# Study plan

# Name of study plan: Open Informatics - Computer Games and Graphics 2016

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch: Program of study: Welcome page Type of study: unknown full-time

Required credits: 152 Elective courses credits: 28 Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 122

The role of the block: P

Code of the group: 2015\_BOIAPP Name of the group: Subjects in english Requirement credits in the group:

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

Credits in the group: 0 Note on the group:

Note on the grou	P.					
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
BE4B33SEA	Subject in english - abroad Petr Pošík Petr Pošík Petr Pošík (Gar.)	Z,ZK	0		Z,L	Р
BE5B32PKS	Computer and Communication Networks Pavel Bezpalec Pavel Bezpalec	Z,ZK	6	2P + 2C	Z	Р
BE5B35APO	Computer Architectures Pavel Píša, Richard Šusta Pavel Píša Pavel Píša (Gar.)	Z,ZK	6	2P+2L	L	Р
BE4B38PSIA	Computer Networks Ji í Novák, Jan Holub <b>Ji í Novák</b> Ji í Novák (Gar.)	Z,ZK	5	2P+2L	L	Р
BE4B36FUP	Functional Programming Rostislav Hor ík, Tomáš Votroubek Rostislav Hor ík Michal P chou ek (Gar.)	Z,ZK	6	2P+2C	L	Р
BE4B36ZUI	Introduction to Artificial Intelligence Branislav Bošanský, Viliam Lisý Branislav Bošanský Branislav Bošanský (Gar.)	Z,ZK	6	2P+2C	L	Р
BE5B35LSP	Logic Systems and Processors Richard Šusta, Martin Hlinovský Martin Hlinovský Richard Šusta (Gar.)	Z,ZK	6	3P+2L	Z	Р
BE5B33RPZ	Pattern Recognition and Machine Learning Ond ej Drbohlav, Ji í Matas, Jan Šochman Jan Šochman Ji í Matas (Gar.)	Z,ZK	6	2P+2C	Z	Р
BE4B35PSR	Real-time Systems Programming Michal Sojka Michal Sojka Michal Sojka (Gar.)	Z,ZK	6	2P+2C	Z	Р
BE4B39VGO	Creating graphic content Ladislav molík Ladislav molík (Gar.)	Z,ZK	6	2P+2C+8D	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIAPP Name=Subjects in english

Characteristics of the courses of this group of Study Flan. Code=2013_BOIAFF Name=300jects in english								
BE4B33SEA	Subject in english - abroad	Z,ZK	0					
The subject serves for validation of the duty to complete at least one compulsory course of the program in English.								
BE5B32PKS	Computer and Communication Networks	Z,ZK	6					
The aim of the course is to familiarize students with current trends in the switched local networks and the key functions of routing protocols in IP networks. The course is aimed rather								
primarily practically then theoretically.								
BE5B35APO	Computer Architectures	7.7K	6					

Subject provides overview of basic building blocks of computer systems. Explanation starts from hardware side where it extends knowledge presented in the previous lectures of Structures of computer systems. Topics cover building blocks description, CPU structure, multiple processors interconnections, input/output subsystem and basic overview of network and buses topologies. Emphasis is placed on clarification of interconnection of hardware components with software support, mainly lower levels of operating systems, device drivers and virtualization techniques. General principles are more elaborated during presentation of examples of multiple standard CPU architectures. Exercises are more focused on the software view to the contrary. Students are lead from basic programming on CPU level to the interaction with raw hardware.

BE4B38PSIA Computer Networks

7.7K

5

Subject is devoted to principles and technologies of Computer Networks. Physical layer media, analog and digital modulations, network topologies, MAC methods, ARQ algorithms, data communication models, coding and cryptography basics are introduced. Widely used LAN technologies are then presented together with their features. Internet protocols are explained and internetworking approaches are presented.

BE4B36FUP Functional Programming

Z,ZK

6

This course introduces students into the techniques of functional programming, the advantages and disadvantages of this programming paradigm, and its use in practice. This approach is declarative in the sense that the programmer symbolically describes the problem to be solved, rather than specifying the exact sequence of operations required to solve it. It allows focusing on the essence of the solved problem and implementing even more complex algorithms compactly. Functional programming has notable advantages for parallelization and automated verification of algorithms, and the most useful functional programming concepts are increasingly often introduced to standard programming languages. Because of the focus of functional programming on symbols, rather than numbers, functional programming has been heavily used in in artificial intelligence fields, such as agent systems or symbolic machine learning. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE4B36ZUI Introduction to Artificial Intelligence

Z,ZK

6

The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space search, problem representation and solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to two-player games. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE5B35LSP Logic Systems and Processors

7.7K

6

The course introduces the basic hardware structures of computing resources, their design, and architecture. It provides an overview of the possibilities of performing data operations at the hardware level and the design of embedded processor systems with peripherals on modern FPGA programmable logic circuits, which are increasingly widely used today. Students will learn their description in VHDL, from logic to more complex sequential circuits to practical finite state machine (FSM) designs. They will also master the correct design procedure using circuit simulation. Practical problems are solved using development boards used at hundreds of leading universities around the world. The course ends with RISC-V processor structure, cache, and pipeline processing.

BE5B33RPZ Pattern Recognition and Machine Learning

Z.ZK

6

The basic formulations of the statistical decision problem are presented. The necessary knowledge about the (statistical) relationship between observations and classes of objects is acquired by learning on the raining set. The course covers both well-established and advanced classifier learning methods, as Perceptron, AdaBoost, Support Vector Machines, and Neural Nets. This course is also part of the inter-university programme prg.ai Minor. It pools the best of Al education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE4B35PSR Real-time Systems Programming

Z,ZK

6

The goal of this course is to provide students with basic knowledge about software development for real-time systems, for example in control and embedded applications. The main focus is on embedded systems equipped with a real-time operating system (RTOS). Lectures will cover real-time systems theory, which can be used to formally verify timing correctness such systems. Another set of lectures will introduce methods and techniques used for development of safety-critical systems, whose failure may have catastrophic consequences. During labs, students will first solve a few simple tasks to familiarize them with basic components of VxWorks RTOS and to benchmark the used OS and hardware (Xilinx Zynq). The obtained metrics represent the typical criteria for assessing the suitability of a given platform for the given application. After the simple tasks, students will solve complex task of time-critical motion control application which will require full utilization of RTOS features. All the tasks at the labs will be implemented in C (or C++) language.

BE4B39VGO Creating graphic content

7.7k

6

The aim of this course is to provide theory behind geometric modeling and modeling of materials, give students an overview of methods used in the process of creating 2D and 3D graphics and how to apply those methods in praxis. At the seminars, students will learn how to design and create three-dimensional scene, create and apply textures imitating materials (e.g., wall finishes, wood, sky) and geometrical details, and position and set-up lights in the scene.

Code of the group: 2015\_BOIBAP Name of the group: Bachelor Project

Requirement credits in the group: In this group you have to gain 20 credits

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

Credits in the group: 20

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BBAP20	Bachelor thesis Roman mejla Roman mejla (Gar.)	Z	20	12S	L,Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIBAP Name=Bachelor Project

BBAP20	Bachelor thesis	Z	20
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Code of the group: 2015 BOIBBE

Name of the group: Safety of the bachelor's studies

Requirement credits in the group:

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BEZB	Safety in Electrical Engineering for a Bachelor's Degree Ivana Nová, Radek Havlí ek, Vladimír K la Radek Havlí ek Vladimír K la (Gar.)	Z	0	2BP+2BC	Z,L	Р
BEZZ	Basic Health and Occupational Safety Regulations Ivana Nová, Radek Havlí ek, Vladimír K la Radek Havlí ek Vladimír K la (Gar.)	Z	0	2BP+2BC	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIBBE Name=Safety of the bachelor's studies

BEZB	Safety in Electrical Engineering for a Bachelor's Degree	Z	0			
The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course						
contains fundamentals	contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.					
BEZZ	Basic Health and Occupational Safety Regulations	Z	0			
The guidelines were wo	The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague,					
which was provided by the Rector's Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety						
regulations forms an integral and permanent part of qualification requirements. This program is obligatory.						

Code of the group: 2015\_BOIH

Name of the group: Humanities subjects

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

Note on the group	o.					
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
B0B16ET1	Ethic 1 Vladimír Sláme ka Vladimír Sláme ka Vladimír Sláme ka (Gar.)	KZ	4	2P+2C	Z	Р
B0B16FIL	Philosophy Peter Zamarovský Peter Zamarovský (Gar.)	ZK	2	2P+0S	Z,L	Р
B0B16FI1	Philosophy 1 Peter Zamarovský Peter Zamarovský (Gar.)	KZ	4	2P+2S	Z	Р
B0B16HTE	History of technology and economic  Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	ZK	2	2P+0S	Z,L	Р
B0B16HT1	History of science and technology 1 Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	KZ	4	2P+2S	Z	Р
B0B16HI1	History 1 Milena Josefovi ová Milena Josefovi ová Milena Josefovi ová (Gar.)	KZ	4	2P+2S	Z	Р
B0B16MPS	Psychology Jan Fiala Jan Fiala (Gar.)	Z,ZK	4	2P+2S	Z,L	Р
B0B16MPL	Psychology for managers  Jan Fiala Jan Fiala (Gar.)	ZK	2	2P+0S	Z,L	Р
A003TV	Physical Education Ji í Drnek	Z	2	0+2	L,Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIH Name=Humanities subjects

B0B16ET1	Ethic 1	KZ	4		
Aim of this subject is t	provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various	s situations of hum	an life. Essential		
parts of the subject ar	e discussions in which students can react to lectures but also to actual questions coming with news and look for the communa	al answers.			
B0B16FIL	Philosophy	ZK	2		
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.					
B0B16FI1	Philosophy 1	KZ	4		
We deal with the most	important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy.	sophy and connec	ction of old		
philosophical thoughts	with recent problems of science, technology, economics and politics.				
B0B16HTE	History of technology and economic	ZK	2		
B0B16HT1	History of science and technology 1	KZ	4		
B0B16HI1	History 1	KZ	4		
B0B16MPS	Psychology	Z,ZK	4		
B0B16MPL	Psychology for managers	ZK	2		
A003TV	Physical Education	Z	2		

Code of the group: 2015\_BOIP

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 102 credits

Requirement courses in the group: In this group you have to complete 17 courses

Credits in the group: 102

Note on the group:

Note on the gi						
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
B4B33ALG	Algorithms  Marko Genyk-Berezovskyj, Daniel Pr ša Daniel Pr ša Marko Genyk-Berezovskyj (Gar.)	Z,ZK	6	2P+2C	Z	Р
B0B35APO	Computer Architectures Pavel Píša, Richard Šusta, Petr Št pán Pavel Píša Pavel Píša (Gar.)	Z,ZK	5	2P+2L	L	Р
B0B36DBS	Database Systems Martin imná , Václav Kratochvíl Martin imná Martin imná (Gar.)	Z,ZK	6	2P+2C+4D	L	Р
B4B01DMA	Discrete Mathematics Petr Habala Petr Habala (Gar.)	Z,ZK	5	2P+2S	Z	Р
B0B01LAG	Linear Algebra Ji í Velebil, Jakub Rondoš, Natalie Žukovec, Daniel Gromada, Josef Dvo ák, Mat j Dostál <b>Ji í Velebil</b> Ji í Velebil (Gar.)	Z,ZK	8	4P+2S	Z	Р
B0B01LGR	Logic and Graphs Natalie Žukovec, Mat j Dostál, Alena Gollová Alena Gollová Marie Demlová (Gar.)	Z,ZK	5	3P+2S	Z,L	Р
B0B01MA1	Mathematical Analysis 1 Josef Dvo ák, Martin K epela, Josef Tkadlec, Veronika Sobotíková Josef Tkadlec Josef Tkadlec (Gar.)	Z,ZK	7	4P+2S	Z,L	Р
B0B01MA2	Mathematical Analysis 2 Miroslav Korbelá, Petr Hájek, Martin Bohata, Jaroslav Tišer, Karel Pospíšil, Paola Vivi, Hana Tur inová <b>Petr Hájek</b> Jaroslav Tišer (Gar.)	Z,ZK	7	4P+2S	L,Z	Р
B4B35OSY	Operating Systems Michal Sojka, Petr Št pán Michal Sojka Michal Sojka (Gar.)	Z,ZK	4	2P+2C	Z	Р
B0B33OPT	Optimization Tomáš Werner, Petr Olšák, Mirko Navara, Tomáš Kroupa Tomáš Werner Tomáš Werner (Gar.)	Z,ZK	7	4P+2C	Z,L	Р
B4B36PDV	Parallel and Distributed Computing Mat j Kafka, Michal Jakob Michal Jakob (Gar.)	Z,ZK	6	2P+2C	L	Р
B4B38PSIA	Computer Networks Jií Novák, Jan Holub <b>Jií Novák</b> Jií Novák (Gar.)	Z,ZK	5	2P+2L	L	Р
B0B01PST	Probability and Statistics Kate ina Helisová Kate ina Helisová Petr Hájek (Gar.)	Z,ZK	7	4P+2S	Z	Р
B0B36PRP	Procedural Programming  Jan Faigl Jan Faigl (Gar.)	Z,ZK	6	2P+2C	Z	Р
B0B36PJV	Programming in Java Ji í Vok ínek, Martin Mudroch, Ladislav Serédi <b>Ji í Vok ínek</b> Ji í Vok ínek (Gar.)	Z,ZK	6	2P+3C+7C	L	Р
B4B33RPH	Solving Problems and other Games Petr Pošík, Tomáš Svoboda Petr Pošík Tomáš Svoboda (Gar.)	KZ	6	2P+3C	Z	Р
B4BPROJ6	Unassisted project Petr Pošík, Tomáš Svoboda, Ji í Šebek, Jaroslav Sloup, Ivan Jelínek, Katarína Žmolíková Petr Pošík	Z	6	0+2	Z,L	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIP Name=Compulsory subjects of the programme

Characteristics of the courses of this group of Study Mail. Code=2015_Boil Name=Compaisory subjects of	me program	Characteristics of the courses of this group of Study Plan: Code=2015_BOIP Name=Compulsory subjects of the programme						
B4B33ALG Algorithms	Z,ZK	6						
In the course, the algorithms development is constructed with minimum dependency to programming language; nevertheless the lectures and seminars are based on Java. Basic data								
types a data structures, basic algorithms, recursive functions, abstract data types, stack, queues, trees, searching, sorting, special application algorithms	nms, Dynamic pr	ogramming.						
Students are able to design and construct non-trivial algorithms and to evaluate their effectivity.								
B0B35APO Computer Architectures	Z,ZK	5						
B0B36DBS Database Systems	Z,ZK	6						
The course is designed as a basic database course mainly aimed at the student ability to design a relational data model and to use the SQL language	e for data definiti	on as well as for						
data querying and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing	techniques, data	abase system						
architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.								
B4B01DMA Discrete Mathematics	Z,ZK	5						
In this course students meet some important topics from the field of discrete mathematics. Namely, they will explore divisibility and calculations modulo	n, diophantine e	quations, binary						
relations, mappings, cardinality of sets, induction, and recurrence equations. The second aim of this course is to teach students the language of math	ematics, both pa	ssively and						
actively, and introduce them to mathematics as science.								
B0B01LAG Linear Algebra	Z,ZK	8						
The course covers the initial parts of linear algebra. Firstly, the basic notions of a linear space and linear mappings are covered (linear dependence and ir	ndependence, ba	sis, coordinates,						
etc). The calculus of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covere	d next. The appli	cations include						
solving systems of linear equations, the geometry of a 3D space (including the scalar product and the vector product) and SVD.								
B0B01LGR Logic and Graphs	Z,ZK	5						
This course covers basics of mathematical logic and graph theory. Syntax and semantics of propositional and predicate logic are introduced. The importa	nce of the notion	of consequence						
and of the relationship between a formula and its model is stressed. Further, basic notions from graph theory are introduced.								
B0B01MA1 Mathematical Analysis 1	Z,ZK	7						
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.	·							

B0B01MA2 Mathematical Analysis 2 The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series. B4B35OSY **Operating Systems** Z,ZK Lecture introduces operation system's basic concepts and principles as processes, threads, communication and synchronization, virtual memory, drivers, file systems, basic security aspects. These topics are theoretically described and demonstrated on Linux and Windows OS with multi-core systems. Practical exercises from OS in C programming language will be solved on labs. Students will work with Linux OS and micro-kernel NOVA. B0B33OPT Z,ZK Optimization The course provides an introduction to mathematical optimization, specifically to optimization in real vector spaces of finite dimension. The theory is illustrated with a number of examples. You will refresh and extend many topics that you know from linear algebra and calculus courses. B4B36PDV Parallel and Distributed Computing Z,ZK B4B38PSIA Computer Networks Z,ZK 5 B0B01PST Probability and Statistics Z,ZK B0B36PRP Procedural Programming Z,ZK6 The course accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and processing user inputs are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable and reusable programs. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C programming language is used that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with program compilation and linking but also with debugging and profiling. Labs aim to acquire practical skills of implementing simple individual tasks, emphasizing functionality and accuracy of implementation. Student independence is developed by a set of homework with the possibility of optional and bonus assignments. The final task is an integration of a larger program using existing implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is also a part of the selected tasks. B0B36PJV Programming in Java The course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the object concept of the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using generic types will be introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is tested in the form of solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists of points for the

correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability.

B4B33RPH Solving Problems and other Games
The main motivation is to let students to deal with real-world problems properly. When working on real problems the student shall learn how to decompose the big problem, how to define interfaces, how to test and validate individual steps and so on. Many problems will actually be beyond the first-year-student skills. And many problem will not be solved in the

define interfaces, how to test and validate individual steps and so on. Many problems will actually be beyond the first-year-student skills. And many problem will not be solved in the optimal way. The unsolved parts should motivate the students to study difficult theoretical subjects. They should generate the important questions. Ideally, at the end of the subject, the student should be eager to study deeper about informatics. The course also explains the basis of the object oriented design, software testing, ways for writing readable and robust codes.

B4BPROJ6 Unassisted project Z 6

Code of the group: 2015\_BZAJ

Name of the group: Exam from the english language

Requirement credits in the group:

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B0B04B1K	English language B1 - classified assessment Markéta Havli ková, Pavla Péterová, Erik Peter Stadnik, Michael Ynsua, Dana Saláková, Petra Juna Jennings Petra Juna Jennings (Gar.)	KZ	0	0C	Z,L	Р
B0B04B2Z	English language B2 - exam  Markéta Havlí ková, Michael Ynsua, Dana Saláková, Petra Juna Jennings  Petra Juna Jennings Petra Juna Jennings (Gar.)	Z,ZK	0	0C	Z,L	Р

Characteristics of the courses of this group of Study Plan: Code=2015\_BZAJ Name=Exam from the english language

B0B04B1K	English language B1 - classified assessment	KZ	0
verifying of the student	s skills of B1 level		•
B0B04B2Z	English language B2 - exam	Z,ZK	0

I) The B2 English Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Study and Examination Rules and Regulations for Students at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully complete the study programme. In addition, this requires the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common European Framework of Reference for Languages (CEFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B2 (Upper-Intermediate) level is one who can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed an approved international exam within the past five years may present their certificate to the Department of Languages, Faculty of Electrical Engineering. Upon approval, students are then exempt from both the Written Test and the Oral Part. For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 30

The role of the block: PO

Code of the group: 2015\_BOIPO4

Name of the group: Compulsory subjects of the branch

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 30 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B4B39IUR	User interfaces implementation Zden k Mikovec, Miroslav Macík Miroslav Macík Zden k Mikovec (Gar.)	Z,ZK	6	2P+2S	Z	РО
B4B39HRY	Computer Games Ji í Bittner, David Sedlá ek David Sedlá ek Ji í Bittner (Gar.)	Z,ZK	6	2P+2C	Z	РО
B0B39PGR	Computer graphics programming  Jaroslav Sloup, Petr Felkel Jaroslav Sloup Petr Felkel (Gar.)	Z,ZK	6	2P+2C+8D	L	РО
B4B39VGO	Creation of Graphics Contents  Ladislav molík	Z,ZK	6	2P+2C	Z	РО
B4B36ZUI	Introduction to Artificial Intelligence Branislav Bošanský, Viliam Lisý Branislav Bošanský Michal P chou ek (Gar.)	Z,ZK	6	2P+2C	L	РО

Characteristics of the courses of this group of Study Plan: Code=2015\_BOIPO4 Name=Compulsory subjects of the branch

B4B39IUR	User interfaces implementation	Z,ZK	6
Based on the user inter	ace specification (created by design team), the student will be able to implement user interface and communicate efficiently	with other stakeho	olders taking part
in the whole process of	design, testing, and implementation of the user interface.		

B4B39HRY **Computer Games** Z,ZK Students familiarize themselves with the issues encountered during programming computer games. They learn topics such as 3D model representation, animations, collision detection, physical simulation, and real-time rendering in the context of computer games development. During exercises they will develop a computer game in teams: from the game concept and

6

Z,ZK

design document, throu	ign programming game mechanics to the presentation in front of a jury of experts. The exercises are build around the Unity fr	amework.	
B0B39PGR	Computer graphics programming	Z,ZK	6
B4B39VGO	Creation of Graphics Contents	Z,ZK	6

The aim of this course is to provide theory behind geometric modeling and modeling of materials, give students an overview of methods used in the process of creating 2D and 3D graphics and how to apply those methods in praxis. At the seminars, students will learn how to design and create three-dimensional scene, create and apply textures imitating materials (e.g., wall finishes, wood, sky) and geometrical details, and position and set-up lights in the scene.

#### B4B36ZUI Introduction to Artificial Intelligence

The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space search, problem representation and solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to two-player games. This course is also part of the inter-university programme prg.ai Minor. It pools the best of Al education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

Name of the block: Elective courses Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 2015\_BJKA

Name of the group: English language courses

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B0B04A21	English Language A2-1 Dana Saláková	Z		2s	Z	V
B0B04A22	English Language A2-2 Dana Saláková	Z	0	2s	L	V
B0B04B11	English Language B1-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	Z	V
B0B04B12	English Language B1-2 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	L	V
B0B04B21	English Language B2-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	3	2C	Z	V

B0B04B22 English Language B2-2 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	3	2C	Z,L	V
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Characteristics of the courses of this group of Study Plan: Code=2015 BJKA Name=English language courses

B0B04A21	English Language A2-1	Z	
The course is open to	students who are beginners in their second language. Course objective: Achieving competence in basic English.		!
B0B04A22	English Language A2-2	Z	0
The course is open to	students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowledge.	edge of the Engli	sh language.
B0B04B11	English Language B1-1	Z	0
Course objective: Broa	adening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	expansion; under	standing spoke
English.			
DODO 4D 40	F 11 1 D10		_
B0B04B12	English Language B1-2		0
	English Language B1-2 adening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	Z expansion; under	-
B0B04B12 Course objective: Broat English.		∠ expansion; under	-
Course objective: Broa English.		expansion; under	-
Course objective: Broad English. B0B04B21	ndening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	Z	standing spoke
Course objective: Broad English.  B0B04B21 This course is designed	adening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary  English Language B2-1	Z 32 - zkouška - B0	standing spoker  3  B04B2Z*). While
Course objective: Broad English.  B0B04B21  This course is designed the course is focused	dening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary  English Language B2-1  das a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk E	Z 32 - zkouška - B0 .), it also focuses	standing spoker  3  B04B2Z*). While more on the
Course objective: Broad English.  B0B04B21  This course is designed the course is focused	English Language B2-1  day as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk Eon helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark	Z 32 - zkouška - B0 .), it also focuses	standing spoker  3  B04B2Z*). While more on the
Course objective: Broatenglish.  B0B04B21  This course is designed the course is focused academic and technic	English Language B2-1  day as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk Eon helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark	Z 32 - zkouška - B0 .), it also focuses	standing spoker  3  B04B2Z*). While more on the
Course objective: Broad English.  B0B04B21  This course is designed the course is focused academic and technic / International Study.  B0B04B22	English Language B2-1 ed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk Eon helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark al vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate to the students at the university level. This exam is also used for determining an appropriate to the students at the university level.	Z 32 - zkouška - B0 .), it also focuses priate level of Eng Z	standing spoke  3  B04B2Z*). While more on the glish for Erasmu
Course objective: Broad English.  B0B04B21  This course is designed the course is focused academic and technic / International Study.  B0B04B22  This course is designed the course is designed to the course is designed to the course is designed the course is designed to the course is designed the course is designed to the course is designed the course is designed to the course is desi	English Language B2-1 ed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk Eon helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark all vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate English Language B2-2	Z 32 - zkouška - B0 c), it also focuses priate level of Eng Z 2 - zkouška - B0	standing spoke  3  B04B2Z*). Whil more on the glish for Erasmu  3  B04B2Z*). Whil

Code of the group: BTV

/ International Study.

Name of the group: Physical education

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
TVV	Physical education	Z	0	0+2	Z,L	V
TV-V1	Physical education	Z	1	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V

Characteristics of the courses of this group of Study Plan: Code=BTV Name=Physical education

TVV	Physical education	Z	0
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0

Code of the group: BTVK

Name of the group: Physical education courses

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

	- g s.p.					
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
TVKLV	Physical Education Course	Z	0	7dní	L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V

Characteristics of the courses of this group of Study Plan: Code=BTVK Name=Physical education courses

TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0

Code of the group: 2015\_BOIVOL Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

~Nabídku volitelných předmětů uspořádaných podle kateder najdete na webových stránkách http://www.fel.cvut.cz/cz/education/volitelne-predmety.html\\

# List of courses of this pass:

Code	Name of the course	Completion	Credits
A003TV	Physical Education	Z	2
B0B01LAG	Linear Algebra	Z,ZK	8
	the initial parts of linear algebra. Firstly, the basic notions of a linear space and linear mappings are covered (linear dependence and ind	•	
etc). The calculus	of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covered solving systems of linear equations, the geometry of a 3D space (including the scalar product and the vector product) and S	VD.	ons include
B0B01LGR	Logic and Graphs	Z,ZK	5
This course covers	basics of mathematical logic and graph theory. Syntax and semantics of propositional and predicate logic are introduced. The important and of the relationship between a formula and its model is stressed. Further, basic notions from graph theory are introduced.		onsequence
B0B01MA1	Mathematical Analysis 1  The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.	Z,ZK	7
B0B01MA2	Mathematical Analysis 2	Z,ZK	7
The subject cover	rs an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals series and power series with application to Taylor and Fourier series.	. Other part contair	ns function
B0B01PST	Probability and Statistics	Z,ZK	7
B0B04A21	English Language A2-1  The course is open to students who are beginners in their second language. Course objective: Achieving competence in basic B	Z English.	
B0B04A22	English Language A2-2	Z	0
	en to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowle	dge of the English	language.
B0B04B11	English Language B1-1	Z	0
-	Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary ex English.		ding spoker
B0B04B12	English Language B1-2	Z	0
	sroadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary ex English.		ding spoker
B0B04B1K	English language B1 - classified assessment verifying of the student's skills of B1 level	KZ	0
B0B04B21	English Language B2-1	Z	3
	gned as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2		
	used on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark nical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropri		
acadomio ana toon	/ International Study.	ato lovoi oi Erigilori	ioi Eiaoilia
B0B04B22	English Language B2-2	Z	3
	gned as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 -		
	used on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark nical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropri / International Study.		
B0B04B2Z	English language B2 - exam	Z.ZK	0
	Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Stu	,	_
Regulations for Stu	idents at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully cor	nplete the study pro	ogramme. Ir
	res the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common Euro	-	
	EFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B stand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisa		
	ntaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed t		_
and explain a viev	wpoint on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed ar	approved internati	ional exam
within the past five	years may present their certificate to the Department of Languages, Faculty of Electrical Engineering.Upon approval, students are the Test and the Oral Part. For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/	n exempt from both	n the Writter
B0B16ET1	Ethic 1	KZ	4
	is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various sit f the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the c		
B0B16FI1	Philosophy 1	KZ	4
We deal with the	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophical thoughts with recent problems of science, technology, economics and politics.	sophy and connecti	ion of old
B0B16FIL	Philosophy	ZK	2
We deal with the	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy.	sophy and connecti	ion of old
	philosophical thoughts with recent problems of science, technology, economics and politics.		
B0B16HI1	Philosophical thoughts with recent problems of science, technology, economics and politics.  History 1	KZ	4

B0B16MPL Psychology for managers ZK B0B16MPS Psychology Psychology Z,ZK B0B33OPT Optimization Psychology Z,ZK B0B33OPT Optimization or near evector spaces of finite dimension. The theory is illustrated with a numb You will refresh and extend many topics that you know from linear algebra and calculus courses.  B0B35APO Computer Architectures Z,ZK B0B33OPS Database Systems B0B36DBS Database Systems B0B36DBS Database Systems B0B36DBS Database Systems B0B36DBS Database Systems B0B36PJV Programming and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing techniques, da architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task. B0B36PJV Programming in Java B0B36PJV Programming from the first semester and introduces students to the Java environment. The course also focus on the first semester and introduced. An important topic is models of multithreaded applications and their implementation. Practical skills and knowledge of Java is tender of solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability. B0B36PRP Procedural Programming B0B36PRP Procedural Programming programming programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and process are developed. Students master the practical implementation of simple individual tasks. The course accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and process are developed. Students master the practical implementation of simple individual tasks. The final task is an integration of a larger program implementations basic individual task	ZK 2,ZK 4  Z,ZK 7  dimension. The theory is illustrated with a number of examples. It calculus courses.  Z,ZK 5  Z,ZK 6  and to use the SQL language for data definition as well as for most commonly used indexing techniques, database system continuously submitted seminar task.  Z,ZK 6  ava environment. The course also focus on the object concept sic library methods, working with files and using generic types is of practical skills and knowledge of Java is tested in the form a system. The semester work scoring consists of points for the rece codes, their readability and reusability.  Z,ZK 6  concepts of linked data structures and processing user inputs fring programming habits for creating readable and reusable ss, and management. Therefore, the C programming language Students will get acquainted not only with program compilation ks, emphasizing functionality and accuracy of implementation. final task is an integration of a larger program using existing ble codes is also a part of the selected tasks.  Z,ZK 6  Z,ZK 5  billity and calculations modulo n, diophantine equations, binary students the language of mathematics, both passively and
B0B16MPS	dimension. The theory is illustrated with a number of examples of calculus courses.    Z,ZK
B0B33OPT   Optimization	dimension. The theory is illustrated with a number of example of calculus courses.    Z,ZK
BOB35APO Computer Architectures	dimension. The theory is illustrated with a number of example decalculus courses.    Z,ZK
B0B35APO Computer Architectures Z,ZK B0B35APO Database Systems Z,ZK B0B36DBS Database course mainly aimed at the student ability to design a relational data model and to use the SQL language for data definition architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.  B0B36PJV Programming in Java Z,ZK B0B36PJV Programming in Java B0B36PJV Programming in Java B0B36PJV Programming in Java B0B36PJV Programming in Java B0B36PJV Programming from the first semester and introduces students to the Java environment. The course also focus on the pava language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and usin be introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is te solving partial tasks and semester work, which will be submitted continuously through the source oversion control system. The semester work scoring consists:  B0B36PRP Procedural Programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and process are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable organs. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C programused that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with program implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is also a part of the selected tasks. B0B39PGR Comp	A calculus courses.    Z,ZK
B0B35APO Computer Architectures Z,ZK B0B36DBS Database Systems	Z,ZK 5  and to use the SQL language for data definition as well as formost commonly used indexing techniques, database system continuously submitted seminar task.  Z,ZK 6  ava environment. The course also focus on the object concests is library methods, working with files and using generic types is of practical skills and knowledge of Java is tested in the for a system. The semester work scoring consists of points for the codes, their readability and reusability.  Z,ZK 6  concepts of linked data structures and processing user inpuring programming habits for creating readable and reusable ss, and management. Therefore, the C programming language Students will get acquainted not only with program compilations, emphasizing functionality and accuracy of implementations final task is an integration of a larger program using existing ble codes is also a part of the selected tasks.  Z,ZK 6  Z,ZK 5  billity and calculations modulo n, diophantine equations, binal students the language of mathematics, both passively and
B0B36DBS le course is designed as a basic database course mainly aimed at the student ability to design a relational data model and to use the SQL language for data definition data querying and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing techniques, da architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.  B0B36PJV Programming in Java Z,ZK le course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is te solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability.  B0B36PRP Procedural Programming  B0B36PRP Procedural Programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and proces are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable ograms. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C program sed that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with program implementations. Evaluation of coding style motiva	and to use the SQL language for data definition as well as the most commonly used indexing techniques, database system continuously submitted seminar task.  Z,ZK 6  ava environment. The course also focus on the object concestic library methods, working with files and using generic types of practical skills and knowledge of Java is tested in the for large system. The semester work scoring consists of points for the codes, their readability and reusability.  Z,ZK 6  concepts of linked data structures and processing user inpuring programming habits for creating readable and reusable ss, and management. Therefore, the C programming languages, and management. Therefore, the C programming languages, emphasizing functionality and accuracy of implementation final task is an integration of a larger program using existing ble codes is also a part of the selected tasks.  Z,ZK 6  Z,ZK 5  billity and calculations modulo n, diophantine equations, binal students the language of mathematics, both passively and
ne course is designed as a basic database course mainly aimed at the student ability to design a relational data model and to use the SQL language for data definition data querying and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing techniques, data querying and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing techniques, data richitecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.  BOB36PJV Programming in Java Z,ZK ne course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Lava language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Lava language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Lava language. The topics of the course also focus on the the Java language interface. Basic library methods, working with files and using the Lava language of the course and their implementation. Fireface and seminary methods, working with files and using the Java language of Java is testing the Java language of the course accompanies and seminary methods. Procedural Programming  BOB36PRP Procedural Programming  Procedural Programming  Procedural Programming  Procedural Programming  Procedural Programming emphasizes acquiring programming habits for creating readable opparates. At the same time, the effort is to build students an overview of the program poperation, data model, memory access, and managem	and to use the SQL language for data definition as well as a most commonly used indexing techniques, database system continuously submitted seminar task.    Z,ZK
BOB36PJV   Programming and to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing techniques, da architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.  Programming in Java  the course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course and semester work which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability.  BOB36PRP Procedural Programming programming habits for creating readable organises acquiring programming habits for creating readable organises. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C programused that provides a direct link between the program data structures and their representation in the computer memory. Students w	most commonly used indexing techniques, database system continuously submitted seminar task.    Z,ZK
B0B36PJV Programming in Java Z,ZK  B0B36PJV Programming in Java Z,ZK  B0B36PJV Programming in Java Programming in Java Z,ZK  B0B36PJV Programming in Java Programming in Java Programming from the first semester and introduces students to the Java environment. The course also focus on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the business of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the Java language. The topics of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is te solving partial tasks and semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source code, their readability and reusability.  B0B36PRP Procedural Programming Procedural Programming Procedural Programming Procedural Programming emphasizing the data structures and process are developed. Students master the practical skillation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable organs. At the same time, the effort is to build students an overview of the program operation, data model, memory Students will get	continuously submitted seminar task.    Z,ZK
Programming in Java  Z,ZK  the course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using library language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using library programming in Java  It is introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is the solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability.  BOB36PRP  Procedural Programming  Procedural Programming  Z,ZK  The course accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and process are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable orgarams. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C program did inking but also with debugging and profiling. Labs aim to acquire practical skills of implementing simple individual tasks, emphasizing functionality and accuracy of Students independence is developed by a set of homework with the possibility of optional and bonus assignments. The final task is an integration of a larger program implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is als	Z,ZK 6 ava environment. The course also focus on the object concesic library methods, working with files and using generic types of practical skills and knowledge of Java is tested in the following system. The semester work scoring consists of points for the codes, their readability and reusability.  Z,ZK 6 concepts of linked data structures and processing user inputing programming habits for creating readable and reusabless, and management. Therefore, the C programming langual Students will get acquainted not only with program compilating ks, emphasizing functionality and accuracy of implementation final task is an integration of a larger program using existing ble codes is also a part of the selected tasks.  Z,ZK 6  Z,ZK 5 billity and calculations modulo n, diophantine equations, binal students the language of mathematics, both passively and
the course builds on the basics of algorithms and programming from the first semester and introduces students to the Java environment. The course also focus on the the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using the introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is test solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and revasability.  BOB36PRP	ava environment. The course also focus on the object conces is clibrary methods, working with files and using generic types of practical skills and knowledge of Java is tested in the following system. The semester work scoring consists of points for the codes, their readability and reusability.    Z,ZK
the Java language. The topics of the course includes exceptions, event handling, and building a graphical interface. Basic library methods, working with files and using libe introduced. An important topic is models of multithreaded applications and their implementation. Practical exercises of practical skills and knowledge of Java is the solving partial tasks and semester work, which will be submitted continuously through the source code version control system. The semester work scoring consists correctness and efficiency of the code, as well as points that take into account the quality of the source codes, their readability and reusability.  Procedural Programming  Procedural Programming  Recourse accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and process are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable orgams. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C program used that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with prograd linking but also with debugging and profiling. Labs aim to acquire practical skills of implementing simple individual tasks, emphasizing functionality and accuracy of Student independence is developed by a set of homework with the possibility of optional and bonus assignments. The final task is an integration of a larger program implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is also a part of the selected tasks.  BOB39PGR Computer graphics programming Z,ZK  BABO1DMA Discrete Mathematics  Namely, they will explore divisibility and calculations modulo n, diophantine e relations, mappings, cardinality of sets, induction, an	sic library methods, working with files and using generic typs of practical skills and knowledge of Java is tested in the foll system. The semester work scoring consists of points for the concepts of linked data structures and processing user inputing programming habits for creating readable and reusable ss, and management. Therefore, the C programming langual Students will get acquainted not only with program compilating ks, emphasizing functionality and accuracy of implementation final task is an integration of a larger program using existing ble codes is also a part of the selected tasks.    Z,ZK
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types a data structures, hasic algorithms, recursive tunctions, abstract data types, stack, queues, trees, searching, corting, special application algorithms. Dynamic i	
Students are able to design and construct non-trivial algorithms and to evaluate their effectivity.	
B4B33RPH   Solving Problems and other Games   KZ The main motivation is to let students to deal with real-world problems properly. When working on real problems the student shall learn how to decompose the big pr	
optimal way. The unsolved parts should motivate the students to study difficult theoretical subjects. They should generate the important questions. Ideally, at the end e student should be eager to study deeper about informatics. The course also explains the basis of the object oriented design, software testing, ways for writing read	
codes.	
B4B35OSY Operating Systems Z,ZK	
ecture introduces operation system's basic concepts and principles as processes, threads, communication and synchronization, virtual memory, drivers, file systems	design, software testing, ways for writing readable and robu
spects. These topics are theoretically described and demonstrated on Linux and Windows OS with multi-core systems. Practical exercises from OS in C programmin	design, software testing, ways for writing readable and robu
be solved on labs. Students will work with Linux OS and micro-kernel NOVA.	design, software testing, ways for writing readable and robu
B4B36PDV Parallel and Distributed Computing Z,ZK	design, software testing, ways for writing readable and robing the state of the sta
B4B36ZUI Introduction to Artificial Intelligence Z,ZK	design, software testing, ways for writing readable and robut the street on the street of the street on the street on the street of the street on the street of the street on the street of the street
e aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space search, problem rep	design, software testing, ways for writing readable and robing the state of the sta
solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to two-player games.	design, software testing, ways for writing readable and rob    Z,ZK
	design, software testing, ways for writing readable and rob    Z,ZK
also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the fie	design, software testing, ways for writing readable and robing the state space search, problem representation a pow decision making, and to two-player games. This course is
intelligence. More information is available at https://prg.ai/minor.	design, software testing, ways for writing readable and robing the second section of the second section of the second section of the section
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B4B38PSIA Computer Networks Z,ZK	Z,ZK 4  conization, virtual memory, drivers, file systems, basic secure Practical exercises from OS in C programming language well NOVA.  Z,ZK 6 Z,ZK 6 Z,ZK 6 d uninformed state space search, problem representation a pow decision making, and to two-player games. This course is swith a deeper and broader insight into the field of artificial or.  Z,ZK 5
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intelligence. More information is available at https://prg.ai/minor.  B4B38PSIA Computer Networks Z,ZK  B4B39HRY Computer Games Z,ZK  udents familiarize themselves with the issues encountered during programming computer games. They learn topics such as 3D model representation, animations, col	Z,ZK 4  conization, virtual memory, drivers, file systems, basic secure. Practical exercises from OS in C programming language vel NOVA.  Z,ZK 6 Z,ZK 6 Z,ZK 6 D uninformed state space search, problem representation a cover decision making, and to two-player games. This course is swith a deeper and broader insight into the field of artificial or.  Z,ZK 5 Z,ZK 6 C,ZK 6 C,ZZK 6 C,ZK 6 C,ZZK 7 C,ZZK 6 C,ZZK 6 C,ZZK 7
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obtained metrics represent the typical criteria for assessing the suitability of a given platform for the given application. After the simple tasks, students will solve complex task of time-critical motion control application which will require full utilization of RTOS features. All the tasks at the labs will be implemented in C (or C++) language.

BE4B36FUP

# Functional Programming

Z.ZK

6

This course introduces students into the techniques of functional programming, the advantages and disadvantages of this programming paradigm, and its use in practice. This approach is declarative in the sense that the programmer symbolically describes the problem to be solved, rather than specifying the exact sequence of operations required to solve it. It allows focusing on the essence of the solved problem and implementing even more complex algorithms compactly. Functional programming has notable advantages for parallelization and automated verification of algorithms, and the most useful functional programming concepts are increasingly often introduced to standard programming languages. Because of the focus of functional programming on symbols, rather than numbers, functional programming has been heavily used in in artificial intelligence fields, such as agent systems or symbolic machine learning. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE4B36ZUI

### Introduction to Artificial Intelligence

Z.ZK

The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space search, problem representation and solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to two-player games. This course is also part of the inter-university programme prg.ai Minor. It pools the best of Al education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE4B38PSIA

#### Computer Networks

7.7K

Subject is devoted to principles and technologies of Computer Networks. Physical layer media, analog and digital modulations, network topologies, MAC methods, ARQ algorithms, data communication models, coding and cryptography basics are introduced. Widely used LAN technologies are then presented together with their features. Internet protocols are explained and internetworking approaches are presented.

BE4B39VGO

#### Creating graphic content

Z.ZK

The aim of this course is to provide theory behind geometric modeling and modeling of materials, give students an overview of methods used in the process of creating 2D and 3D graphics and how to apply those methods in praxis. At the seminars, students will learn how to design and create three-dimensional scene, create and apply textures imitating materials (e.g., wall finishes, wood, sky) and geometrical details, and position and set-up lights in the scene.

BE5B32PKS

#### Computer and Communication Networks

The aim of the course is to familiarize students with current trends in the switched local networks and the key functions of routing protocols in IP networks. The course is aimed rather primarily practically then theoretically. BE5B33RPZ

### Pattern Recognition and Machine Learning

The basic formulations of the statistical decision problem are presented. The necessary knowledge about the (statistical) relationship between observations and classes of objects is acquired by learning on the raining set. The course covers both well-established and advanced classifier learning methods, as Perceptron, AdaBoost, Support Vector Machines, and Neural Nets. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.

BE5B35APO

Computer Architectures

Subject provides overview of basic building blocks of computer systems. Explanation starts from hardware side where it extends knowledge presented in the previous lectures of Structures of computer systems. Topics cover building blocks description, CPU structure, multiple processors interconnections, input/output subsystem and basic overview of network and buses topologies. Emphasis is placed on clarification of interconnection of hardware components with software support, mainly lower levels of operating systems, device drivers and virtualization techniques. General principles are more elaborated during presentation of examples of multiple standard CPU architectures. Exercises are more focused on the software view to the contrary. Students are lead from basic programming on CPU level to the interaction with raw hardware.

BE5B35LSP

#### Logic Systems and Processors

Ζ

0

The course introduces the basic hardware structures of computing resources, their design, and architecture. It provides an overview of the possibilities of performing data operations at the hardware level and the design of embedded processor systems with peripherals on modern FPGA programmable logic circuits, which are increasingly widely used today. Students will learn their description in VHDL, from logic to more complex sequential circuits to practical finite state machine (FSM) designs. They will also master the correct design procedure using circuit simulation. Practical problems are solved using development boards used at hundreds of leading universities around the world. The course ends with RISC-V processor structure, cache, and pipeline processing.

**BEZB** 

## Safety in Electrical Engineering for a Bachelor's Degree

The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.

### Basic Health and Occupational Safety Regulations

The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague, which was provided by the Rector's Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety regulations forms an integral and permanent part of qualification requirements. This program is obligatory.

TV-V1	Physical education	Z	1
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 <a href="http://bilakniha.cvut.cz/en/FF.html">http://bilakniha.cvut.cz/en/FF.html</a> Generated: day 2025-07-19, time 09:22.