

Studijní plán

Název plánu: Bc. Branch Computer Science, Presented in English, Version 2015, 2016, 2017 and 2018

Součást ČVUT (fakulta/ústav/další): Fakulta informačních technologií

Katedra: katedra teoretické informatiky

Obor studia, garantovaný katedrou: Computer Science (Bachelor, in English)

Garant oboru studia.: doc. Ing. Jan Janoušek, Ph.D.

Program studia: Informatics (in English)

Typ studia: Bakalářské prezenční

Předepsané kredity: 156

Kredity z volitelných předmětů: 24

Kredity v rámci plánu celkem: 180

Poznámka k plánu: This version of the study plan is intended for students, who enrolled to study in the academic year 2015/16 in the part-time form of study Bachelor's program

Název bloku: Povinné předměty programu

Minimální počet kreditů bloku: 119

Role bloku: PP

Kód skupiny: BIE-PP.2015

Název skupiny: Compulsory Courses od Study Program Infomatics, Presented in English, Version 2015

Podmínka kredity skupiny: V této skupině musíte získat 119 kreditů

Podmínka předměty skupiny: V této skupině musíte absolvovat alespoň 21 předmětů

Kredity skupiny: 119

Poznámka ke skupině:

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejích členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-AG1	Algorithms and Graphs 1 Jiřina Scholtzová, Pavel Tvrdlík Pavel Tvrdlík Pavel Tvrdlík (Gar.)	Z,ZK	6	2P+2C	Z	PP
BIE-AAG	Automata and Grammars Jan Holub, Jan Trávníček, Jan Janoušek, Martin Svoboda, Ondřej Guth Radomír Polách Jan Holub (Gar.)	Z,ZK	6	2P+2C	Z	PP
BIE-BPR	Bachelor Project Dana Vynikarová	Z	2		Z	PP
BIE-BAP	Bachelor Thesis Miroslav Balík	Z	14		L,Z	PP
BIE-PSI	Computer Networks Vladimír Smotlacha, Yelena Trofimova Alexandru Moucha Vladimír Smotlacha (Gar.)	Z,ZK	5	2P+1R+1C	L	PP
BIE-SAP	Computer Structures and Architectures Pavel Kubalík, Jiří Douša, Petr Fišer Petr Fišer Jiří Douša (Gar.)	Z,ZK	6	2P+1R+2C	L	PP
BIE-DBS	Database Systems Yelena Trofimova, Josef Pavlíček Miroslav Balík Josef Pavlíček (Gar.)	Z,ZK	6	3L	Z,L	PP
BIE-CAO	Digital and Analog Circuits Kateřina Hyniová Miroslav Balík Kateřina Hyniová (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-DPR	Documentation, Presentation, Rhetorics Ondřej Guth, Dana Vynikarová, Petra Pavličková Ondřej Guth Dana Vynikarová (Gar.)	KZ	4		L	PP
BIE-ZMA	Elements of Calculus Antonella Marchesiello Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	3P+2C	Z	PP
BIE-ZDM	Elements of Discrete Mathematics Josef Kolář Miroslav Balík Josef Kolář (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-PAI	Law and Informatics Alžběta Krausová, Martin Myška, Michal Matějka, Zdeněk Kučera Miroslav Balík Zdeněk Kučera (Gar.)	ZK	3	2P	Z	PP
BIE-LIN	Linear Algebra Pavel Hrabák Karel Klouda (Gar.)	Z,ZK	7	4P+2C	L	PP
BIE-MLO	Mathematical Logic Kateřina Trlifajová, Jitka Rybníčková Kateřina Trlifajová (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-OSY	Operating Systems Pavel Tvrdlík, Michal Štepanovský Pavel Tvrdlík (Gar.)	Z,ZK	5	2P+1R+1L	L	PP

BIE-PST	Probability and Statistics <i>Petr Novák Petr Novák (Gar.)</i>	Z,ZK	5	2P+1R+1C	Z	PP
BIE-PA1	Programming and Algorithmics 1 <i>Jan Trávníček, Ladislav Vagner, Miroslav Balík, Josef Vogel Jan Trávníček Ladislav Vagner (Gar.)</i>	Z,ZK	6	2P+2R+2C	Z	PP
BIE-PA2	Programming and Algorithmics 2 <i>Jan Trávníček, Ladislav Vagner, Josef Vogel Jan Trávníček Ladislav Vagner (Gar.)</i>	Z,ZK	7	2P+1R+1C	L	PP
BIE-PS1	Programming in Shell 1 <i>Jan Trdlička Jan Zďárek Jan Trdlička (Gar.)</i>	KZ	5	2P+2C	Z	PP
BIE-BEZ	Security <i>Róbert Lórencz, Jiří Buček Róbert Lórencz (Gar.)</i>	Z,ZK	6	2P+1R+1C	L	PP
BIE-SI1.2	Software Engineering I <i>Zdeněk Rybala Zdeněk Rybala Zdeněk Rybala (Gar.)</i>	Z,ZK	5	2P+1C	Z,L	PP

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-PP.2015 Název=Compulsory Courses od Study Program Infomatics, Presented in English, Version 2015

BIE-AG1	Algorithms and Graphs 1 The course covers the basics from the efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing curriculum. It is interlinked with the concurrent BIE-AAG and BIE-ZDM courses in which the students gain the basic skills and knowledge needed for time and space complexity of algorithms and learn to handle practically the asymptotic mathematics.	Z,ZK	6			
BIE-AAG	Automata and Grammars 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.	Z,ZK	6			
BIE-BPR	Bachelor Project	Z	2			
BIE-BAP	Bachelor Thesis	Z	14			
BIE-PSI	Computer Networks Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing primarily 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.	Z,ZK	5			
BIE-SAP	Computer Structures and Architectures 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.	Z,ZK	6			
BIE-DBS	Database Systems Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases (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 module does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores.	Z,ZK	6			
BIE-CAO	Digital and Analog Circuits Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of 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.	Z,ZK	5			
BIE-DPR	Documentation, Presentation, Rhetorics	KZ	4			
BIE-ZMA	Elements of Calculus Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions.	Z,ZK	6			
BIE-ZDM	Elements of Discrete Mathematics Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, and tools for solving recurrent equations.	Z,ZK	5			
BIE-PAI	Law and Informatics Students have knowledge of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an appropriate contract-based copyright protection and do research and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate actively in the proceedings to register intangible property. They have a good overview of the Czech Republic legislation as well as the EU legislation.	ZK	3			
BIE-LIN	Linear Algebra 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 polynomials 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 error-detecting and error-correcting codes.	Z,ZK	7			
BIE-MLO	Mathematical Logic An introduction to predicate logic, the standard language and deductive system of mathematics and computer science.	Z,ZK	5			
BIE-OSY	Operating Systems 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 managing 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.	Z,ZK	5			
BIE-PST	Probability and Statistics 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.	Z,ZK	5			

BIE-PA1	Programming and Algorithmics 1	Z,ZK	6
Students learn to construct 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 the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, and manipulating with linked lists.			
BIE-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 to all C++ features needed to achieve the main objective (e.g., operator overloading, templates).			
BIE-PS1	Programming in Shell 1	KZ	5
Students become advanced and knowledgeable users of common operating system Linux or other UNIX-based operating system. 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.			
BIE-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 properly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal aspects of information security, security standards, social engineering, and basic principles of security management.			
BIE-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. Students will get acquainted with CASE tools using a visual modeling language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis, design, architecture, validation, verification, and testing processes. The knowledge obtained in the lectures is practiced on a team project. If enrolled for the BIE-SP1 course running in parallel (only summer semester), the students can work on a single more complex project and they are classified to both courses for a single project. This course does not teach the students programming, nor any particular technology, framework or programming language. The students are required to have some knowledge of these to apply them on their team project.			

Název bloku: Povinné předměty oboru

Minimální počet kreditů bloku: 27

Role bloku: PO

Kód skupiny: BIE-PO-TI.2015

Název skupiny: Compulsory Courses of Bachelor Branch Computer Science, Presented in English, Version 2015

Podmínka kredity skupiny: V této skupině musíte získat 27 kreditů

Podmínka předměty skupiny: V této skupině musíte absolvovat alespoň 6 předmětů

Kredity skupiny: 27

Poznámka ke skupině:

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejich členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-AG2	Algorithms and Graphs 2 Jiřina Scholtzová Jiřina Scholtzová Jiřina Scholtzová (Gar.)	Z,ZK	5	2P+2C	L	PO
BIE-APS.1	Architectures of Computer Systems Pavel Tvrdlík, Michal Štepanovský Jiří Buček Pavel Tvrdlík (Gar.)	Z,ZK	5	2P+2C	Z	PO
BIE-VZD	Data Mining Juan Pablo Maldonado Lopez, Kamil Dedecius Pavel Kordík Pavel Kordík (Gar.)	Z,ZK	4	2P+2C	Z	PO
BIE-OOP	Object-Oriented Programming Stéphane Ducasse, Robert Pergl, Filip Křikava, Jan Blizničenko Robert Pergl Robert Pergl (Gar.)	Z,ZK	4	2P+2C	Z	PO
BIE-PJP	Programming Languages and Compilers Jan Trávníček, Radomír Polách Radomír Polách Jan Janoušek (Gar.)	Z,ZK	5	2P+1C	L	PO
BIE-PPA	Programming Paradigms Tomáš Pecka, Jan Janoušek, Radomír Polách, Petr Máj Petr Máj Petr Máj (Gar.)	Z,ZK	5	2P+2C	Z	PO

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-PO-TI.2015 Název=Compulsory Courses of Bachelor Branch Computer Science, Presented in English, Version 2015

BIE-AG2	Algorithms and Graphs 2	Z,ZK	5
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5
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 a given processor architecture. They get an idea about the trends in the area of computer architectures and how they will affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They understand the principles of shared-memory multiprocessor system architectures and the issues of memory consistency.			
BIE-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 will 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).			

BIE-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.			
BIE-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.			
BIE-PPA	Programming Paradigms	Z,ZK	5

Název bloku: Povinné ekonomické

Minimální počet kreditů bloku: 4

Role bloku: PE

Kód skupiny: BIE-PP-EM.2015

Název skupiny: Compulsory Economics and Management Bachelor Courses, in English, Version 2015

Podmínka kredity skupiny: V této skupině musíte získat 4 kredity

Podmínka předměty skupiny: V této skupině musíte absolvovat 1 předmět

Kredity skupiny: 4

Poznámka ke skupině:

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejích členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-EMP	Economic and management principles Tomáš Evan Tomáš Evan (Gar.)	KZ	4	2P+2C	Z	PE

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-PP-EM.2015 Název=Compulsory Economics and Management Bachelor Courses, in English, Version 2015

BIE-EMP	Economic 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.			

Název bloku: Povinně volitelné ekonomicko-manažerské

Minimální počet kreditů bloku: 4

Role bloku: VE

Kód skupiny: BIE-PV-EM.2015

Název skupiny: Compulsory Elective Economics, and Management Courses, in English, Version 2015

Podmínka kredity skupiny: V této skupině musíte získat alespoň 4 kredity (maximálně 10)

Podmínka předměty skupiny: V této skupině musíte absolvovat alespoň 1 předmět

Kredity skupiny: 4

Poznámka ke skupině:

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejích členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-EPR	Economic project Tomáš Evan Michal Valenta Tomáš Evan (Gar.)	Z	1		L	VE
BIE-FTR.1	Financial Markets	Z,ZK	5	2P+2C	Z	VE
BIE-MIK	Fundamentals of Microeconomics	Z,ZK	4	2P+2C	L	VE
BIE-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	L	VE

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-PV-EM.2015 Název=Compulsory Elective Economics, and Management Courses, in English, Version 2015

BIE-EPR	Economic project	Z	1
This course is an extension of the course Introduction to European Economic History (BIE-EHD).			
BIE-FTR.1	Financial Markets	Z,ZK	5
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.			

BIE-MIK	Fundamentals of Microeconomics	Z,ZK	4
This is an introductory course of microeconomics designed for students without previous economic background. It describes different market regimes and ways how firm can react to consumer demand, competitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life examples.			
BIE-EHD	Introduction to European Economic History	Z,ZK	3
The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key periods in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic history. From large economic area of Roman Empire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover detailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lecture and discussion.			

Název bloku: Povinně volitelné humanitní

Minimální počet kreditů bloku: 2

Role bloku: VH

Kód skupiny: BIE-PV-HU.2015

Název skupiny: Compulsory Elective Bachelor Social Courses, Presented in English, Ver. 2015

Podmínka kredity skupiny: V této skupině musíte získat alespoň 2 kredity (maximálně 9)

Podmínka předměty skupiny: V této skupině musíte absolvovat alespoň 1 předmět (maximálně 3)

Kredity skupiny: 2

Poznámka ke skupině: Faculty guarantees the availability of these modules.

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejích členů) <i>Vyučující, autoři a garanti (gar.)</i>	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-HMI	History of Mathematics and Informatics <i>Alena Šolcová Alena Šolcová Alena Šolcová (Gar.)</i>	Z,ZK	3	2P+1C	L	VH
FIE-HTE	History of Technology and Economics	ZK	2	2+0	Z,L	VH
FI-HPZ	Humanitní předmět z výjezdu v zahraničí <i>Miroslav Balík</i>	Z	3	0+0	Z,L	VH
BIE-EHD	Introduction to European Economic History <i>Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)</i>	Z,ZK	3	2P+1C	L	VH
AE0B16F11	Philosophy I <i>Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)</i>	KZ	4	2+2s	Z,L	VH

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-PV-HU.2015 Název=Compulsory Elective Bachelor Social Courses, Presented in English, Ver. 2015

BIE-EHD	Introduction to European Economic History	Z,ZK	3
The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key periods in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic history. From large economic area of Roman Empire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover detailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lecture and discussion.			
BIE-HMI	History of Mathematics and Informatics	Z,ZK	3
Students will master the methods traditionally used in mathematics and related disciplines - informatics - from different periods of the development of mathematics, and will thus become acquainted with mathematical methods suitable for applications in contemporary computer science.			
FIE-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	Humanitní předmět z výjezdu v zahraničí	Z	3
Předmět "Humanitní předmět z výjezdu v zahraničí" zastřešuje ve studijním plánu povahou humanitní předměty získané studenty v rámci jejich výjezdu v zahraničí. Předpokládá se tedy splnění náhradou a o uznání rozhoduje proděkan pro studijní a pedagogickou činnost v zastoupení děkana a to na základě žádosti studenta			
AE0B16F11	Philosophy I	KZ	4
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics. Výsledek studentské ankety předmětu je zde: http://www.fel.cvut.cz/anketa/aktualni/courses/AE0B16F11			

Název bloku: Volitelné předměty

Minimální počet kreditů bloku: 0

Role bloku: V

Kód skupiny: BIE-V-PRO_MG

Název skupiny: Elective Courses, Suitable for those who intend to apply for Master's program at FIT, in English

Podmínka kredity skupiny:

Podmínka předměty skupiny:

Kredity skupiny: 0

Poznámka ke skupině:

Modules in this group are recommended for students who intend to enroll to master program at FIT.

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejich členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-EFA	Efficient Algorithms Jiřina Scholtzová	Z,ZK	5	2P+2C	Z	v
BIE-GRA	Graph Algorithms and Complexity Theory Josef Kolář Miroslav Balík Josef Kolář (Gar.)	Z,ZK	5	2P+2C	L	v

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-V-PRO_MG Název=Elective Courses, Suitable for those who intend to apply for Master's program at FIT, in English

BIE-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.		
BIE-GRA	Graph Algorithms and Complexity Theory	Z,ZK	5	Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and NP-hardness.		

Kód skupiny: BIE-TI-VO.2017

Název skupiny: Elective Vocational Courses for Bachelor Branch BIE-TI, Version 2017

Podmínka kredity skupiny:

Podmínka předměty skupiny:

Kredity skupiny: 0

Poznámka ke skupině:

Oborové předměty všech oborů včetně povinných předmětů zaměřen s výjimkou oboru BIE-TI-VO.2017

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejich členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-KOM	Conceptual Modelling Robert Pergl, Marek Suchánek Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	v
BIE-BIG	DB Technologies for Big Data Josef Gattermayer Josef Gattermayer Josef Gattermayer (Gar.)	KZ	4	2P+2C	Z	v
BIE-HWB	Hardware Security Róbert Lórencz, Jiří Buček, Filip Kodýtek Róbert Lórencz Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	v
BIE-TJV	Java Technology Josef Pavlíček Josef Pavlíček (Gar.)	Z,ZK	4	2P+2C	Z	v
BIE-VWM	Searching Web and Multimedia Databases Jiří Novák Jiří Novák Tomáš Skopal (Gar.)	Z,ZK	5	2P+1C	L	v
BIE-BEK	Secure Code Josef Kokeš Josef Kokeš Josef Kokeš (Gar.)	Z,ZK	5	2P+2C	L	v
BIE-SI2.3	Software Engineering 2 Petr Špaček Petr Špaček Petr Kroha (Gar.)	Z,ZK	3	2P	Z	v
BIE-SSB	System and Network Security Alexandru Moucha	Z,ZK	5	2P+2C	Z	v
BIE-SP1	Team Software Project 1 Zdeněk Rybala Zdeněk Rybala Zdeněk Rybala (Gar.)	KZ	4	2C	Z	v
BIE-SP2	Team Software Project 2	KZ	6		Z	v
BIE-ADU.1	Unix Administration Zdeněk Muzikář, Jan Žďárek Jan Žďárek Zdeněk Muzikář (Gar.)	Z,ZK	5	2P+2C	L	v
BIE-TWA.1	Web Application Design Petr Klán Petr Klán (Gar.)	Z,ZK	5	2P+2C	Z	v
BIE-ADW.1	Windows Administration Miroslav Prágl, Jiří Kašpar Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	v
BIE-XML	XML Technology	Z,ZK	4	2P+2C	Z	v

Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-TI-VO.2017 Název=Elective Vocational Courses for Bachelor Branch BIE-TI, Version 2017

BIE-KOM	Conceptual Modelling	Z,ZK	5			
BIE-BIG	DB Technologies for Big Data	KZ	4			
BIE-HWB	Hardware Security	Z,ZK	5			
BIE-TJV	Java Technology	Z,ZK	4			
The subject goal is to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programming. This subject presents how to build the three and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb services, JNDI etc.). At the course end is student able to create three layers enterprise application.						

BIE-VWM	Searching 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 will understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity retrieval methods focused on heterogenous multimedia databases (unstructured data collections, respectively).			
BIE-BEK	Secure Code	Z,ZK	5
Studenti se naučí posuzovat a zohledňovat bezpečnostní rizika při návrhu svého kódu a řešení v běžné inženýrské praxi. Od teorie modelování bezpečnostních rizik přistoupí k praxi, ve které si vyzkouší běh programů pod nižšími oprávněními a jak tato oprávnění stanovovat, protože ne každý program musí nutně běžet s administrátorským oprávněním. Budou také prakticky demonstrována rizika spojená s přetečením bufferu. Dále se studenti budou krátce věnovat zabezpečení dat a jak toto zabezpečení souvisí s databázovými systémy a webem. V závěru se budou věnovat útokům typu DoS (Denial of Service) a obraně proti nim.			
BIE-SI2.3	Software Engineering 2	Z,ZK	3
Students will learn to work methodically with respect to software development methodic, especially Unified Process methodic and Unified Modeling Language (UML). They will understand the functions of individual roles in a typical software team, as well as get a practical experience with them in the concurrent BIE-SP2 module. Students will also get an idea about software testing and measuring software quality. This knowledge will get extended with a practical experience thanks to the concurrently running BIE-SP2 module.			
BIE-SSB	System and Network Security	Z,ZK	5
BIE-SP1	Team Software Project 1	KZ	4
In this course, students work on a complex team project applying all the knowledge obtained in the BIE-SI1.2 course. There are no lectures and no seminars/tutorials in this course. This course is to be enrolled in parallel with BIE-SI1.2 course.			
BIE-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.			
BIE-ADU.1	Unix Administration	Z,ZK	5
Students learn the internals of the UNIX operating system and the administration of its basic subsystems and get practical skills on real-world examples. They understand the differences between the user and administrator roles. They understand theoretically and know practically system monitoring, analysis and tuning tools; file systems implementation and administration; disk subsystems; processes; memory; network services; shared file systems; naming services; remote access; system boot.			
BIE-TWA.1	Web Application Design	Z,ZK	5
The basic course of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properties of language describing the structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, which will be demonstrated in modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony 2, Doctrine 2. Developments on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.			
BIE-ADW.1	Windows Administration	Z,ZK	4
Students understand the architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the standard administration and security tools and apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting methods and administrate heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.			
BIE-XML	XML Technology	Z,ZK	4

Kód skupiny: BIE-V.2017

Název skupiny: Purely Elective Bachelor Courses, Version 2017

Podmínka kredity skupiny:

Podmínka předměty skupiny:

Kredity skupiny: 0

Poznámka ke skupině:

Kód	Název předmětu / Název skupiny předmětů (u skupiny předmětů seznam kódů jejich členů) Vyučující, autoři a garanti (gar.)	Zakončení	Kredity	Rozsah	Semestr	Role
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	v
BIE-ZRS	Basics of System Control Kateřina Hyniová Kateřina Hyniová Kateřina Hyniová (Gar.)	Z,ZK	4	2P+2C	L	v
BIE-FTR.1	Financial Markets	Z,ZK	5	2P+2C	Z	v
BIE-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	L	v
BIE-IMA	Introduction to Mathematics Antonella Marchesiello Karel Klouda Antonella Marchesiello (Gar.)	Z	4	3C	Z	v
BIE-IMA2	Introduction to Mathematics 2 Karel Klouda	Z	2	1C	Z	v
BIE-ST1	Network Technology 1 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	v
BIE-OOP	Object-Oriented Programming Stéphane Ducasse, Robert Pergl, Filip Kříkava, Jan Blizničenko Robert Pergl Robert Pergl (Gar.)	Z,ZK	4	2P+2C	Z	v
BIE-PHP.1	Programing in PHP	KZ	4	3C	Z	v
BIE-PJV	Programming in Java Jiří Daněček Miroslav Balík Jiří Daněček (Gar.)	Z,ZK	4	2P+2C	Z	v
BI-SCE1	Seminář počítačového inženýrství I Hana Kubátová, Martin Novotný, Miroslav Skrbek Martin Novotný Hana Kubátová (Gar.)	Z	4	2C	L,Z	v
BIE-CZ0	Základy češtiny pro cizince Hana Maulová Miroslav Balík Hana Maulová (Gar.)	KZ	2	4C	Z,L	v

BIE-3DT.1	3D Printing	KZ	4	3C	L	V
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Charakteristiky předmětů této skupiny studijního plánu: Kód=BIE-V.2017 Název=Purely Elective Bachelor Courses, Version 2017

BIE-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.			
BIE-FTR.1	Financial Markets	Z,ZK	5
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.			
BIE-EHD	Introduction to European Economic History	Z,ZK	3
The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key periods in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic history. From large economic area of Roman Empire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover detailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lecture and discussion.			
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.			
BIE-ZRS	Basics of System Control	Z,ZK	4
Volitelný předmět základy řízení systémů je určen pro všechny zájemce o aplikovanou informatiku v bakalářském studiu. Alespoň přehledové znalosti oboru automatického řízení budou pro naše absolventy jistě konkurenční výhodou a zhodnotí je bezesporu v průmyslové praxi. Studenti získají znalosti v dynamicky se rozvíjejícím oboru s velkou budoucností. Zaměříme se zejména na řízení inženýrských a fyzikálních systémů. Poskytneme vám základní informace z oblasti zpětnovazebního řízení lineárních dynamických jednorozměrových systémů. Seznámíme vás s metodami vytváření popisu a modelu systémů, základní analýzou lineárních dynamických systémů a návrhem a ověřením jednoduchých zpětnovazebních PID, PSD a fuzzy regulátorů. Pozornost je věnována rovněž snímačům a akčním členům v regulačních obvodech, otázkám stability regulačních obvodů, jednorázovému a průběžnému nastavování parametrů regulátoru a některým aspektům průmyslových realizací spojitých a číslicových regulátorů. Jednotlivá témata přednášek jsou provázena množstvím užitečných příkladů a praktických průmyslových realizací.			
BIE-IMA	Introduction to Mathematics	Z	4
Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are able to apply them in particular examples.			
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are able to apply them in particular examples.			
BIE-ST1	Network Technology 1	Z	3
Předmět je zaměřen na získání základních znalostí z oblasti počítačových sítí a praktických zkušeností se sítovými technologiemi. Předmět odpovídá látce kurikula Cisco Netacad programu - CCNA1 - R&S Introduction to Networks.			
BIE-PHP.1	Programing in PHP	KZ	4
Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 3rd semester of study.			
BIE-PJV	Programming in Java	Z,ZK	4
BI-SCE1	Seminář počítačového inženýrství I	Z	4
Seminář počítačového inženýrství je výběrový předmět pro studenty, kteří se chtějí zabývat hlouběji tématy číslicového návrhu, spolehlivosti a odolnosti proti poruchám a útokům. Ke studentům se v rámci předmětu přistupuje individuálně a každý student či skupinka studentů řeší nějaké zajímavé aktuální téma s vybraným školitelem. Součástí předmětu je práce s vědeckými články a jinou odbornou literaturou a/nebo práce v laboratořích KČN. Kapacita předmětu je omezena možnostmi učitelů semináře. Probíraná témata jsou pro každý semestr nová.			
BIE-CZ0	Základy češtiny pro cizince	KZ	2
Kurz Základy češtiny pro cizince obsahuje základní témata konverzace: Seznamování, Orientace, Nakupování, Práce/Studium, Cestování, Čas, Rodina, na kterých se student seznámí s češtinou a jejím používáním.			
BIE-3DT.1	3D Printing	KZ	4
Students learn to design three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design objects, prepare for printing and print in 3D.			

Seznam předmětů tohoto průchodu:

Kód	Název předmětu	Zakončení	Kredity
AE0B16F11	Philosophy I	KZ	4
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics. Výsledek studentské ankety předmětu je zde: http://www.fel.cvut.cz/anketa/aktualni/courses/AE0B16F11			
BI-SCE1	Seminář počítačového inženýrství I	Z	4
Seminář počítačového inženýrství je výběrový předmět pro studenty, kteří se chtějí zabývat hlouběji tématy číslicového návrhu, spolehlivosti a odolnosti proti poruchám a útokům. Ke studentům se v rámci předmětu přistupuje individuálně a každý student či skupinka studentů řeší nějaké zajímavé aktuální téma s vybraným školitelem. Součástí předmětu je práce s			

vědeckými články a jinou odbornou literaturou a/nebo práce v laboratořích KČN. Kapacita předmětu je omezena možnostmi učitelů semináře. Probíraná témata jsou pro každý semestr nová.			
BIE-3DT.1	3D Printing	KZ	4
Students learn to design three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design objects, prepare for printing and print in 3D.			
BIE-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.			
BIE-ADU.1	Unix Administration	Z,ZK	5
Students learn the internals of the UNIX operating system and the administration of its basic subsystems and get practical skills on real-world examples. They understand the differences between the user and administrator roles. They understand theoretically and know practically system monitoring, analysis and tuning tools; file systems implementation and administration; disk subsystems; processes; memory; network services; shared file systems; naming services; remote access; system boot.			
BIE-ADW.1	Windows Administration	Z,ZK	4
Students understand the architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the standard administration and security tools and apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting methods and administrate heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.			
BIE-AG1	Algorithms and Graphs 1	Z,ZK	6
The course covers the basics from the efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing curriculum. It is interlinked with the concurrent BIE-AAG and BIE-ZDM courses in which the students gain the basic skills and knowledge needed for time and space complexity of algorithms and learn to handle practically the asymptotic mathematics.			
BIE-AG2	Algorithms and Graphs 2	Z,ZK	5
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5
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 a given processor architecture. They get an idea about the trends in the area of computer architectures and how they will affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They understand the principles of shared-memory multiprocessor system architectures and the issues of memory consistency.			
BIE-BAP	Bachelor Thesis	Z	14
BIE-BEK	Secure Code	Z,ZK	5
Studenti se naučí posuzovat a zohledňovat bezpečnostní rizika při návrhu svého kódu a řešení v běžné inženýrské praxi. Od teorie modelování bezpečnostních rizik přistoupí k praxi, ve které si vyzkouší běh programů pod nižšími oprávněními a jak tato oprávnění stanovovat, protože ne každý program musí nutně běžet s administrátorským oprávněním. Budou také prakticky demonstrována rizika spojená s přetečením bufferu. Dále se studenti budou krátce věnovat zabezpečení dat a jak toto zabezpečení souvisí s databázovými systémy a webem. V závěru se budou věnovat útokům typu DoS (Denial of Service) a obraně proti nim.			
BIE-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 properly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal aspects of information security, security standards, social engineering, and basic principles of security management.			
BIE-BIG	DB Technologies for Big Data	KZ	4
BIE-BPR	Bachelor Project	Z	2
BIE-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.			
BIE-CZ0	Základy češtiny pro cizince	KZ	2
Kurz Základy češtiny pro cizince obsahuje základní témata konverzace: Seznamování, Orientace, Nakupování, Práce/Studium, Cestování, Čas, Rodina, na kterých se student seznámí s češtinou a jejím používáním.			
BIE-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 module does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores.			
BIE-DPR	Documentation, Presentation, Rhetorics	KZ	4
BIE-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.			
BIE-EHD	Introduction to European Economic History	Z,ZK	3
The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key periods in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic history. From large economic area of Roman Empire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover detailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lecture and discussion.			
BIE-EMP	Economic 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.			

BIE-EPR	Economic project This course is an extension of the course Introduction to European Economic History (BIE-EHD).	Z	1
BIE-FTR.1	Financial Markets 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.	Z,ZK	5
BIE-GRA	Graph Algorithms and Complexity Theory Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and NP-hardness.	Z,ZK	5
BIE-HMI	History of Mathematics and Informatics Students will master the methods traditionally used in mathematics and related disciplines - informatics - from different periods of the development of mathematics, and will thus become acquainted with mathematical methods suitable for applications in contemporary computer science.	Z,ZK	3
BIE-HWB	Hardware Security	Z,ZK	5
BIE-IMA	Introduction to Mathematics Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are able to apply them in particular examples.	Z	4
BIE-IMA2	Introduction to Mathematics 2 Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are able to apply them in particular examples.	Z	2
BIE-KOM	Conceptual Modelling	Z,ZK	5
BIE-LIN	Linear Algebra 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 polynomials 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 error-detecting and error-correcting codes.	Z,ZK	7
BIE-MIK	Fundamentals of Microeconomics This a introductory course of microeconomics designed for students without previous economic background. It describes different market regimes and ways how firm can react to consumer demand, competitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life examples.	Z,ZK	4
BIE-MLO	Mathematical Logic An introduction to predicate logic, the standard language and deductive system of mathematics and computer science.	Z,ZK	5
BIE-OOP	Object-Oriented Programming 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.	Z,ZK	4
BIE-OSY	Operating Systems 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 managing 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.	Z,ZK	5
BIE-PA1	Programming and Algorithmics 1 Students learn to construct 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 the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, and manipulating with linked lists.	Z,ZK	6
BIE-PA2	Programming and Algorithmics 2 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 to all C++ features needed to achieve the main objective (e.g., operator overloading, templates).	Z,ZK	7
BIE-PAI	Law and Informatics Students have knowledge of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an appropriate contract-based copyright protection and do research and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate actively in the proceedings to register intangible property. They have a good overview of the Czech Republic legislation as well as the EU legislation.	ZK	3
BIE-PHP.1	Programming in PHP Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 3rd semester of study.	KZ	4
BIE-PJP	Programming Languages and Compilers 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.	Z,ZK	5
BIE-PJV	Programming in Java	Z,ZK	4
BIE-PPA	Programming Paradigms	Z,ZK	5
BIE-PS1	Programming in Shell 1 Students become advanced and knowledgeable users of common operating system Linux or other UNIX-based operating system. 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.	KZ	5
BIE-PSI	Computer Networks Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing primarily 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.	Z,ZK	5

BIE-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.			
BIE-SAP	Computer Structures and Architectures	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.			
BIE-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. Students will get acquainted with CASE tools using a visual modeling language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis, design, architecture, validation, verification, and testing processes. The knowledge obtained in the lectures is practiced on a team project. If enrolled for the BIE-SP1 course running in parallel (only summer semester), the students can work on a single more complex project and they are classified to both courses for a single project. This course does not teach the students programming, nor any particular technology, framework or programming language. The students are required to have some knowledge of these to apply them on their team project.			
BIE-SI2.3	Software Engineering 2	Z,ZK	3
Students will learn to work methodically with respect to software development methodic, especially Unified Process methodic and Unified Modeling Language (UML). They will understand the functions of individual roles in a typical software team, as well as get a practical experience with them in the concurrent BIE-SP2 module. Students will also get an idea about software testing and measuring software quality. This knowledge will get extended with a practical experience thanks to the concurrently running BIE-SP2 module.			
BIE-SP1	Team Software Project 1	KZ	4
In this course, students work on a complex team project applying all the knowledge obtained in the BIE-SI1.2 course. There are no lectures and no seminars/tutorials in this course. This course is to be enrolled in parallel with BIE-SI1.2 course.			
BIE-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.			
BIE-SSB	System and Network Security	Z,ZK	5
BIE-ST1	Network Technology 1	Z	3
Předmět je zaměřen na získání základních znalostí z oblasti počítačových sítí a praktických zkušeností se sítovými technologiemi. Předmět odpovídá látce kurikula Cisco Netacad programu - CCNA1 - R&S Introduction to Networks.			
BIE-TJV	Java Technology	Z,ZK	4
The subject goal is to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programming. This subject presents how to build the three and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb services, JNDI etc.). At the course end is student able to create three layers enterprise application.			
BIE-TWA.1	Web Application Design	Z,ZK	5
The basic course of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properties of language describing the structure (HTML) and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications, which will be demonstrated in modern libraries facilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfony 2, Doctrine 2. Developments on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.			
BIE-VWM	Searching 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 will understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity retrieval methods focused on heterogenous multimedia databases (unstructured data collections, respectively).			
BIE-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 will 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).			
BIE-XML	XML Technology	Z,ZK	4
BIE-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, and tools for solving recurrent equations.			
BIE-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.			
BIE-ZRS	Basics of System Control	Z,ZK	4
Volitelný předmět základy řízení systémů je určen pro všechny zájemce o aplikovanou informatiku v bakalářském studiu. Alespoň přehledové znalosti oboru automatického řízení budou pro naše absolventy jistě konkurenční výhodou a vhodnou je bezesporu v průmyslové praxi. Studenti získají znalosti v dynamicky se rozvíjejícím oboru s velkou budoucností. Zaměříme se zejména na řízení inženýrských a fyzikálních systémů. Poskytneme vám základní informace z oblasti zpětnovazebního řízení lineárních dynamických jednorozměrových systémů. Seznámíme vás s metodami vytváření popisu a modelu systémů, základní analýzou lineárních dynamických systémů a návrhem a ověřením jednoduchých zpětnovazebních PID, PSD a fuzzy regulátorů. Pozornost je věnována rovněž snímačům a akčním členům v regulačních obvodech, otázkám stability regulačních obvodů, jednorázovému a průběžnému nastavování parametrů regulátoru a některým aspektům průmyslových realizací spojitych a číslicových regulátorů. Jednotlivá témata přednášek jsou provázena množstvím užitečných příkladů a praktických průmyslových realizací.			
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-HPZ	Humanitní předmět z výjezdu v zahraničí	Z	3
Předmět "Humanitní předmět z výjezdu v zahraničí" zastřešuje ve studijním plánu povahou humanitní předměty získané studenty v rámci jejich výjezdu v zahraničí. Předpokládá se tedy splnění náhradou a o uznání rozhoduje proděkan pro studijní a pedagogickou činnost v zastoupení děkana a to na základě žádosti studenta			

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