Studijní plán

Název plánu: Bachelor branch Computer Science, in English, 2015-2020 original version

Sou ást VUT (fakulta/ústav/další): Fakulta informa ních technologií

Katedra:

Obor studia, garantovaný katedrou: Úvodní stránka

Garant oboru studia.:

Program studia: Informatics, valid until 2024

Typ studia: Bakalá ské prezen ní

P edepsané kredity: 158

Kredity z volitelných p edm t : 22 Kredity v rámci plánu celkem: 180

Poznámka k plánu: PLÁN VZNIKL JAJO KOPIE Z UPRAVENÉHO PLÁNU BIE-TI.2015

Název bloku: Povinné p edm ty programu

Minimální po et kredit bloku: 117

Role bloku: PP

Kód skupiny: BIE-PP.2015-ORIGINAL

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

Podmínka kredity skupiny: V této skupin musíte získat 117 kredit

Podmínka p edm ty skupiny: V této skupin musíte absolvovat 20 p edm t

Kredity skupiny: 117 Poznámka ke skupině:

Původní verze skupiny předmětů BIE-PP.2015

| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
|-----------|--|-----------|---------|----------|---------|------|
| BIE-AAG | Automata and Grammars | Z,ZK | 6 | 2P+2C | Z | PP |
| BIE-BAP | Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.) | Z | 14 | | L,Z | PP |
| BIE-PSI | Computer Networks | Z,ZK | 5 | 2P+1R+1C | L | PP |
| BIE-SAP | Computer Structures and Architectures | Z,ZK | 6 | 2P+1R+2C | L | PP |
| BIE-DBS | Database Systems | Z,ZK | 6 | 3L | Z,L | PP |
| BIE-CAO | Digital and Analog Circuits | Z,ZK | 5 | 2P+2C | Z | PP |
| BIE-TED | Electronic Documentation Design | KZ | 5 | 2P+2C | 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 Ji ina Scholtzová, Jan Legerský Ji ina Scholtzová Josef Kolá (Gar.) | Z,ZK | 5 | 2P+2C | Z | PP |
| BIE-UOS | Introduction to Operating Systems Zden k Muziká | KZ | 5 | 2P+2C | Z | PP |
| BIE-PAI | Law and Informatics | ZK | 3 | 2P | Z | PP |
| BIE-LIN | Linear Algebra Antonella Marchesiello Antonella Marchesiello (Gar.) | Z,ZK | 7 | 4P+2C | L | PP |
| BIE-MLO | Mathematical Logic Kate ina Trlifajová Kate ina Trlifajová (Gar.) | Z,ZK | 5 | 2P+2C | Z | PP |
| BIE-OSY | Operating Systems | Z,ZK | 5 | 2P+1R+1L | . L | PP |
| BIE-PST | Probability and Statistics | Z,ZK | 5 | 2P+1R+1C | Z | PP |
| BIE-PA1 | Programming and Algorithmics 1 | Z,ZK | 6 | 2P+2R+2C | Z | PP |
| BIE-PA2 | Programming and Algorithmics 2 | Z,ZK | 7 | 2P+1R+1C | L | PP |
| BIE-BEZ | Security Ji í Bu ek | Z,ZK | 6 | 2P+1R+1C | L | PP |
| BIE-SI1.2 | Software Engineering I Zden k Rybola Zden k Rybola Zden k Rybola (Gar.) | Z,ZK | 5 | 2P+1C | Z,L | PP |

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

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. **BIE-BAP Bachelor Thesis** Z,ZK **BIE-PSI** Computer Networks 5 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 **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. **BIF-DBS Database Systems** 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. 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 **BIE-TED** Electronic Documentation Design 5 Studenti se nau í správn psát technické zprávy za použití konfigurovatelných nástroj vhodných pro informatické profesionály. Rozší í své schopnosti v oblasti p ístupu k tvorb elektronických dokument . Seznámí se s dokumentováním softwarových projekt , zejména se základy UML a s dokumentováním zdrojových kód 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. This course is last taught in the winter semester 2021/22 (B211). Latecomers who fail to meet it can replace it with a pair of courses BIE-MA1.21 and BIE-MA2.21. **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. **BIF-UOS** Introduction to Operating Systems Students become advanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Windows. 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. 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. **BIE-LIN** Linear Algebra Z.ZK 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. **BIE-MLO** Mathematical Logic Z.ZK 5 An introduction to propositional and predicate logic. **BIE-OSY Operating Systems** Z.ZK 5 Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-PS1 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. Probability and Statistics The students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variables. They will be able to to apply basic models of random variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction they will be able to perform estimations of unknown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the statistical dependence of two or more random variables 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. 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). BIE-BEZ Z.ZK 6 Security 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

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 p edm ty oboru Minimální po et kredit bloku: 31

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 skupin musíte získat 31 kredit

Podmínka p edm ty skupiny: V této skupin musíte absolvovat alespo 7 p edm t

Kredity skupiny: 31 Poznámka ke skupině:

| FUZITATINA NE SKI | ирите. | | | | | |
|-------------------|--|-----------|---------|--------|---------|------|
| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
| BIE-AG2 | Algorithms and Graphs 2 Ond ej Suchý | Z,ZK | 5 | 2P+2C | L | PO |
| BIE-APS.1 | Architectures of Computer Systems | Z,ZK | 5 | 2P+2C | Z | РО |
| BIE-VZD | Data Mining Daniel Vašata, Rodrigo Augusto Da Silva Alves Daniel Vašata Daniel Vašata (Gar.) | Z,ZK | 4 | 2P+2C | Z | РО |
| BIE-PAI | Law and Informatics | ZK | 3 | 2P | Z | PO |
| BIE-OOP | Object-Oriented Programming Filip K ikava Filip K ikava (Gar.) | Z,ZK | 4 | 2P+2C | Z | РО |
| BIE-PJP | Programming Languages and Compilers | Z,ZK | 5 | 2P+1C | Ĺ | РО |
| BIE-PPA | Programming Paradigms | Z,ZK | 5 | 2P+2C | Z | РО |

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

| BIE-PAI | Law and Informatics | ∣ ZK ¦ | 3 |
|--------------------------|---|--------------------|------------------|
| Students have knowledge | e of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an ap | propriate contract | -based copyright |
| protection and do resea | rch and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate active | ely in the proceed | ings to register |
| intangible property They | where a good everying of the Czech Republic logislation as well as the ELL logislation | | |

| BIE-AG2 | Algorithms and Graphs 2 | Z,ZK | 5 |
|-----------|-----------------------------------|------|---|
| BIE-APS.1 | Architectures of Computer Systems | Z,ZK | 5 |

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

BIE-VZD Data Mining 7 7K

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).

Object-Oriented Programming

Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error handing, refactoring and design patterns.

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.

Programming Paradigms

Z,ZK

Název bloku: Povinné ekonomické Minimální po et kredit bloku: 4

Role bloku: PE

BIE-PPA

Kód skupiny: BIE-PP-EM.2015

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

Podmínka kredity skupiny: V této skupin musíte získat 4 kredity

Podmínka p edm ty skupiny: V této skupin musíte absolvovat 1 p edm t

Kredity skupiny: 4 Poznámka ke skupině:

| | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
|---------|--|-----------|---------|--------|---------|------|
| BIE-EMP | Economic and management principles Tomáš Evan Tomáš Evan (Gar.) | KZ | 4 | 2P+2C | Z,L | PE |

Charakteristiky p edmet 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

۲Z)

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: Povinn volitelné ekonomicko-manažerské

Minimální po et kredit 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 skupin musíte získat alespo 4 kredity (maximáln 10)

Podmínka p edm ty skupiny: V této skupin musíte absolvovat alespo 1 p edm t

Kredity skupiny: 4 Poznámka ke skupině:

| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
|-----------|--|-----------|---------|--------|---------|------|
| BIE-EPR | Economic project Tomáš Evan Tomáš Evan (Gar.) | Z | 1 | | L | VE |
| BIE-FTR.1 | Financial Markets Pavla Vozárová | Z,ZK | 5 | 2P+2C | L | VE |
| BIE-MIK | Fundamentals of Microeconomics Tomáš Evan, Pavla Vozárová Tomáš Evan Pavla Vozárová (Gar.) | Z,ZK | 4 | 2P+2C | L | VE |
| BIE-EHD | Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.) | Z,ZK | 3 | 2P+1C | L | VE |

Charakteristiky p edmet 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 exten- | sion 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 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.

BIE-EHD Introduction to European Economic History Z,ZK 3

The course introduces a selection of themes from European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. From the large economic area of the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lectures and discussions.

Název bloku: Povinn volitelné humanitní

Minimální po et kredit 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 skupin musíte získat alespo 2 kredity (maximáln 9)

Podmínka p edm ty skupiny: V této skupin musíte absolvovat alespo 1 p edm t (maximáln 3)

Kredity skupiny: 2

Poznámka ke skupině:

Faculty guarantees the availability of these modules.

| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
|-----------|--|-----------|---------|--------|---------|------|
| BIE-HMI | History of Mathematics and Informatics Alena Šolcová Alena Šolcová Alena Šolcová (Gar.) | Z,ZK | 3 | 2P+1C | L | VH |
| FI-HPZ | Humanitní p edm t z výjezdu v zahrani í | Z | 3 | 0+0 | Z,L | VH |
| BIE-EHD | Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.) | Z,ZK | 3 | 2P+1C | L | VH |
| BE0B16FI1 | Philosophy 1 Peter Zamarovský Peter Zamarovský (Gar.) | KZ | 4 | 2P+2S | Z,L | VH |

Charakteristiky p edmet 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 European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. From the large economic area of the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lectures and discussions.

BIE-HMI History of Mathematics and Informatics

7.7K

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.

FI-HPZ Humanitní p edm t z výjezdu v zahrani í

P edm t "Humanitní p edm t z výjezdu v zahrani í" zast ešuje ve studijním plánu povahou humanitní p edm ty získané studenty v rámci jejich výjezdu v zahrani í. P edpokládá se

tedy spln ní náhradou a o uznání rozhoduje prod kan pro studijní a pedagogickou innost v zastoupení d kana a to na základ žádosti studenta

BE0B16FI1 Philosophy 1

ΚZ

4

Probírají se postavy a myšlenky antické filozofie a v dy. Na historickém pozadí se otevírají i aktuální problémy dneška. Jde zejména o otázky související s rozvojem dnešní fyziky, matematiky a p írodov dy, dále s rozvojem a spole enskými aspekty techniky a otázek ekonomiky, etiky a politiky.

Název bloku: Volitelné p edm ty Minimální po et kredit 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 p edm ty 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 p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | Kredity | Rozsah | Semestr | Role |
|---------|--|-----------|---------|--------|---------|------|
| BIE-EFA | Efficient Algorithms Ji ina Scholtzová | Z,ZK | 5 | 2P+2C | Z | V |
| BIE-GRA | Graph Algorithms and Complexity Theory Josef Kolá | Z,ZK | 5 | 2P+2C | L | V |

Charakteristiky p edmet 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 over | view of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dy | namically changin | ng 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 p edm ty skupiny:

Kredity skupiny: 0

BIF-ADU.1

Unix Administration

memory, network services, shared file systems, name services, remote access, and system boot.

Poznámka ke skupině:

Oborové předměty všech oborů včetně povinných předmětů zaměření s výjimkou oboru BIF-TI-VO 2017

| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | 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-HWB | Hardware Security Filip Kodýtek, Róbert Lórencz, Ji í Bu ek Ji í Bu ek Róbert Lórencz (Gar.) | Z,ZK | 5 | 2P+2C | Z | V |
| BIE-TJV | Java Technology | Z,ZK | 4 | 2P+2C | Z | V |
| BIE-VWM | Searching Web and Multimedia Databases | Z,ZK | 5 | 2P+1C | L | V |
| BIE-BEK | Secure Code Róbert Lórencz | Z,ZK | 5 | 2P+2C | L | V |
| BIE-SI2.3 | Software Engineering 2 Michal Valenta Michal Valenta (Gar.) | Z,ZK | 3 | 2P | Z | V |
| BIE-SSB | System and Network Security Jií Dostál Jií Dostál Jií Dostál (Gar.) | Z,ZK | 5 | 2P+2C | Z | V |
| BIE-SP1 | Team Software Project 1 Zden k Rybola | KZ | 4 | 2C | Z,L | ٧ |
| BIE-ADU.1 | Unix Administration | Z,ZK | 5 | 2P+2C | L | V |
| BIE-ADW.1 | Windows Administration Miroslav Prágl, Ji í Kašpar Miroslav Prágl Miroslav Prágl (Gar.) | Z,ZK | 4 | 2P+1C | Z | V |

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

BIE-KOM Conceptual Modelling

The course focuses on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the ability to distinguish key concepts in the domain, categorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will learn the basics of ontological

in the domain, categorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will learn the basics of ontological structural modeling in OntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Students will also learn the basics of Enterprise Engineering as a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEMO methodology. The course is also designed with regard to the continuity of software implementations.

BIE-HWB Hardware Security Z,ZK

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

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

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 nau í posuzovat a zohled ovat bezpe nostní rizika p i návrhu svého kódu a ešení v b žné inženýrské praxi. Od teorie modelování bezpe nostních rizik p istoupí k praxi, ve které si vyzkouší b h program pod nižšími oprávn ními a jak tato oprávn ní stanovovat, protože ne každý program musí nutn b žet s administrátorským oprávn ním. Budou také prakticky demonstrována rizika spojená s p ete ením bufferu. Dále se studenti budou krátce v novat zabezpe ení dat a jak toto zabezpe ení souvisí s databázovými systémy a webem. V záv ru se budou v novat útok m typu DoS (Denial of Service) a obran 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

The students will understand the public key infrastructure (PKI), its strengths and weaknesses, its vulnerabilities againstattacks. The students will also understand the analysis of network protocols from the perspectives of: authentication and authorisation, key exchange, and encryption. They get an overview of the security mechanisms of operating systems (OSs), of the ways virtualization canbe used to protect OSs, and of the security mechanisms for the OS memory. The students will learn basic methods of forensic analysis of storage media and networks. The students will also understand security of the networking infrastructure and its protocols andwill be able to design and implement a secured and survivable network. Students will also get an overview of securing data in clouds, database systems, and servers.

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.

Students became familiar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of their protection against unauthorized use. In the seminars they will verify the information from the lectures on real life examples from practice. They will understand the differences between user and administrator roles. They gain theoretical and practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file systems, disk subsystems, processes,

Z.ZK

BIE-ADW.1 Windows Administration

7.7K

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.

Kód skupiny: BIE-V.2017

Název skupiny: Purely Elective Bachelor Courses, Version 2017

Podmínka kredity skupiny: Podmínka p edm ty skupiny:

Kredity skupiny: 0 Poznámka ke skupině:

| Kód | Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.) | Zakon ení | 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 | Z,ZK | 4 | 2P+2C | L | V |
| BIE-CCN | Compiler Construction Christoph Kirsch Christoph Kirsch (Gar.) | Z,ZK | 5 | 3P | L | V |
| BIE-SCE1 | Computer Engineering Seminar I Miroslav Skrbek, Hana Kubátová Hana Kubátová (Gar.) | Z | 4 | 2C | Z | V |
| BIE-SCE2 | Computer Engineering Seminar II Hana Kubátová Hana Kubátová (Gar.) | Z | 4 | 2C | L | V |
| BIE-CZ0 | Czech Language for Foreigners Markéta Hofmannová, Ivana Vondrá ková, Tomáš Houdek, Petra Korfová Zden k Muziká Zden k Muziká (Gar.) | KZ | 2 | 4C | Z,L | V |
| BIE-CZ1.21 | Czech Language for Foreigners II Ivana Vondrá ková, Petra Korfová Zden k Muziká Zden k Muziká (Gar.) | KZ | 2 | 4C | Z,L | V |
| BIE-FTR.1 | Financial Markets Pavla Vozárová | Z,ZK | 5 | 2P+2C | L | V |
| BIE-EHD | Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.) | Z,ZK | 3 | 2P+1C | L | V |
| BIE-IMA | Introduction to Mathematics | Z | 4 | 3C | Z | V |
| BIE-IMA2 | Introduction to Mathematics 2 | 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 Filip K ikava Filip K ikava (Gar.) | Z,ZK | 4 | 2P+2C | Z | V |
| BIE-PKM | Preparatory Mathematics Jitka Rybní ková Tomáš Kalvoda (Gar.) | Z | 4 | | Z | V |
| BIE-PJV | Programming in Java Jan Blizni enko Jan Blizni enko (Gar.) | Z,ZK | 4 | 2P+2C | Z | V |
| BIE-PS2 | Programming in shell 2 | Z,ZK | 4 | 2P+2C | L | V |
| BIE-PRR.21 | Project ma19nagement David Pešek David Pešek David Pešek (Gar.) | Z,ZK | 5 | 2P+2C | Z,L | V |
| BIE-VAK.21 | Selected Combinatorics Applications Tomáš Valla, Dušan Knop, Ond ej Suchý, Šimon Schierreich, Maria Saumell Mendiola Tomáš Valla Tomáš Valla (Gar.) | Z | 3 | 2R | L | V |
| BI-SCE1 | Seminá po íta ového inženýrství l Hana Kubátová Hana Kubátová Hana Kubátová (Gar.) | Z | 4 | 2C | L,Z | V |
| TV2K1 | T lesná výchova 2 | Z | 1 | | L | V |
| BIE-SEP | World Economy and Business Tomáš Evan Tomáš Evan Tomáš Evan (Gar.) | Z,ZK | 4 | 2P+2C | Z | V |

Charakteristiky p edmet této skupiny studijního plánu: Kód=BIE-V.2017 Název=Purely Elective Bachelor Courses, Version 2017

BIE-OOP Object-Oriented Programming

Z,ZK

4

Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error handing, refactoring and design patterns.

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 European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. From the large economic area of the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lectures and discussions.

| BIE-ZUM Artificial Intelligence Fundamentals | Z,ZK | 4 |
|---|---|--|
| Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the class | | |
| space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm presented as well | thms and the neu | ral networks, will |
| be presented as well. BIE-ZRS Basics of System Control | Z,ZK | 4 |
| Volitelný p edm t základy ízení systém je ur en pro všechny zájemce o aplikovanou informatiku v bakalá ském studiu. Alespo p ehledové znalos | | |
| budou pro naše absolventy jist konkuren ní výhodou a zhodnotí je bezesporu v pr myslové praxi. Studenti získají znalosti v dynamicky se rozvíjejí | | |
| Zam íme se zejména na ízení inženýrských a fyzikálních sysém . Poskytneme vám základní informace z oblasti zp tnovazebního ízení lineárníci | | |
| systém . Seznámíme vás s metodami vytvá ení popisu a modelu systém , základní analýzou lineárních dynamických systém a návrhem a ov ení | m jednoduchých z | p tnovazebních |
| PID, PSD a fuzzy regulátor . Pozornost je v nována rovn ž sníma m a ak ním len m v regula ních obvodech, otázkám stability regula ních obvo | = | - |
| nastavování parametr regulátoru a n kterým aspekt m pr myslových realizací spojitých a íslicových regulátor . Jednotlivá témata p ednášek jsou | provázena množ | stvím užite ných |
| p íklad a praktických pr myslových realizací. BIE-CCN Compiler Construction | Z,ZK | 5 |
| BIE-CCN Compiler Construction This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principle | | |
| understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme | | students to |
| BIE-SCE1 Computer Engineering Seminar I | Z | 4 |
| The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance | ce to failures and a | attacks. Students |
| are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of | the subject is wor | k with scientific |
| articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead | chers. The topics a | are new for each |
| semester. | | |
| BIE-SCE2 Computer Engineering Seminar II | Z | 4 |
| The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of | | |
| articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. | · · | |
| semester. | o | 2.0 |
| BIE-CZ0 Czech Language for Foreigners | KZ | 2 |
| Course Czech for foreigners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Time, Family. | ! | |
| BIE-CZ1.21 Czech Language for Foreigners II | KZ | 2 |
| The course is intended for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. | | r expands the |
| basic vocabulary and clarifies the structure of the Czech language structure with regard to the practical needs of Students residing in the Czech Rep | | |
| 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 a | re able to apply tr | iem in particular |
| BIE-IMA2 Introduction to Mathematics 2 | 7 | 2 |
| Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a | | _ |
| | o abio to appiy a | .o particular |
| examples. | | |
| BIE-ST1 Network Technology 1 | Z | 3 |
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| BIE-ST1 Network Technology 1 P edm t je zam en na získání základních znalosti z oblasti po íta ových sítí a praktických zkušeností se sí ovými technologiemi. P edm t odpovíd programu - CCNA1 - R&S Introduction to Networks. BIE-PKM Preparatory Mathematics | | _ |
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| BIE-ST1 Network Technology 1 P edm t je zam en na získání základních znalosti z oblasti po íta ových sítí a praktických zkušeností se sí ovými technologiemi. P edm t odpovíd programu - CCNA1 - R&S Introduction to Networks. BIE-PKM Preparatory Mathematics The purpose of Preparatory Mathematics is to help students revise the most important topics of high-school mathematics. BIE-PJV Programming in Java Tento kurz je prezentován v angli tin . Existuje ale také eská varianta BI-PJV a BIK-PJV. BIE-PS2 Programming in shell 2 Students get a general overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In account of the structure | z,ZK Z,ZK ddition, they gain | 4 4 4 a deeper insight |
| BIE-ST1 Network Technology 1 P edm t je zam en na získání základních znalosti z oblasti po íta ových sítí a praktických zkušeností se sí ovými technologiemi. P edm t odpovíd programu - CCNA1 - R&S Introduction to Networks. BIE-PKM Preparatory Mathematics The purpose of Preparatory Mathematics is to help students revise the most important topics of high-school mathematics. BIE-PJV Programming in Java Tento kurz je prezentován v angli tin . Existuje ale také eská varianta BI-PJV a BIK-PJV. BIE-PS2 Programming in shell 2 | Z,ZK Z,ZK ddition, they gain a students: We are | 4 4 a deeper insight e ready do adapt |
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Seznam p edm t tohoto pr chodu:

| Kód | Název p edm tu | Zakon ení | Kredity |
|---------------------|--|-------------------------|---------------|
| BE0B16FI1 | Philosophy 1 | KZ | 4 |
| Probírají se post | avy a myšlenky antické filozofie a v dy. Na historickém pozadí se otevírají i aktuální problémy dneška. Jde zejména o otázky souvisej | ící s rozvojem dne | ešní fyziky, |
| DI 0054 | matematiky a p írodov dy, dále s rozvojem a spole enskými aspekty techniky a otázek ekonomiky, etiky a politiky. | _ | 1 4 |
| BI-SCE1 | Seminá po íta ového inženýrství l vého inženýrství je výb rový p edm t pro studenty, kte í se cht jí zabývat hloub ji tématy íslicového návrhu, spolehlivosti a odolnosti | Z i proti poruchám o | 4 |
| | nci p edm tu p istupuje individuáln a každý student i skupinka student – eší n jaké zajímavé aktuální téma s vybraným školitelem. | | |
| | a jinou odbornou literaturou a/nebo práce v laborato ích K N. Kapacita p edm tu je omezena možnostmi u itel seminá e. Probíraná t | | |
| | nová. | | |
| BIE-AAG | Automata and Grammars | Z,ZK | 6 |
| | luced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite | - | - |
| | iars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships between foi red through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation, | | |
| BIE-ADU.1 | Unix Administration | Z,ZK | 5 |
| | amiliar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of their p | · | 1 |
| use. In the semin | ars they will verify the information from the lectures on real life examples from practice. They will understand the differences between | user and administ | rator roles. |
| They gain theoretic | cal and practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file systems | s, disk subsystems | , processes, |
| DIE ADWA | memory, network services, shared file systems, name services, remote access, and system boot. | 7.71/ | |
| BIE-ADW.1 | Windows Administration tand the architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the | Z,ZK | 4 |
| | and apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting | | |
| , | heterogeneous systems. Students are able to effectively configure centralised administration of a computer network. | | |
| BIE-AG2 | Algorithms and Graphs 2 | Z,ZK | 5 |
| BIE-APS.1 | Architectures of Computer Systems | Z,ZK | 5 |
| | rn the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec | | |
| | n processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the princessors, but also in superscalar processors that one execute multiple instructions in one cycle, while appropriate the correctness of the | • | |
| | rocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and | • | |
| BIE-BAP | Bachelor Thesis | Z | 14 |
| BIE-BEK | Secure Code | Z,ZK | 5 |
| | posuzovat a zohled ovat bezpe nostní rizika p i návrhu svého kódu a ešení v b žné inženýrské praxi. Od teorie modelování bezpe i | | |
| • | í b h program pod nižšími oprávn ními a jak tato oprávn ní stanovovat, protože ne každý program musí nutn bžet s administrátor | | |
| prakticky demonstr | rována rizika spojená s p ete ením bufferu. Dále se studenti budou krátce v novat zabezpe ení dat a jak toto zabezpe ení souvisí s dat | tabázovými systén | ny a webem. |
| BIE-BEZ | V záv ru se budou v novat útok m typu DoS (Denial of Service) a obran proti nim. | Z.ZK | 6 |
| | Security Indicate the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a | , | - |
| | s. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos | | - |
| They are able to p | roperly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as | spects of informati | on security, |
| | security standards, social engineering, and basic principles of security management. | | 1 |
| BIE-CAO | Digital and Analog Circuits | Z,ZK | 5 |
| | efundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw | | |
| transistors, gates, | of electronic devices. | veen analog and a | iigitai moacs |
| BIE-CCN | Compiler Construction | Z,ZK | 5 |
| This is an introd | uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles | | tudents to |
| | and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching | | |
| BIE-CZ0 | Czech Language for Foreigners | KZ | 2 |
| BIE-CZ1.21 | Course Czech for foreigners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Time | KZ | 2 |
| | Czech Language for Foreigners II ended for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. Th | | 1 |
| | c vocabulary and clarifies the structure of the Czech language structure with regard to the practical needs of Students residing in the | | |
| BIE-DBS | Database Systems | Z,ZK | 6 |
| | oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear | • | |
| | constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the | | |
| | lation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda Illing parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced t | • | |
| · - | ases with respect to speed of access to large quantities of data. This introductory-level module does not cover: Administration of datal | | - |
| | optimizing database applications, distributed database systems, data stores. | | 00 0 |
| BIE-EFA | Efficient Algorithms | Z,ZK | 5 |
| _ | overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dyna | | |
| | to design and implement such algorithms, to use methods for analysing their computational and memory complexity. They understar | | |
| | nplexity, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the eff hash tables, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dyr | = | |
| 5451145 | and district the state of the s | p. ogrammin | . 5. |

| | | | , | |
|--|--|--|---|--|
| BIE-EHD | Introduction to European Economic History | Z,ZK | 3 | |
| | ces a selection of themes from European economic history. It gives the student basic knowledge about forming of the global economy | - | | |
| key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. From the large economic area of the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The | | | | |
| | over the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, ins | | | |
| | history. Class meetings will consist of a mixture of lectures and discussions. | | | |
| BIE-EMP | Economic and management principles | KZ | 4 | |
| This course is air | ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with | fields: enterprise f | oundation, | |
| enterprise putting | into state economic environment (CR), management of property and capital structure, business transaction records keeping during ar | ٠. | d, a relation | |
| 515 555 | between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination | | | |
| BIE-EPR | Economic project | Z | 1 | |
| BIE-FTR.1 | This course is an extension of the course Introduction to European Economic History (BIE-EHD). Financial Markets | Z,ZK | 5 | |
| | has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on | , | | |
| | rket activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activitie | | | |
| - | nools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of final | = | - | |
| Markets cours | se thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistic | | is field. | |
| BIE-GRA | Graph Algorithms and Complexity Theory | Z,ZK | 5 | |
| - | erview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand algorithmic methods of solving graph problems. | | | |
| domains of graph t | theory (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer science Turing machine models and issues of NP-completeness and NP-hardness. | background: they | understand | |
| BIE-HMI | History of Mathematics and Informatics | Z.ZK | 3 | |
| | er the methods traditionally used in mathematics and related disciplines - informatics - from different periods of the development of math | , | - | |
| | acquainted with mathematical methods suitable for applications in contemporary computer science. | , | | |
| BIE-HWB | Hardware Security | Z,ZK | 5 | |
| | s with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with | | | |
| | ules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi | | | |
| including side-char | nnel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec | ٠, ٠ | applications | |
| BIE-IMA | and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of | 7 | 1 | |
| | Introduction to Mathematics nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a | _ | 4 in particular | |
| Oludents remestra | examples. | ible to apply them | in particular | |
| BIE-IMA2 | Introduction to Mathematics 2 | Z | 2 | |
| | nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a | ble to apply them | | |
| | | | | |
| | examples. | | | |
| BIE-KOM | Conceptual Modelling | Z,ZK | 5 | |
| The course focuse | Conceptual Modelling son the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abi | lity to distinguish k | ey concepts | |
| The course focuse in the domain, ca | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will learn the ability of the conceptual models. | lity to distinguish kearn the basics of o | ey concepts ontological | |
| The course focuse in the domain, ca structural modeling | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will leng in OntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Students | lity to distinguish kearn the basics of one will also learn the | ey concepts ontological e basics of | |
| The course focuse in the domain, ca structural modeling | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will learn the ability of the conceptual models. | lity to distinguish kearn the basics of one will also learn the | ey concepts ontological e basics of | |
| The course focuse in the domain, ca structural modeling | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abit tegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will leng in OntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Students ering as a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEM | lity to distinguish kearn the basics of one will also learn the | ey concepts ontological e basics of | |
| The course focuse in the domain, ca structural modelii Enterprise Enginee | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will leng in OntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Students ering as a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEM also designed with regard to the continuity of software implementations. | lity to distinguish kearn the basics of one will also learn the BO methodology. The Z,ZK | ey concepts ontological e basics of he course is | |
| The course focuse in the domain, ca structural modelii Enterprise Enginee BIE-LIN Students understalinear. They know | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will lear in the properties of the structure of enterprises and institutions and their process and learn the DEM also designed with regard to the continuity of software implementations. Linear Algebra Indeed the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies of the basic methods for operating with polynomials and linear spaces. They are able to perform matrix operations and solve systems of the specific principles of the space of the perform matrix operations and solve systems of the specific principles of the perform matrix operations and solve systems of the performance | lity to distinguish kearn the basics of one will also learn the IO methodology. The Z,ZK among componer of linear equations. | ey concepts ontological e basics of he course is 7 nts are only | |
| The course focuse in the domain, ca structural modelii Enterprise Enginee BIE-LIN Students understa linear. They know | Conceptual Modelling s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abilitegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will lead in the process of the process and learn to express the rules and limitations of everyday reality using the OCL language. Students are a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEM also designed with regard to the continuity of software implementations. Linear Algebra Independent of algebra and mathematical principles of linear models of systems around us, where the dependencies of the basic methods for operating with polynomials and linear spaces. They are able to perform matrix operations and solve systems opply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand error-detecting and error-corrections. | lity to distinguish kearn the basics of one will also learn the BO methodology. The Example of Linear equations, ecting codes. | ey concepts ontological e basics of he course is 7 nts are only . They can | |
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| BIE-PJP Students master ba | | | |
|--|--|--|--|
| Students master ba | Programming Languages and Compilers | Z,ZK | 5 |
| | isic methods of implementation of common high-level programming languages. They get experience with the design and implementati | on of individual cor | mpiler parts |
| for a simple progra | ımming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has | a certain syntax ir | nto a target |
| form and write a co | mpiler 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 | er programs |
| | for parsing and processing text in a language defined by a LL(1) grammar. | | |
| BIE-PJV | Programming in Java | Z,ZK | 4 |
| | Tento kurz je prezentován v angli tin . Existuje ale také eská varianta BI-PJV a BIK-PJV. | · | |
| BIE-PKM | Preparatory Mathematics | Z | 4 |
| ' | The purpose of Preparatory Mathematics is to help students revise the most important topics of high-school mathematics. | ' | |
| BIE-PPA | Programming Paradigms | Z,ZK | 5 |
| BIE-PRR.21 | Project ma19nagement | Z,ZK | 5 |
| | urse is to introduce students into the basic concepts and principles of project management, i.e. methods of planning, teamwork, analy | | _ |
| | cation, argumentation and meeting management. Students will practice project management techniques (e.g. SWOT analysis, risk as | - | |
| | purce schedule, resource balancing, network graphs) and creation of project documentation. The course is designed especially for stu- | | - |
| | nowledge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in larg | | |
| deepering their ki | also suitable for all those who will develop software or hardware in the form of team projects. | ge companies. The | COUISC IS |
| DIE DC2 | | 7 7V | 4 |
| BIE-PS2 | Programming in shell 2 | Z,ZK | |
| | eral overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In additi | | - |
| _ | shell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus stu | | - |
| · · | vide even very basic Bourne shell usage. Depending on actual knowledge of the students, orientation in user filesystem tools (cp, In, | • | |
| data ilitering tool | s (cut, tr, sort, uniq) can be provided. The advantage of this module is that we do not stop at this point - we will show you also a selection to the provided in practice. | ection of advanced | scripting |
| DIE DOI | techniques used in practice. | 7.71 | |
| BIE-PSI | Computer Networks | Z,ZK | 5 |
| | nd the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing | - | - |
| of the ISO OSI mo | del. 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. | | |
| BIE-PST | Probability and Statistics | Z,ZK | 5 |
| The students will le | arn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable | s. They will be able | to to apply |
| basic models of rai | ndom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical inductic | on they will be able | to perform |
| estimations of unkr | nown distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the st | atistical dependen | ce of two or |
| | more random variables. | | |
| BIE-SAP | Computer Structures and Architectures | Z,ZK | 6 |
| Students understa | nd basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inpu | its, outputs, data s | torage and |
| transfer | In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern of | digital design tools. | |
| BIE-SCE1 | Computer Engineering Seminar I | Z | 4 |
| | mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to | failures and attack | s. Students |
| | dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the | | |
| | rofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher | · · | |
| | | | |
| | semester. | o. The topice are in | CW IOI Cacii |
| BIF-SCE2 | semester. Computer Engineering Seminar II | | |
| BIE-SCE2 | Computer Engineering Seminar II | Z | 4 |
| The Seminar of Cor | Computer Engineering Seminar II mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to | Z failures and attack | 4 ss. Students |
| The Seminar of Cor are approached in | Computer Engineering Seminar II nputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the | Z failures and attack subject is work wit | 4 ss. Students |
| The Seminar of Cor are approached in | Computer Engineering Seminar II mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the rofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher | Z failures and attack subject is work wit | 4 ss. Students |
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| BIE-TED | Electronic Documentation Design | KZ | 5 |
|--------------------|---|----------------------|----------------|
| | í správn psát technické zprávy za použití konfigurovatelných nástroj vhodných pro informatické profesionály. Rozší í své schopno- lektronických dokument . Seznámí se s dokumentováním softwarových projekt , zejména se základy UML a s dokumentováním zdr | | ou k tvorb |
| BIE-TJV | Java Technology | Z,ZK | 4 |
| Γhe subject goal i | s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programm | ing. This subject p | resents how |
| to build the three | e and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWei course end is student able to create three layers enterprise application. | b services, JNDI e | etc.). At the |
| BIE-UOS | Introduction to Operating Systems | KZ | 5 |
| Students becom | e advanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Windows. They understand the fundament | al principles of the | operating |
| stems (file syste | ms, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, w shell, basic commands, and filters. | ith hands-on expe | rience of th |
| BIE-VAK.21 | Selected Combinatorics Applications | Z | 3 |
| ne course aims to | introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the b | asic courses, we | approach th |
| sue from applica | tions to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basi | c data structures. | Furthermore |
| ith the active par | ticipation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) inf | ormatics. Areas fro | om which we |
| will select proble | ns to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimiz | ation and more. S | tudents will |
| | also try to implement solutions to the studied problems with a special focus on the effective use of existing tools. | | |
| BIE-VWM | Searching Web and Multimedia Databases | Z,ZK | 5 |
| udents gain basi | r c knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogeno | us data repository. | . İn particula |
| the students wi | Il understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity re | etrieval methods fo | ocused on |
| | heterogenous multimedia databases (unstructured data collections, respectively). | | |
| BIE-VZD | Data Mining | Z,ZK | 4 |
| | problems (classification, regression, clustering). | | |
| BIE-ZDM | Elements of Discrete Mathematics | Z,ZK | 5 |
| tudents get both | a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula appr recurrent equations. | oximation, and too | ols for solvin |
| 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 a | and reasoning and | I are able to |
| use basic proof to | echniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the li | nks between the in | ntegrals and |
| ums of sequence | es. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions. This cou | urse is last taught | in the winte |
| | semester 2021/22 (B211). Latecomers who fail to meet it can replace it with a pair of courses BIE-MA1.21 and BIE-MA2.2 | .1. | |
| BIE-ZRS | Basics of System Control | Z,ZK | 4 |
| Volitelný p edm | t základy ízení systém je ur en pro všechny zájemce o aplikovanou informatiku v bakalá ském studiu. Alespo pehledové znalost | i oboru automaticl | kého ízení |
| udou pro naše a | bsolventy jist konkuren ní výhodou a zhodnotí je bezesporu v pr myslové praxi. Studenti získají znalosti v dynamicky se rozvíjejícír | n oboru s velkou b | oudoucností |
| am íme se zejm | iéna na ízení inženýrských a fyzikálních sysém . Poskytneme vám základní informace z oblasti zp tnovazebního ízení lineárních d | ynamických jedno | rozm rovýc |
| stém . Seznámí | me vás s metodami vytvá ení popisu a modelu systém , základní analýzou lineárních dynamických systém a návrhem a ov ením j | ednoduchých zp t | tnovazební |
| - | egulátor. Pozornost je v nována rovn ž sníma m a ak ním len m v regula ních obvodech, otázkám stability regula ních obvod, | - | |
| astavování param | ietr regulátoru a n kterým aspekt m pr myslových realizací spojitých a íslicových regulátor . Jednotlivá témata p ednášek jsou pro | ovázena množství | m užite nýc |
| | p íklad a praktických pr myslových realizací. | | |
| BIE-ZUM | Artificial Intelligence Fundamentals | Z,ZK | 4 |
| | uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classic ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm be presented as well. | | |
| FI-HPZ | Humanitní p edm t z výjezdu v zahrani í | Z | 3 |
| | itních podmít z výjezdu v zahrani í" zast ešuje ve studijním plánu povahou humanitní p edmíty získané studenty v rámci jejich výjezd | 1 | |
| | tedy spln ní náhradou a o uznání rozhoduje prod kan pro studijní a pedagogickou innost v zastoupení d kana a to na základ žádí | | ., |
| T) (01// | | T | |

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