# Recomended pass through the study plan

## Name of the pass: Bachelor branch Computer Engineering, in Czech, 2015-2020

Faculty/Institute/Others:
Department:
Pass through the study plan: Bachelor branch Computer Engineering, in Czech, 2015-2020
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Informatics, valid until 2024
Type of study: Bachelor full-time
Note on the pass: Studenti, kteří opakují studium a mají uznaný předmět ADS, mohou požádat proděkana o uznání zápočtu z předmětu SSB.# Předmět EMP je ekvivalentní staršímu předmětu EPD. Platí obousměrná zastupitelnost. Oba předměty lze zapsat dohromady nejvýše dvakrát.#

**Coding of roles of courses and groups of courses:**
**P - compulsory courses of the program, PO - compulsory courses of the branch, Z - compulsory courses, S - compulsory elective courses, PV - compulsory elective courses, F - elective specialized courses, V - elective courses, T - physical training courses**

**Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):**
**KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester**

Number of semester: 1

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-CAO | **Digital and Analog Circuits** ***Martin Kohlík*** | Z,ZK | 5 | 2P+2C | Z | PP |
| BI-MLO | **Mathematical Logic** *Kateřina Trlifajová* ***Kateřina Trlifajová*** *Kateřina Trlifajová (Gar.)* | Z,ZK | 5 | 2P+1C | Z | PP |
| BI-PA1 | **Programming and Algorithmics 1** ***Ladislav Vagner*** | Z,ZK | 6 | 2P+2R+2C | Z | PP |
| BI-PS1 | **Programming in Shell 1** ***Zdeněk Muzikář*** | KZ | 5 | 2P+2C | Z | PP |
| BI-ZMA | **Elements of Calculus** *Ivo Petr* ***Ivo Petr*** *Tomáš Kalvoda (Gar.)* | Z,ZK | 6 | 3P+2C | Z | PP |
| BI-PAI | **Law and Informatics** ***Zdeněk Kučera*** | ZK | 3 | 2P | Z | PO |
| BI-PT.2015 | **Povinná tělesná výchova bakalářského programu Informatika, verze 2015** *TV1,TVV,..... (see the list of groups below)* | Min. cours. 2 | Min/Max 0/ | | | PT |

Number of semester: 2

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-DBS | **Database Systems** ***Jiří Hunka*** | Z,ZK | 6 | 2P+2R+1L | Z,L | PP |
| BI-LIN | **Linear Algebra** *Daniel Dombek* ***Daniel Dombek*** *Daniel Dombek (Gar.)* | Z,ZK | 7 | 4P+2C | L | PP |
| BI-PA2 | **Programming and Algorithmics 2** ***Ladislav Vagner*** | Z,ZK | 7 | 2P+1R+2C | L | PP |
| BI-SAP | **Computer Structure and Architecture** ***Hana Kubátová*** | Z,ZK | 6 | 2P+1R+2C | L | PP |
| BI-PT.2015 | **Povinná tělesná výchova bakalářského programu Informatika, verze 2015** *TV1,TVV,..... (see the list of groups below)* | Min. cours. 2 | Min/Max 0/ | | | PT |
| BI-V.2017 | **Čistě volitelné předměty bakalářského programu BI, verze 2017** *BI-ALO,BI-AVI.21,..... (see the list of groups below)* | Min. cours. 0 | Min/Max 0/ | | | V |

Number of semester: 3

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-AG1 | **Algorithms and Graphs 1** ***Dušan Knop*** | Z,ZK | 6 | 2P+2C | Z | PP |
| BI-AAG | **Automata and Grammars** ***Jan Janoušek*** | Z,ZK | 6 | 2P+2C | Z | PP |
| BI-ZDM | **Elements of Discrete Mathematics** *Jan Legerský, Jiřina Scholtzová **Jiřina Scholtzová** Josef Kolář (Gar.)* | Z,ZK | 5 | 2P+2C | Z | PP |
| BI-APS.1 | **Architectures of Computer Systems** ***Pavel Tvrdík*** | Z,ZK | 5 | 2P+2C | Z | PO |
| BI-JPO | **Computer Units** ***Alois Pluháček*** | Z,ZK | 5 | 2P+2C | Z | PO |
| BI-V.2017 | **Čistě volitelné předměty bakalářského programu BI, verze 2017** *BI-ALO,BI-AVI.21,..... (see the list of groups below)* | Min. cours. 0 | Min/Max 0/ | | | V |

## Number of semester: 4

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-BEZ | **Security** ***Jiří Dostál*** | Z,ZK | 6 | 2P+2C | L | PP |
| BI-OSY | **Operating Systems** ***Ladislav Vagner*** | Z,ZK | 5 | 2P+1R+1L | L | PP |
| BI-PSI | **Computer Networks** ***Jan Fesl*** | Z,ZK | 5 | 2P+1R+1C | L | PP |
| BI-VES | **Embedded Systems** ***Miroslav Skrbek*** | Z,ZK | 5 | 2P+2C | L | PO |
| BI-EMP | **Economics and Management Principles** *David Buchtela, Petra Pavlíčková **David Buchtela** David Buchtela (Gar.)* | KZ | 4 | 2P+2C | Z,L | PE |
| BI-V.2017 | **Čistě volitelné předměty bakalářského programu BI, verze 2017** *BI-ALO,BI-AVI.21,..... (see the list of groups below)* | Min. cours. 0 | Min/Max 0/ | | | V |

## Number of semester: 5

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-BPR | **Bachelor project** *Zdeněk Muzikář **Zdeněk Muzikář** Zdeněk Muzikář (Gar.)* | Z | 2 | | Z,L | PP |
| BI-PST | **Probability and Statistics** ***Petr Novák*** | Z,ZK | 5 | 2P+1R+1C | Z | PP |
| BI-SI1.2 | **Software Engineering I** *Jiří Mlejnek, Zdeněk Rybola **Zdeněk Rybola** Jiří Mlejnek (Gar.)* | Z,ZK | 5 | 2P+1C | Z,L | PP |
| BI-PNO | **Practical Digital Design** *Martin Novotný **Martin Novotný** Martin Novotný (Gar.)* | KZ | 5 | 2P+2C | Z | PO |
| BI-SRC | **Real-time systems** *Jaroslav Borecký, Hana Kubátová **Jaroslav Borecký** Hana Kubátová (Gar.)* | KZ | 4 | 2P+2C | Z | PO |
| BI-ZRS | **Basics of System Control** ***Kateřina Hyniová*** | Z,ZK | 4 | 2P+2C | Z | PO |
| BI-V.2017 | **Čistě volitelné předměty bakalářského programu BI, verze 2017** *BI-ALO,BI-AVI.21,..... (see the list of groups below)* | Min. cours. 0 | Min/Max 0/ | | | V |

## Number of semester: 6

| Code | Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)* | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| BI-BAP | **Bachelor Thesis** ***Zdeněk Muzikář*** *Zdeněk Muzikář (Gar.)* | Z | 14 | | L,Z | PP |
| BI-DPR | **Document., Presentation, Rhetorics** *Ondřej Guth, Petra Pavlíčková, Alena Libánská, Dana Vynikarová **Ondřej Guth** Dana Vynikarová (Gar.)* | KZ | 4 | 2P+2C | Z,L | PP |
| BI-PV-EM.2015 | **Povinně volitelné ekonomicko manažerské předměty bc. programu Informatika, ver. 2015** *BI-DAN,FI-VEZ,..... (see the list of groups below)* | Min. cours. 1 | Min/Max 4/12 | | | VE |

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|---|---|---|---|---|---|---|
| | | Max. cours. 3 | | | | |
| BI-ZKA | **Zkouška z angličtiny 2009**<br>*BI-ANG1,BIE-EEC,..... (see the list of groups below)* | Min. cours. 1<br>Max. cours. 1 | Min/Max 2/4 | | | PJ |
| BI-PV-HU.2015 | **Povinně volitelné humanitní předměty bakalářského programu Informatika, verze 2015**<br>*FI-FIL,BI-HMI,..... (see the list of groups below)* | Min. cours. 1 | Min/Max 2/6 | | | VH |
| BI-V.2017 | **Čistě volitelné předměty bakalářského programu BI, verze 2017**<br>*BI-ALO,BI-AVI.21,..... (see the list of groups below)* | Min. cours. 0 | Min/Max 0/ | | | V |

## List of groups of courses of this pass with the complete content of members of individual groups

| Kód | Name of the group of courses and codes of members of this group (for specification see here or below the list of courses) | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| **BI-PT.2015** | **Povinná tělesná výchova bakalářského programu Informatika, verze 2015** | **Min. cours. 2** | **Min/Max** 0/ | | | **PT** |

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|---|---|---|---|---|---|
| TV1 | Physical Education | TVV | Physical education | TVV0 | Physical education |
| TV2 | Physical Education | TVKLV | Physical Education Course | TVKZV | Physical Education Course |

| | | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| **BI-PV-EM.2015** | **Povinně volitelné ekonomicko manažerské předměty bc. programu Informatika, ver. 2015** | **Min. cours. 1**<br>**Max. cours. 3** | **Min/Max** 4/12 | | | **VE** |

| | | | | | |
|---|---|---|---|---|---|
| BI-DAN | Taxes for non-Economists | FI-VEZ | economic-managerial course from ... | BI-FTR.1 | Financial Markets |
| BI-MEK | Macroeconomic Context of Domesti ... | BI-PRP | Law and business | BI-PRR | Project management |
| BI-SEP | World Economy and Business | BI-MIK | Fundamentals of Microeconomics | | |

| | | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| **BI-PV-HU.2015** | **Povinně volitelné humanitní předměty bakalářského programu Informatika, verze 2015** | **Min. cours. 1** | **Min/Max** 2/6 | | | **VH** |

| | | | | | |
|---|---|---|---|---|---|
| FI-FIL | Philosophy | BI-HMI | History of Mathematics and Infor ... | FI-HTE | History of Technology and Econom ... |
| FI-HPZ | Humanities subject from a study ... | FI-MPL | Managerial Psychology | BI-EHD | Introduction to European Economi ... |
| FI-KSA | Cultural and Social Anthropology | BI-KSA | Cultural and Social Anthropology | FI-ULI | Introduction to Linguistics for ... |
| FI-GNO | Introduction to Gnoseology | | | | |

| | | Completion | Credits | Scope | Semester | Role |
|---|---|---|---|---|---|---|
| **BI-V.2017** | **Čistě volitelné předměty bakalářského programu BI, verze 2017** | **Min. cours. 0** | **Min/Max** 0/ | | | **V** |

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|---|---|---|---|---|---|
| BI-ALO | Algebra and Logic | BI-AVI.21 | Algorithms visually | BI-A2L | English language, preparation fo ... |
| BI-APJ | Aplication Programming in Java | NI-AFP | Applied Functional Programming | BIE-ZUM | Artificial Intelligence Fundamen ... |
| BI-BLE | Blender | NI-DSP | Database Systems in Practes | BI-STO | Storage and Filesystems |
| NI-DZO | Digital Image Processing | NI-DDM | Distributed Data Mining | BI-EP1 | Effective programming 1 |
| BI-EP2 | Efficient Programming 2 | BI-EJA | Enterprise Java | BI-FMU | Financial and Management Account ... |
| BI-HAM | HW accelerated network traffic m ... | BI-ARD | Interactive applications on Ardu ... | NI-IAM | Internet and Multimedia |
| BIE-IMA2 | Introduction to Mathematics 2 | BI-CS2 | C# language and data access | BI-CS3 | Language C# - design of web appl ... |
| BI-SQL.1 | Language SQL, advanced | BI-QAP | Quantum algorithms and programmi ... | NI-LSM | Statistical Modelling Lab |
| NI-MPL | Managerial Psychology | NI-MSI | Mathematical Structures in Compu ... | BI-MPP.21 | Methods of interfacing periphera ... |
| BI-MIT | Mikrotik technologies | NI-MOP | Modern Object-Oriented Programmi ... | BI-MVT.21 | Modern Visualisation Technologie ... |
| BI-MMP | Multimedia team project | NI-OLI | Linux Drivers | BI-ACM | Programming Practices 1 |
| BI-ACM2 | Programming Practices 2 | BI-ACM3 | Programming Practices 3 | BI-ACM4 | Programming Practices 4 |
| BI-AND.21 | Programming for the Android Oper ... | BI-CS1 | Programming in C# | BI-PJV | Programming in Java |
| BI-PJS.1 | JavaScript Programming | BI-KOT | Programing in Kotlin | NI-PSL | Programming in Scala |
| BI-PMA | Programming in Mathematica | BI-PHP.1 | Programing in PHP | BI-PS2 | Programming in shell 2 |
| NI-PDD | Data Preprocessing | BI-PKM | Introduction to mathematics | NI-REV | Reverse Engineering |
| BI-SCE1 | Computer Engineering Seminar I | BI-SCE2 | Computer Engineering Seminar II | BI-ST1 | Network Technology 1 |
| BI-ST2 | Network Technology 2 | BI-ST3 | Network Technology 3 | BI-ST4 | Network Technology 4 |
| BI-SOJ | Machine Oriented Languages | BI-SVZ | Machine vision and image process ... | NI-SYP | Parsing and Compilers |
| BI-GIT | Version control system GIT | BI-TS1 | Theoretical Seminar I | BI-TS2 | Theoretical Seminar II |
| BI-TS3 | Theoretical Seminar III | BI-TS4 | Theoretical Seminar IV | BI-TDA | Test driven architecture |
| NI-TSP | Testing and Reliability | BI-CCN | Compiler Construction | BI-TEX | TeX and Typography |
| BI-ULI | Introduction to Linux | BI-OPT | Introduction to Optical Networks | NI-VCC | Virtualization and Cloud Computi ... |
| BI-VHS | Virtual game worlds | BI-VR1 | Virtual reality I | BI-VR2 | Virtual reality II |
| BI-VAK.21 | Selected Applications of Combina ... | BI-VMM | Selected Mathematical Methods | NI-VYC | Computability |
| BI-ZS10 | Bachelor internship abroad for 1 ... | BI-ZS20 | Bachelor internship abroad for 2 ... | BI-ZS30 | Bachelor internship abroad for 3 ... |
| BI-ZIVS | Intelligent Embedded System Fund ... | BI-ZPI | Process engineering | BI-ZNF | PHP Framework Nette - basics |
| BI-ZRS | Basics of System Control | BI-IOS | Fundamentals of iOS Application ... | BI-ZWU | Introduction to Web and User Int ... |
| BI-3DT.1 | 3D Printing | | | | |

| BI-ZKA | Zkouška z angličtiny 2009 | Min. cours. 1<br>Max. cours. 1 | Min/Max 2/4 | | | PJ |
|---|---|---|---|---|---|---|
| BI-ANG1 | English Language Examination wit ... | BIE-EEC | English language external certif ... | BI-ANG | English Language, Internal Certi ... | |

## List of courses of this pass:

| Code | Name of the course | Completion | Credits |
|---|---|---|---|
| BI-3DT.1 | 3D Printing | KZ | 4 |
| BI-A2L | English language, preparation for the B2 level exam | Z | 2 |
| The content of the course corresponds to the preparation for the English exam at the B2 level. Requirements for course credit. Academic Achievement - students are due to: -Take an active part in the language instruction. -Meet the requirements for writing assignments - Summary, Abstract, Argumentation Paper. -Succeed in both the midterm and the final term tests with the success rate set at 70%. -80% and over in BOTH tests means ORAL EXAM ONLY (no written part). Requirements will be specified by individual teachers during the first class of the term. | | | |
| BI-AAG | Automata and Grammars | Z,ZK | 6 |
| Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite automata, regular expressions and regular grammars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, Relationships between formal languages and automata. Knowledge acquired through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation, and design of digital circuits. | | | |
| BI-ACM | Programming Practices 1<br>This course is presented in Czech. | KZ | 5 |
| BI-ACM2 | Programming Practices 2<br>This course is presented in Czech. | KZ | 5 |
| BI-ACM3 | Programming Practices 3<br>This course is presented in Czech. | KZ | 5 |
| BI-ACM4 | Programming Practices 4<br>This course is presented in Czech. | KZ | 5 |
| BI-AG1 | Algorithms and Graphs 1 | Z,ZK | 6 |
| The course covers the basics of efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing curriculum. It links and partially develops the knowledge from the course BI-DML.21, in which students acquire the knowledge and skills in combinatorics necessary for evaluating the time and space complexity of algorithms. The course also follows up knowledge from BI-MA1.21, the practical usage of asymptotic mathematics, in particular, the asymptotic notation. | | | |
| BI-ALO | Algebra and Logic<br>The course extends and deepens the study of topics touched upon in the basic course in logic. | Z,ZK | 4 |
| BI-AND.21 | Programming for the Android Operating System<br>This course is presented in Czech. | KZ | 4 |
| BI-ANG | English Language, Internal Certificate<br>Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG | ZK | 2 |
| BI-ANG1 | English Language Examination without Preparatory Courses | Z,ZK | 2 |
| BI-APJ | Aplication Programming in Java<br>This course is presented in Czech. Advanced technologies in Java. | Z,ZK | 4 |
| BI-APS.1 | Architectures of Computer Systems | Z,ZK | 5 |
| Students will learn the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Special emphasis is given on the pipelined instruction processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the principles of instruction processing not only in scalar processors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the sequential model of programs. The course further elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and consistency in such systems. | | | |
| BI-ARD | Interactive applications on Arduino | KZ | 4 |
| The subject is designed for students of first grade of bachelor study as introduction to embedded systems. Students will learn how to design simple applications for modern programmable kits and control varied peripherals with help of available libraries. The goal of the subject is to show varied software approaches to control embedded systems, i.e. to see the results not only on display of a PC. Thanks to possible control on higher (objective) layer, this platform is frequently used for artist performance and therefore is suitable even for Web and Software Engineering students. | | | |
| BI-AVI.21 | Algorithms visually | Z,ZK | 4 |
| The course complements other algorithm courses at FIT. It brings knowledge about particular important algorithms from different fields of the computer science that extend substantially knowledge presented in BI-AG1 and BI-AG2. A wide scope of covered subject is made possible due to using visualization bz Algovision (www.algovision.org<http://www.algovision.org>) that make understanding the principles of algorithms easy. | | | |
| BI-BAP | Bachelor Thesis | Z | 14 |
| BI-BEZ | Security | Z,ZK | 6 |
| Students understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric cryptosystems, and hash functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptosystems for computer systems. They are able to use properly and securely cryptographic primitives and systems that are based on these primitives. | | | |
| BI-BLE | Blender | Z,ZK | 4 |
| The course extends knowledge of opensource program Blender from BI-MGA (Multimedia and Graphics Applications) course. It is intended for those interested in 3D graphics and animation. It offers a complete and practically oriented introduction to Blender environment. Students may continue to BI-PGA (Programming graphics applications) course. | | | |
| BI-BPR | Bachelor project | Z | 2 |

| | | | |
|---|---|---|---|
| BI-CAO | Digital and Analog Circuits | Z,ZK | 5 |
| Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and principles of functionality of transistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between analog and digital modes of electronic devices. | | | |
| BI-CCN | Compiler Construction | Z,ZK | 5 |
| This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles of compilers for students to understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme of the class. | | | |
| BI-CS1 | Programming in C# | KZ | 4 |
| The goal of the course is to introduce .NET Framework as a multi-language development platform. Then, programming language C#, its fundamental construction, types of variables, operators, arrays, loops, definitions and calls of functions will be discussed. Attention is focused on the object oriented programming in C# - class definition and class instancing, constructors, methods, properties, static members, Garbage Collector, inheritance and polymorphism, collections, delegates, and generics. Debugging and exception processing, as well as work with files are emphasized. | | | |
| BI-CS2 | C# language and data access | KZ | 4 |
| The C# language and data access course objective is to introduce students several data access technologies - database, XML, NoSQL - on the Microsoft platform. The students will get to know objects used to retrieve data - Connection, Command, Data Reader and DataAdapter v ADO.NET. Next, they will learn to use current technologies such as LINQ - a set of features for querying and updating data, integrated directly with the .NET platform languages, which enable LINQ use with Objects, XML and SQL (LINQ to Objects, LINQ to XML and LINQ to SQL). Another objective is the Entity Framework - an object-relational mapper that enables .NET developers to work with relational data using domain-specific objects (ORM). This part of the course introduces Code First, Database First, Model First approaches. The students will also get to know the Conceptual Model, Storage Model and Mapping (XML description). | | | |
| BI-CS3 | Language C# - design of web applications | KZ | 4 |
| The students will be introduced to current technologies in web application development on the .NET platform. They will acquire a comprehensive overview of the development possibilities on thisplatform. They will learn to create WebAPI and to use it by client programs. | | | |
| BI-DAN | Taxes for non-Economists | Z,ZK | 4 |
| Taxes, including social insurance contributions, are obligatory payments paid by people or institutions to public budgets. This is the way how a significant portion of GDP is redistributed. This course concerns who pays which taxes or who bears the tax burden. The course introduces students to the tax theory and policy fundamentals and shows how they affect taxation of income, consumption, and wealth. The course provides practical information on calculations of tax liabilities of both citizens and institutions as well as information about important taxpayers´ formal duties towards public administration. | | | |
| BI-DBS | Database Systems | Z,ZK | 6 |
| Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn to design small databases (including integrity constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the SQL language, as well as with its theoretical foundation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the fundamental concepts of transaction processing, controlling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to special ways of storing data in relational databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores. | | | |
| BI-DPR | Document., Presentation, Rhetorics | KZ | 4 |
| This subject is aimed to the professional communication and writing of the scientific texts (bachelor´s and diploma thesis). Students will learn to create and prepare interactive presentations and presenting before an audience. Students will also learn to write technical reports and scientific texts. | | | |
| BI-EHD | Introduction to European Economic History | Z,ZK | 3 |
| This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). | | | |
| BI-EJA | Enterprise Java | Z,ZK | 4 |
| The course is on advanced technologies in the Java programming language. The focus is on technologies for development of enterprise information systems which are connected to a database and are accessed through the web interface. | | | |
| BI-EMP | Economics and Management Principles | KZ | 4 |
| This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with fields: enterprise foundation, enterprise putting into state economic environment (CR), management of property and capital structure, business transaction records keeping during an accounting period, a relation between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination. | | | |
| BI-EP1 | Effective programming 1 | Z | 4 |
| The course is taught in Czech. | | | |
| BI-EP2 | Efficient Programming 2 | KZ | 4 |
| Continuation of Efficient Programming 1. Students will practice implementation of algorithms by solving typical problems. Various ways of solving individual problems are discussed, with the aim to choose the best one and avoid implementation errors. | | | |
| BI-FMU | Financial and Management Accounting | Z,ZK | 5 |
| The aim of the course is explanation of basic terms in the theory of accounting, the principles of balancing the property amounts and liabilities in the particular accounting operations, operations in accounts and accounting statements including opening and closing of bookkeeping. The course provides students with a legal modification of bookkeeping, description of economic operations based on current methods of double-entry bookkeeping for enterprising subjects in the Czech Republic. Principles of management accounting are base of Business Inteligence moduls in Business information systems. | | | |
| BI-FTR.1 | Financial Markets | Z,ZK | 5 |
| This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). | | | |
| BI-GIT | Version control system GIT | KZ | 2 |
| Students will be introduced to basic principles of version control systems. These principles will be then shown on DCVS Git both theoretically and practically. In this particular system even the implementation details will be shown. Students will be challenged to use Git as users, project managers, team leaders as well as Git server administrators. | | | |
| BI-HAM | HW accelerated network traffic monitoring | KZ | 4 |
| This course introduces students to modern and widely used technologies and principles in the area of network infrastructure and traffic monitoring. The monitoring and analysis of network traffic are mandatory skills to network operators (planning and development of resources and infrastructure) and security analysts alike (as a source of information and data for analysis). The goals of the course are to acquaint students with the modern trends and cornerstone principles in the area of monitoring network traffic on a hardware and software level and to develop their practical abilities in this field. | | | |
| BI-HMI | History of Mathematics and Informatics | Z,ZK | 3 |
| This course is presented in Czech. | | | |
| BI-IOS | Fundamentals of iOS Application Development for iPhone and iPad | KZ | 4 |
| This course is presented in Czech. | | | |

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|---|---|---|---|
| BI-JPO | Computer Units | Z,ZK | 5 |
| Students deepen their basic knowledge of digital computer units acquired in the obligatory course of the program (BIE-SAP), get acquainted in detail with the internal structure and organization of computer units and processors and their interactions with the environment, including accelerating arithmetic-logic units and using appropriate codes for implementation of multiplication. The organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM) will be discussed in detail, including codes for error detection and correction for parallel and serial data transmissions. They will also get acquainted with the methodology of controller design, with the principles of communication of the processor with the environment and the architecture of the bus system. The problems will be practically evaluated in the labs and with the help of the educational microprogrammed processor simulator and programmable hardware design kits (FPGA). | | | |
| BI-KOT | Programing in Kotlin | Z,ZK | 4 |
| Kotlin is a modern, statically-styled object-functional language that exploits the extensive Java language ecosystem while delivering a number of advanced language constructions. The language is fully Java compliant and allows for mixed projects that preserve existing parts written in Java, and continue with the development of a modern, object-functional way with minimum of boiler-plate code. Last but not least, Kotlin is suitable for designing of DSLs (Domain-Specific Languages). | | | |
| BI-KSA | Cultural and Social Anthropology | ZK | 2 |
| The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity of the world - examples from anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health, history, death, etc ...) will be shown. The course is presented in Czech. | | | |
| BI-LIN | Linear Algebra | Z,ZK | 7 |
| The course is taught in Czech. Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies among components are only linear. They know the basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-correcting codes. | | | |
| BI-MEK | Macroeconomic Context of Domestic and World Economy | Z,ZK | 4 |
| This course is presented in Czech. | | | |
| BI-MIK | Fundamentals of Microeconomics | Z,ZK | 4 |
| This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). | | | |
| BI-MIT | Mikrotik technologies | KZ | 3 |
| The main motivation of the subject stands in the introduction of the RouterOS operating system and some network Mikrotik technologies which are commonly used by the small and middle internet service providers (ISPs). The students learn how to use and create the architectures of the network solutions which are based on the metallic, optical or wireless links and how to administrate and practically deploy them. The successful completion of this subject requires the previous knowledge of elementary computer networks concepts like protocols and technologies of the data-link, network and transport layer of the OSI model. | | | |
| BI-MLO | Mathematical Logic | Z,ZK | 5 |
| The course seminary is taught in Czech. | | | |
| BI-MMP | Multimedia team project | KZ | 4 |
| This course is presented in Czech. | | | |
| BI-MPP.21 | Methods of interfacing peripheral devices | Z,ZK | 5 |
| The course is focused on methods for interfacing of peripheral devices. Interfacing of real peripheral devices is focused on techniques based on Universal serial bus (USB). The course includes both PC side and peripheral devices side. Labs are practically oriented. Students gain experience with implementation of relevant parts of USB devices, Linux and Windows drivers, simple application development, and APIs of selected devices. | | | |
| BI-MVT.21 | Modern Visualisation Technologies | Z,ZK | 5 |
| The goal of the course is to give an overview of modern visualization technologies and their principles, namely technologies related to virtual and augmented reality, visualization on high resolution displays (e.g., SAGE and video mapping) and their applications in practice. Several lectures deal with the content creation for the mentioned technologies, namely fractal and procedural visualization, scientific data visualization, and 3D model scanning. | | | |
| BI-OPT | Introduction to Optical Networks | Z,ZK | 4 |
| Students get basic overview of optical networking technology with the emphasis on practical utilization in Internet and in network infrastructures, on possible problems with deployment of optical network technology and on their solutions. The course will include the history of optical communications, an overview of passive components (optical fibres, multiplexors, dispersion compensators, and others), and an overview of active components (optical switches and amplifiers, high-speed coherent transmission systems). The course will also cover the most up-to-date topics presented at premium research conferences, such as ECOC or OFC. Attention will also be paid to new applications, such as the accurate time on Internet, ultrastable frequency transfer, or sensor networks. The labs will focus on real work with optical components and on measurement of their parameters. Students will solve real tasks from practice. | | | |
| BI-OSY | Operating Systems | Z,ZK | 5 |
| Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and deadlocks, the techniques of the management of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple multithreaded applications. | | | |
| BI-PA1 | Programming and Algorithmics 1 | Z,ZK | 6 |
| Students gain the ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions, statements, functions, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searching, sorting, and manipulating with linked lists. | | | |
| BI-PA2 | Programming and Algorithmics 2 | Z,ZK | 7 |
| Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, queue, enlargeable array, set, table). They can implement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in C++, students are introduced with all C++ features needed to achieve the main objective (operator overloading, templates). | | | |
| BI-PAI | Law and Informatics | ZK | 3 |
| This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). | | | |
| BI-PHP.1 | Programing in PHP | KZ | 4 |
| The course is taught in Czech.. Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 3rd semester of study. | | | |
| BI-PJS.1 | JavaScript Programming | KZ | 4 |
| Main goal of the course is an introduction to Javascript programming. Students will learn also best practices and will use tool that eases development in Javascript. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 4th semester of study. | | | |
| BI-PJV | Programming in Java | Z,ZK | 4 |
| This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753). | | | |

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| BI-PKM | Introduction to mathematics | Z | 4 |
| | This course is presented in Czech. | | |
| BI-PMA | Programming in Mathematica | Z,ZK | 4 |
| | Students will be working with modern technical and scientific software. Students will learn how to use different programming styles (functional programming, rule-based programming, etc.), how to create dynamic interactive applications and visualisations, data processing and presentations. | | |
| BI-PNO | Practical Digital Design | KZ | 5 |
| | Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. Students demonstrate practical use of the design techniques in the module project sing modern, industry-standard CAD design tools. | | |
| BI-PRP | Law and business | Z,ZK | 4 |
| | This course is presented in Czech. | | |
| BI-PRR | Project management | KZ | 4 |
| | This course is presented in Czech. | | |
| BI-PS1 | Programming in Shell 1 | KZ | 5 |
| | Students become knowledgeable users of common Unix-like operating systems. They understand the fundamental principles of the operating systems (file systems, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience of the shell, basic commands, and filters to process various text data. | | |
| BI-PS2 | Programming in shell 2 | Z,ZK | 4 |
| | Students gain a general overview of available scripting languages, their syntax, semantics, programming style, data structures, pros and cons. In addition, they gain a deeper insight into shell and some other particular scripting languages and will get practical experience with shell script programming. | | |
| BI-PSI | Computer Networks | Z,ZK | 5 |
| | Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topics are primarily focused on the 2nd to 4th layer of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students will be able to write a simple network application and configure a simple network. | | |
| BI-PST | Probability and Statistics | Z,ZK | 5 |
| | 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. | | |
| BI-QAP | Quantum algorithms and programming | KZ | 5 |
| | Course aims at giving students hands-on experience with quantum computers and their programming. We focus on fundaments of quantum mechanics, on which quantum technologies are based, and algorithms showing advantages and limitations of quantum computing. During tutorials students work in open-source software development kit Qiskit, which is based on Python language. Knowledge of linear algebra at the level of BI-LA1 and BI-LA2 (or BI-LIN) is necessary. Previous completion of BI-MA2 or BI-VMM and experience with Python might be an advantage. No previous knowledge of physics is assumed. | | |
| BI-SAP | Computer Structure and Architecture | Z,ZK | 6 |
| | Students understand basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inputs, outputs, data storage and transfer. In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital design tools. The subject teaches basic knowledge of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connections to higher programming languages. | | |
| BI-SCE1 | Computer Engineering Seminar I | Z | 4 |
| | The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in KČN laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. | | |
| BI-SCE2 | Computer Engineering Seminar II | Z | 4 |
| | The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in KČN laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. | | |
| BI-SEP | World Economy and Business | Z,ZK | 4 |
| | This course is presented in Czech. The course introduces students of technical university to the international business. It does that predominantly by comparing individual countries and key regions of world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedom, corruption and economic development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of discussions based on individual readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite. | | |
| BI-SI1.2 | Software Engineering I | Z,ZK | 5 |
| | Students learn the methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get practical skill thanks to applying hands-on analysis and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE tools and UML for modelling and solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and testing processes. | | |
| BI-SOJ | Machine Oriented Languages | Z,ZK | 4 |
| | Students of the course will gain an ability to create their own programs in the assembly language of the most common PC platform focusing on optimal use of microprocessor's features and efficient cooperation of software with hardware. Next, there will be discussed x86 specifics of the majority of OSes from the application point of view linked to higher level languages. This knowledge will be used during reverse engineering, optimization, and evaluation of code security. | | |
| BI-SQL.1 | Language SQL, advanced | KZ | 4 |
| | Module is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites, triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL. | | |
| BI-SRC | Real-time systems | KZ | 4 |
| | Students obtain the basic knowledge in the Real-time theory and in the design methods for RT systems including the dependability issues. Thereticla knowledges from lectures will be experimentally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefore the used design kits are the same as in BI-VES subject and FPGA. | | |

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| BI-ST1 | Network Technology 1 | Z | 3 |
| The subject is oriented to providing the students basic information and practical skills from the area of digital and IP networks. The subject is acredited under the Cisco Netacad - CCNA1 - R&S Introduction to Networks. | | | |
| BI-ST2 | Network Technology 2 | Z | 3 |
| This course is presented in Czech. | | | |
| BI-ST3 | Network Technology 3 | Z | 3 |
| Students will further enhance their knowledge acquired from previous BI-ST1 and BI-ST2 courses. Principles of routing and switching presented during BI-ST1 and BI-ST2 courses will get further extended in the course. Students will be able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predictability, extension beyond a simple topology, security, etc. | | | |
| BI-ST4 | Network Technology 4 | Z | 3 |
| Students will further enhance their knowledge already acquired from previous BI-ST1, BI-ST2, and BI-ST3 courses. Principles of routing and switching presented during BI-ST1 and BI-ST2 courses got further extended in BI-ST3. Students were able to start fine-tune protocols' settings to gain certain advantages like increased efficiency, predictability, extension beyond a simple topology, security, etc. This module teaches students to configure and fine-tune Wide Area Networks and to experience a completely other type of network (Non Broadcast Multiple Access) which radically differs from well-known Ethernet (broadcast) type of networks. Students will also manage router and switch firmware, perform password recoveries, and emergency procedures. Also the security aspect is treated; students will learn possible intra- and inter-network attacks and the mitigation ways while maintaining the network running. | | | |
| BI-STO | Storage and Filesystems | Z,ZK | 4 |
| The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archiving, as so as storage scaling, load balancing and high availability. | | | |
| BI-SVZ | Machine vision and image processing | Z,ZK | 5 |
| Camera systems are becoming a common part of life by being universally available. Related to this phenomenon is the need to process and evaluate image information. The course introduces students to different types of camera systems and a variety of methods for image and video processing. The course is focused on practical use of camera systems for solving problems of practice that the graduates may encounter. | | | |
| BI-TDA | Test driven architecture | KZ | 4 |
| The course is focused on practical examples of how to develop, test, and deploy software with tools like GitLab, Docker, Kubernetes, and more that are well known in the DevOps world. This course has a strong connection on courses like BI(E)-SI1 and BI(E)-SI2. The main goal of this course is to learn by examples that occur in the semester project. | | | |
| BI-TEX | TeX and Typography | Z,ZK | 4 |
| This course is presented in Czech. This course gives basics of programming in TeX (plain TeX, ConTeXt, LaTeX, OpTeX, LuaTeX). Te second part of the course focuses on typographic rules. | | | |
| BI-TS1 | Theoretical Seminar I | Z | 4 |
| Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. | | | |
| BI-TS2 | Theoretical Seminar II | Z | 4 |
| Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. | | | |
| BI-TS3 | Theoretical Seminar III | Z | 4 |
| Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. | | | |
| BI-TS4 | Theoretical Seminar IV | Z | 4 |
| Theoretical seminar is intended for students which want to come in deeper contact with contemporary theoretical computer science. It is mostly a classical reading group. The students are treated individually and concern themselves with interesting topics from the latest research in the area. Therefore, an integral part of the course is a work with scientific papers and other scholarly literature. The capacity is limited by the the potentials of the teachers of the seminar. | | | |
| BI-ULI | Introduction to Linux | Z | 2 |
| Students become familiar with the basics of the Linux operating system using e-learning form. They learn to work with the command line and become familiar with basic commands and techniques of a Unix-like system. Topics can be studied first theoretically and then practically verified in a virtual machine (terminal). | | | |
| BI-VAK.21 | Selected Applications of Combinatorics | Z | 3 |
| The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the basic courses, we approach the issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic data structures. Furthermore, with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) informatics. Areas from which we will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimization and more. Students will also try to implement solutions to the studied problems with a special focus on the effective use of existing tools. | | | |
| BI-VES | Embedded Systems | Z,ZK | 5 |
| Students learn to design embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedded processors, their integrated peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools. | | | |
| BI-VHS | Virtual game worlds | ZK | 4 |
| The course leads students to create a complex virtual world. The course is a continuation of basic graphical courses (MGA, PGR, BLE,…). This current students knowledge is furthermore complemented by the theory of game design, principles of writing dialogues and characters in order to create a functional and complex virtual world. The course can be followed by the course MI-PVR with the task of converting scenes and their dynamics into a fully virtual environment suitable for VR devices. | | | |
| BI-VMM | Selected Mathematical Methods | Z,ZK | 4 |
| We start reviewing geometric properties of linear spaces with inner product. Next, we introduce and analyze the discrete Fourier transform (DFT) and its fast implementation (FFT). Further we deal with differential calculus of functions involving multiple variables. We present methods for the localization of extreme values of functions. For this purposes, we study normed linear spaces and quadratic forms. In addition, we introduce the least square method. The last part of the course is devoted to optimization and duality. The linear programming and the Simplex method is analyzed in more detail. | | | |
| BI-VR1 | Virtual reality I | KZ | 4 |
| Introduction to Virtual Reality (VR), virtual reality operating system and virtual reality creation. Another objective is to meet the rules and requirements of virtual worlds communication. The course focuses on the ways of teaching using virtual reality technologies and interactive activities in educational virtual 3D worlds. It improves computational thinking, empathy and shared social activities. | | | |

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| BI-VR2 | Virtual reality II | KZ | 3 |
| Continuation of the course Virtual Reality I. The new course focuses on collaborative telepresence, spatial computing and social life of avatars. The objective is to develop applications for computer science and gamification in various social metaverse and desktop engines. | | | |
| BI-ZDM | Elements of Discrete Mathematics | Z,ZK | 5 |
| Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, tools for solving recurrent equations, and basics of graph theory. | | | |
| BI-ZIVS | Intelligent Embedded System Fundamentals | KZ | 4 |
| Intelligent embedded system fundamentals course is focused on high-level technology embedded systems integrating artificial intelligence. The aim of the course is to teach students modern humanoid robot control and development of applications in a graphical development environment. Lectures provide fundamentals of motion control, sensor reading, application interfaces, robot navigation and development tools. In labs, students program a set of basic task by using the robot simulator and real hardware to get practical experience with these technologies. | | | |
| BI-ZMA | Elements of Calculus | Z,ZK | 6 |
| Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions. | | | |
| BI-ZNF | PHP Framework Nette - basics | KZ | 3 |
| Students will gain the basics of PHP framework Nette. They will learn how to practically work with MVP architecture and various libraries of this Czech popular framework. The resulting knowledge should serve for the efficient creation of a web backend in PHP language. | | | |
| BI-ZPI | Process engineering | KZ | 4 |
| Students will learn fundamentals of process engineering in this subject. Students will get necessary foundations for understanding formal principles of process modelling and they will learn basics of the used notations (UML, BPMN, BORM). The focus in this subject lies in training of practical skills of formalisation and modelling of business processes using modern CASE tools. The role of process engineering for information systems development is discussed as well as its importance in the overall context of information and business strategy of an enterprise. | | | |
| BI-ZRS | Basics of System Control | Z,ZK | 4 |
| The course gives an introduction to the field of automatic control. Students will gain knowledge in this rapidly evolving field of great future. We will focus our attention particularly on control of engineering and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems, description methods of system models, basic linear dynamic systems analysis and design verification, simple PID feedback, PSD, and fuzzy controllers. Students will learn the methods of creating a description of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD, and fuzzy controllers. Attention is also given to sensors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller parameters, and certain aspects of the industrial implementation of continuous and digital controllers and PLC control. | | | |
| BI-ZS10 | Bachelor internship abroad for 10 credits | Z | 10 |
| Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or research institution. Before the internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content and extent of the internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits correspond to 4 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship exceeds the academic year's dead-line. | | | |
| BI-ZS20 | Bachelor internship abroad for 20 credits | Z | 20 |
| Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or research institution. Before the internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content and extent of the internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits correspond to 4 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship exceeds the academic year's dead-line. | | | |
| BI-ZS30 | Bachelor internship abroad for 30 credits | Z | 30 |
| Each student can once within his / her bachelor's study programme have a foreign internship at a foreign university or other foreign scientific and/or research institution. Before the internship the Dean of the FIT, or the vice-dean for study affairs assesses the professional content. The student must provide evidence of the professional content and extent of the internship. Auxiliary courses BI-ZS10, BI-ZS20, BI-ZS30 are used used for the evidence and evaluation of the internship in IS KOS. Every 10 credits correspond to 4 weeks of full-time employment with a foreign institution. The maximum number of credits a student can earn for one internship is 30 credits. This amount can be divided into two subjects if the internship exceeds the academic year's dead-line. | | | |
| BI-ZWU | Introduction to Web and User Interfaces | Z,ZK | 4 |
| This course is presented in Czech. | | | |
| BIE-EEC | English language external certificate | Z | 4 |
| The BIE-ECC course can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English comparable to or exceeding the B2 level of the Common European Framework of Reference for Languages. | | | |
| 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-ZUM | Artificial Intelligence Fundamentals | Z,ZK | 4 |
| Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical tasks from the areas of state space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithms and the neural networks, will be presented as well. | | | |
| FI-FIL | Philosophy | ZK | 2 |
| see A0B16 | | | |
| FI-GNO | Introduction to Gnoseology | ZK | 2 |
| Předmět studenty uvádí do teorie poznání, systémovým pohledem nahlíží na pole kultury, na vztahy a rozdíly mezi přírodními a humánními obory, vědou a uměním. Rozborem dějin modernismu a myšlenkových proudů 20. století jsou ukázány proměny paradigmat a převrat k postmodernismu, analýzou paralelismů ve vědě a umění odhaleny mechanismy tvůrčích procesů. V návaznosti na teorii přírodních jazyků a sémiotiky je vedena diskuze i o kognitivních procesech, v historickém přehledu nastíněna hlediska estetického vnímání. Samostatnou kapitolou jsou modely spojitých přírodních soustav a systémů, v závěru přednášek je pozornost věnována filozofii vědy a otázkám udržitelného rozvoje. Předmět přednáší a garantuje Ing. Ivo Janoušek CSc. | | | |
| FI-HPZ | Humanities subject from a study abroad | Z | 3 |
| A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that is required in the curriculum. The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student. | | | |

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| FI-HTE | History of Technology and Economics | ZK | 2 |
| The course introduces the scientific disciplines of history and technology , economic and social history of the Czech lands and Czechoslovakia in comparison with the development of the European region 19 to 21 century . | | | |
| FI-KSA | Cultural and Social Anthropology | ZK | 2 |
| The one-semester course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity of the world - examples from anthropological research from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health, history, death, etc ...) will be shown. The course is an interesting alternative to other humanities, taught at FIT. | | | |
| FI-MPL | Managerial Psychology | ZK | 2 |
| FI-ULI | Introduction to Linguistics for Computer | ZK | 2 |
| This course is presented in Czech. | | | |
| FI-VEZ | economic-managerial course from a study abroad | Z | 4 |
| A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that is required in the curriculum. The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student. | | | |
| NI-AFP | Applied Functional Programming | KZ | 5 |
| This course is presented in Czech. Functional programming represents one of the traditional programming paradigms. Traditional and novel functional programming languages are on the rise nowadays and the functional paradigm becomes an important construct of traditionally imperative languages (C++, C#, Java). As such, mastering this paradigm becomes a necessary competence of a software engineer: the theory and especially the practice. | | | |
| NI-DDM | Distributed Data Mining | KZ | 4 |
| Course focuses on state-of-the-art approaches for distributed data mining and parallelization of machine learning algorithms. Students will gain hands on experience with large scale data processing framework Apache Spark and with existing distributed DM / ML algorithms. They will learn principles of their parallel implementations and will be capable to propose approaches to parallelize other algorithms. The course is prezented in czech language. | | | |
| NI-DSP | Database Systems in Practes | Z,ZK | 4 |
| This course is presented in Czech. | | | |
| NI-DZO | Digital Image Processing | Z,ZK | 4 |
| This course presents a comprehensive overview of modern methods for interactive editing of digital images and video. It mainly deals with practical algorithms that are both easy to implement and have an interesting theoretical basis. Visually attractive applications provide better understanding of basic theoretical background that is also valuable outside the domain of digital image processing. This course will introduce algorithms solving the following practical applications: edge-aware editing, tone mapping, HDR compression, de-blurring in frequency domain, abstraction, hybrid images, gradient domain editing, seamless image stitching and cloning, digital photo-montage, color-to-gray conversion, context enhancement, interactive as-rigid-as-possible image deformation, free-form image registration, texture synthesis, interactive segmentation, colorization, painting, adding depth, alpha matting. | | | |
| NI-IAM | Internet and Multimedia | Z,ZK | 4 |
| The NI-IAM course is focused on principles and modern technologies for network transmissions of audiovisual (AV) signals. The syllabus includes acquisition of AV signals (input), presentation of AV signals (output), network communication protocols, device interfaces, codecs, data formats and stereoscopy. We will look at practical use case scenarios of real-time audiovisual transmissions. Within the labs, students will practically assemble AV transmission chains using HW and SW technologies and verify the effect of various components on the quality and latency of AV transmissions. Students will learn how to build Internet infrastructure for end-to-end AV transmissions from the recording the scene up to the presentation for audience. | | | |
| NI-LSM | Statistical Modelling Lab | KZ | 5 |
| The subject is oriented on a single and multi-target tracking. The student both learns the existing methods and tries to implement them. The stress is put on the effective use of the available information and its modeling using numpy and scipy. The second half of the semester is focused on the design of methods and algorithms, and analyses of their properties. At this point, the subject is on the border of own research and may result in the topic of final work (diploma or bachelor thesis). | | | |
| NI-MOP | Modern Object-Oriented Programming in Pharo | KZ | 4 |
| Object-oriented programming is currently one of the most widespread paradigms of software creation, especially enterprise information systems, where its ability to natural abstraction is used to build complex modern applications. In this course, we build on the knowledge acquired in the course BI-OOP and aim to further deepen the skills of design and implementation of object systems in modern pure object system Pharo (https://pharo.org). The course focuses on individual approach to students, their development needs and areas of interest. In addition to deepening object programming skills, which are generally applicable in other OO languages, students will also gain the opportunity to work on interesting projects and OO technologies in terms of semestral work with the possibility of cooperation with practice and related bachelor, diploma, postgraduate our direct involvement in the Pharo Consortium. | | | |
| NI-MPL | Managerial Psychology | ZK | 2 |
| NI-MSI | Mathematical Structures in Computer Science | Z,ZK | 4 |
| Mathematical semantics of programming languages. Data types as continous lattices, Scott topology. Procedures as continuous mappings. The Scott model of lambda calculus. Introduction to category theory. | | | |
| NI-OLI | Linux Drivers | Z,ZK | 4 |
| The Linux operating system is an important operating system for personal computer and also for embedded systems. Systems on chip and combining powerful processors and FPGAs increase the variability of peripheral subsystems requiring specific software drivers. This course is an advanced course in the Linux driver development for master's students. The course provides knowledge of Linux operating system architecture, principles of development of various types drivers, including practical experience. | | | |
| NI-PDD | Data Preprocessing | Z,ZK | 5 |
| Students learn to prepare raw data for further processing and analysis. They learn what algorithms can be used to extract information from various data sources, such as images, texts, time series, etc., and learn the skills to apply these theoretical concepts to solve specific problems in individual projects - e.g., extraction of characteristics from images or from web pages. | | | |
| NI-PSL | Programming in Scala | Z,ZK | 4 |
| The course introduces the modern programming language Scala which exploits object-functional paradigm. Scala comprises advance language features - e.g.pattern matching and advance standard library. Scala enables to use of applications functional patterns e.g. H-List, Monads, etc. Scala is used by many powerful frameworks and libraries e.g. Play, Cassandra, Scalaz, etc. | | | |
| NI-REV | Reverse Engineering | Z,ZK | 5 |
| Students will get acquainted with the essentials of reverse engineering of computer software. They will learn how processes start and what happens before and after the main function is called. Students will understand how executable files are organized and how they interact with 3rd party libraries. Another part of the course is dedicated to reverse engineering of applications written in C++. Students will also understand principles of disassemblers and obfuscation techniques. A part of the course will also be dedicated to debuggers: how debuggers and debugging work and which methods can be used to detect it. One of the lectures will be dedicated to the latest trends on the computer malware scene. The focus of the course is on the seminars, where students will solve practically oriented tasks from the real world. | | | |
| NI-SYP | Parsing and Compilers | Z,ZK | 5 |
| The module builds upon the knowledge of fundamentals of automata theory, formal language and formal translation theories. Students gain knowledge of various variants and applications of LR parsing and are introduced to special applications of parsers, such as incremental and parallel parsing. | | | |

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| NI-TSP | Testing and Reliability | Z,ZK | 5 |
| Students will gain knowledge about circuit testing and about methods for increasing reliability and security. They will get practical skills to be able to prepare a test set with the help of the intuitive path sensitization and to use an ATPG for automatic test generation. They will be able to design easily testable circuits and systems with built-in-self-test equipment. They will be able to compute, analyze, and control the reliability and availability of the designed circuits. | | | |
| NI-VCC | Virtualization and Cloud Computing | Z,ZK | 5 |
| Students will gain knowledge of architectures of large computer systems that are used in data centers and computer infrastructure of companies and organizations. They will get acquainted with virtualization principles, tools and technologies that serve to facilitate and automate configuration, testing and monitoring, and to efficiently operate and optimize the performance parameters of modern computer systems. Theoretically and practically, they will get acquainted with containerization as the most effective technology today for the management of complex computer systems and with specific technologies of cloud systems. Finally, they will learn the principles and gain practical skills in the use of modern integration and development tools (Continuous integration and development). | | | |
| NI-VYC | Computability | Z,ZK | 4 |
| Classical theory of recursive functions and effective computability. | | | |
| TV1 | Physical Education | Z | 0 |
| TV2 | Physical Education | Z | 0 |
| TVKLV | Physical Education Course | Z | 0 |
| TVKZV | Physical Education Course | Z | 0 |
| TVV | Physical education | Z | 0 |
| TVV0 | Physical education | Z | 0 |

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