z,ZK	5
The course seminary is taught in Czech.			
BI-MMP	Multimedia team project	KZ	4
This course is presented in Czech.			
BI-MPP	Methods of interfacing peripheral devices	Z,ZK	4
The course is focused on methods interfacing peripheral devices. Interfacing of real devices is included with stress to Universal serial bus (USB). The course includes either PC side or attached devices. Labs are practically oriented. Students gain gain experience in implementation relevant parts of USB device, Linux and Windows drivers, simple application development, and APIs of selected devices.			
BI-OMO	Object Modelling	Z,ZK	5
Students will practically master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Students will learn fundamentals of pure object-oriented paradigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to transform a conceptual model to object-oriented implementation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database. Students will learn to formulate rules and queries upon the object database. Studenti prakticky zvládnou konceptuální modelování struktur businessu, naučí se základy notace a metodiky OntoUML. Dále se studenti naučí základům čistého objektového paradigma, tj. pojmy objekt, metoda, zpráva, třída, instance třídy, skládání, dědění, kolekce. Studenti se naučí konceptuální model transformovat na implementační objektově-orientovaný model a základy čistě objektově-orientované implementace v jazyku Smalltalk s použitím čistě objektové databáze. Studenti se naučí formulovat pravidla a dotazy nad čistě objektovou databází.			
BI-OOP	Object-Oriented Programming	Z,ZK	4
Students will learn the pure object-oriented paradigm, being a tool for effective implementation of quality, evolvable business software systems. They will understand fundamentals and they will learn how to apply it for solving typical implementation tasks. Students will learn syntax and programming fundamentals of a pure OO open-source technology Pharo. Various other modern programming languages utilising the OO concepts will be introduced in the subject, as well.			
BI-OSY	Operating Systems	Z,ZK	5
Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-UOS module. They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions and principles and algorithms for critical sections, thread scheduling, resource allocation, deadlocks. They understand the techniques of the management of virtual memory, principles and architectures of disks and disk arrays, file systems, and peripheral devices. They gain basic knowledge necessary for developing system applications or for system administration. They are able to design and implement simple multithreaded applications.			
BI-PA1	Programming and Algorithmics 1	Z,ZK	6
Students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions, statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searching, sorting, and manipulating with linked lists.			
BI-PA2	Programming and Algorithmics 2	Z,ZK	7
Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, queue, enlargeable array, set, table). They can implement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in C++, students are introduced with all C++ features needed to achieve the main objective (operator overloading, templates).			
BI-PAI	Law and Informatics	ZK	3
This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).			

BI-PCS	C# language and data access	KZ	4
The C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Microsoft platform. The students will get to know objects used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current technologies such as LINQ - a set of features for querying and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQL (LINQ to Objects, LINQ to XML and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data using domain-specific objects (ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model, Storage Model and Mapping (XML description).			
BI-PGR	Computer Graphics	Z,ZK	6
Students are able to program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textures imitating geometric details and materials (like wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in computer graphics, such as graphical pipeline, geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fundamentals for your professional development, e.g. for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfaces, and scientific visualisation.			
BI-PJP	Programming Languages and Compilers	Z,ZK	5
Students master basic methods of implementation of common high-level programming languages. They get experience with the design and implementation of individual compiler parts for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has a certain syntax into a target form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but extends to all other programs for parsing and processing text in a language defined by a LL(1) grammar.			
BI-PJS	JavaScript Programming	KZ	4
This course is presented in Czech.			
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 in Javascript. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 4th semester of study.			
BI-PJV	Programming in Java	Z,ZK	4
The course is taught in Czech.			
BI-PKM	Introduction to mathematics	Z	4
This course is presented in Czech.			
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 programming, rule-based programming, etc.), how to create dynamic interactive applications and visualisations, data processing and presentations.			
BI-PNO	Practical Digital Design	KZ	5
Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools.			
BI-PPR	Project, Presentation and Rhetoric	KZ	5
This course is presented in Czech.			
BI-PRP	Law and business	Z,ZK	4
This course is presented in Czech.			
BI-PRR	Project management	KZ	4
This course is presented in Czech.			
BI-PS1	Programming in Shell 1	KZ	5
Students become advanced and knowledgeable users of common UNIX-like operating systems. They understand the fundamental principles of the operating systems (file systems, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell, basic commands, and filters to process various text data.			
BI-PSI	Computer Networks	Z,ZK	5
Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on the 2nd to 4th layer of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students will be able to write a simple network application and configure a simple network.			
BI-PST	Probability and Statistics	Z,ZK	5
Students are introduced to elements of probability thinking, ability of the synthesis both prior and posterior information and use to work with random variables. They will be able to apply correctly basic models of the distribution of random variables and to solve applied probability problems in the area of informatics and computer science. Using statistical inference methods, they master methods of statistical inference to estimate unknown population parameters on the basis of sample. They get acquainted with basic methods of the determination of possible statistical dependence of two or more random variables.			
BI-PYT	Python Programming	Z,ZK	4
The course is taught in Czech.			
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.			
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	Z,ZK	5
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-SM	Shell Minimum	Z	2
This module covers selected elementary programming skills in Bourne Again shell.			

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	KZ	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-SI1 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-SP2	Team Software Project 2	KZ	6
Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first 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-SQL.1	Language SQL, advanced	KZ	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	KZ	4
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-ST1	Network Technology 1	Z	3
The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredited under the Cisco Netacad - CCNA1 - R&S Introduction to Networks.			
BI-ST2	Network Technology 2	Z	3
This course is presented in Czech.			
BI-ST3	Network Technology 3	Z	3
Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented 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	Z	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	Z,ZK	4
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-TED	Electronic Documentation Design	KZ	5
Students are able to create electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to produce well-formed technical reports using configurable tools appropriate for ICT professionals. They learn the documentation of software projects, including basics of UML and documentation of source code.			
BI-TEX	TeX and Typography	Z,ZK	4
This course is presented in Czech.			
BI-TIS	Information Systems Design	Z,ZK	5
Students know various types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customers) with applications of existing technologies (databases, programming languages, GUI etc.).			
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 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	Z	4
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	Z	4
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-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 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-TUR	User Interface Design	Z,ZK	4
Students have a basic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where software and other products do not communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of the methods that bring users into the development process to ensure optimal communication with a user.			

BI-ULI	Introduction to Linux	Z	2
Students become familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become 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-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 mebedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.			
BI-VMM	Selected Mathematical Methods	Z,ZK	4
We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and 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-VWM	Searching the Web and Multimedia Databases	Z,ZK	5
Students gain basic knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogenous data repository. In particular, the students shall understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they shall be aware of similarity retrieval methods focused on heterogenous multimedia databases (unstructured data collections, respectively).			
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-WT1	Web Technology I	Z,ZK	5
Students learn the presentation side of web technologies. They understand the principles of proper (X)HTML, CSS, XML, and JavaScript design. They are able to use the multimedia elements that can be used on the Web, such as raster graphics, video and 3D graphics. They gain a professional-level ability to design and implement the complete presentation side of a web application.			
BI-XML	XML Technology	Z,ZK	4
Students learn to make and validate XML documents (XML Schema, Relax, Schematron) and learn standard methods of their processing (SAX, DOM). An emphasis will be given to language XPath which enables addressing of parts of XML documents and its usage in different XML technologies. Students will also learn basics of XSLT programming. XSLT and XPath programming will be based on version 2.0. Students will gain a broad overview of XML technologies.			
BI-ZDM	Elements of Discrete Mathematics	Z,ZK	5
Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, tools for solving recurrent equations, and basics of graph theory.			
BI-ZIVS	Intelligent Embedded System Fundamentals	KZ	4
Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of the course is to teach students modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion control, sensor reading, application interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get practical experience with these technologies.			
BI-ZMA	Elements of Calculus	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.			
BI-ZPI	Process engineering	KZ	4
Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of 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	4
Optional subject Basics of System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to the field of automatic control will be definitely evaluated by our graduates in the industrial practice. 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. We will teach you description methods of system models, basic linear dynamic systems analysis and design verification, simple PID feedback, PSD and fuzzy controllers. This is a survey course in which 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. The themes of lectures are accompanied by a number of useful examples and practical industrial implementations.			
BI-ZSI	Introduction to Software Engineering	Z,ZK	5
Students learn to understand formalized descriptions of analytic and design models in UML. To a limited extent, they take part in creating such models in seminars, where they perform small team projects. Students should be able to discuss the models with other members of a software development team. This experience and skills enable the students to participate in such teams as members.			
BI-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical tasks from 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.			
BI-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
This course is presented in Czech.			
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the 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.			
FI-FIL	Philosophy	ZK	2
see A0B16			

FI-GNO	Introduction to Gnoseology	ZK	2
Předmět studenty uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi přírodními a humánními obory, vědou a uměním. Rozborem dějin modernismu a myšlenkových proudů 20. století jsou ukázány proměny paradigmat a převrat k postmodernismu, analýzou paralelismů ve vědě a umění odhaleny mechanismy tvůrčích procesů. V návaznosti na teorii přírodních jazyků a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém přehledu nastíněna hlediska estetického vnímání. Samostatnou kapitolou jsou modely spojitých přírodních soustav a systémů, v závěru přednášek je pozornost věnována filozofii vědy a otázkám udržitelného rozvoje. Předmět přednáší a garantuje Ing. Ivo Janoušek CSc.			
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module 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 introduces the scientific disciplines of history and technology , economic and social history of the Czech lands and Czechoslovakia in comparison with the development of the European region 19 to 21 century .			
FI-KSA	Cultural and Social Anthropology	ZK	2
The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity of the world - examples from anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health, history, death, etc ...) will be 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
This course is presented in Czech.			
MI-GLR	Games and reinforcement learning	Z,ZK	4
The field of reinforcement learning is very hot recently, because of advances in deep learning, recurrent neural networks and general artificial intelligence. This course is intended to give you both theoretical and practical background so you can participate in related research activities. Presented in English.			
TV1	Physical Education	Z	0
TV2	Physical Education	Z	0
TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0
TVV	Physical education	Z	0
TVV0	Physical education	Z	0

For updated information see http://bilakniha.cvut.cz/en/FF.html
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