Recomended pass through the study plan

Name of the pass: Specialization Internet of Things - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Pass through the study plan: Open Informatics - Internet of Things 2018
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Open Informatics
Type of study: Bachelor full-time
Note on the pass:

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
B4B01DMA	**Discrete Mathematics** *Petr Habala **Petr Habala** Petr Habala (Gar.)*	Z,ZK	5	2P+2S	Z	P
B0B01LAG	**Linear Algebra** *Jiří Velebil, Jakub Rondoš, Natalie Žukovec, Daniel Gromada, Josef Dvořák, Matěj Dostál **Jiří Velebil** Jiří Velebil (Gar.)*	Z,ZK	8	4P+2S	Z	P
B0B36PRP	**Procedural Programming** *Jan Faigl **Jan Faigl** Jan Faigl (Gar.)*	Z,ZK	6	2P+2C	Z	P
B4B33RPH	**Solving Problems and other Games** *Tomáš Svoboda, Petr Pošík **Petr Pošík** Tomáš Svoboda (Gar.)*	KZ	6	2P+3C	Z	P
BEZZ	**Basic Health and Occupational Safety Regulations** *Vladimír Kůla, Radek Havlíček, Ivana Nová **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
2018_BOIVOL	**Volitelné odborné předměty**	Min. cours. 0	Min/Max 0/999			V

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
B0B35APO	**Computer Architectures** *Pavel Píša, Richard Šusta, Petr Štěpán **Pavel Píša** Pavel Píša (Gar.)*	Z,ZK	5	2P+2L	L	P
BEZB	**Safety in Electrical Engineering for a Bachelor´s Degree** *Vladimír Kůla, Radek Havlíček, Ivana Nová **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z,L	P
B0B01LGR	**Logic and Graphs** *Natalie Žukovec, Matěj Dostál, Alena Gollová **Alena Gollová** Marie Demlová (Gar.)*	Z,ZK	5	3P+2S	Z,L	P
B0B01MA1	**Mathematical Analysis 1** *Josef Dvořák, Martin Křepela, Josef Tkadlec, Veronika Sobotíková **Josef Tkadlec** Josef Tkadlec (Gar.)*	Z,ZK	7	4P+2S	Z,L	P
B4B38PSIA	**Computer Networks** *Jiří Novák, Jan Holub **Jiří Novák** Jiří Novák (Gar.)*	Z,ZK	5	2P+2L	L	P
B0B36PJV	**Programming in Java** *Martin Mudroch, Jiří Vokřínek, Ladislav Serédi **Jiří Vokřínek** Jiří Vokřínek (Gar.)*	Z,ZK	6	2P+3C+7D	L	P
2018_BOIVOL	**Volitelné odborné předměty**	Min. cours. 0	Min/Max 0/999			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
B4B33ALG	**Algorithms** *Marko Genyk-Berezovskyj, Daniel Průša **Daniel Průša** Marko Genyk-Berezovskyj (Gar.)*	Z,ZK	6	2P+2C	Z	P
B0B01MA2	**Mathematical Analysis 2** *Miroslav Korbelář, Petr Hájek, Martin Bohata, Jaroslav Tišer, Karel Pospíšil, Paola Vivi, Hana Turčinová **Petr Hájek** Jaroslav Tišer (Gar.)*	Z,ZK	7	4P+2S	L,Z	P
B4B35OSY	**Operating Systems** *Petr Štěpán, Michal Sojka **Michal Sojka** Michal Sojka (Gar.)*	Z,ZK	4	2P+2C	Z	P
B0B01PST	**Probability and Statistics** *Kateřina Helisová **Kateřina Helisová** Petr Hájek (Gar.)*	Z,ZK	7	4P+2S	Z	P
B4B17EAM	**Electromagnetism** *Zbyněk Škvor, Pavel Hazdra **Jan Kraček** Zbyněk Škvor (Gar.)*	Z,ZK	6	2P+2C	Z	PZ

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
B0B36DBS	**Database Systems** *Martin Řimnáč, Václav Kratochvíl **Martin Řimnáč** Martin Řimnáč (Gar.)*	Z,ZK	6	2P+2C+4D	L	P
B0B33OPT	**Optimization** *Tomáš Werner, Petr Olšák, Mirko Navara, Tomáš Kroupa **Tomáš Werner** Tomáš Werner (Gar.)*	Z,ZK	7	4P+2C	Z,L	P
B4B36PDV	**Parallel and Distributed Computing** *Matěj Kafka, Michal Jakob **Michal Jakob** Michal Jakob (Gar.)*	Z,ZK	6	2P+2C	L	P
B0B35LSP	**Logic systems and processors** *Richard Šusta, Martin Hlinovský **Martin Hlinovský** Zdeněk Hurák (Gar.)*	Z,ZK	6	2P+2L	L	PZ
B4B32PKS	**Computer and Communication Networks** *Leoš Boháč, Tomáš Vaněk **Ivan Pravda** Leoš Boháč (Gar.)*	Z,ZK	6	2P + 2C	L	PZ

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
B4BPROJ6	**Unassisted project** *Tomáš Svoboda, Petr Pošík, Jiří Šebek, Jaroslav Sloup, Ivan Jelínek, Katarína Žmolíková **Petr Pošík***	Z	6	0+2	Z,L	P
B4B38NVS	**Embedded Systems Design** *Jan Fischer, Vojtěch Petrucha **Jan Fischer** Jan Fischer (Gar.)*	Z,ZK	6	2P+2L	Z	PZ
B4B35PSR	**Real-time Systems Programming** *Michal Sojka **Michal Sojka** Michal Sojka (Gar.)*	Z,ZK	6	2P+2C	Z	PZ
2018_BOIVOL	**Volitelné odborné předměty**	Min. cours. 0	Min/Max 0/999			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
BBAP20	**Bachelor thesis** *Roman Čmejla Roman Čmejla (Gar.)*	Z	20	12S	L,Z	P
2018_BOIVOL	**Volitelné odborné předměty**	Min. cours. 0	Min/Max 0/999			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
2018_BOIVOL	**Volitelné odborné předměty**	**Min. cours. 0**	**Min/Max** 0/999			**V**

List of courses of this pass:

Code	Name of the course	Completion	Credits
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 independence, basis, coordinates, etc). The calculus of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covered next. The applications 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 importance 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	Z,ZK	7
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.			
B0B01PST	Probability and Statistics	Z,ZK	7
B0B33OPT	Optimization	Z,ZK	7
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.			
B0B35APO	Computer Architectures	Z,ZK	5
B0B35LSP	Logic systems and processors	Z,ZK	6
The course introduces computing resources' basic hardware structures, design, and architecture. It provides an overview of the possibilities of performing data operations at the hardware level and designing 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 that hundreds of leading universities worldwide also use. The course ends with RISC-V processor structure, cache, and pipeline processing. [last updated January 2024]			
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 for data definition 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, database system architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar task.			
B0B36PJV	Programming in Java	Z,ZK	6
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.			
B0B36PRP	Procedural Programming	Z,ZK	6
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.			
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 equations, binary relations, mappings, cardinality of sets, induction, and recurrence equations. The second aim of this course is to teach students the language of mathematics, both passively and actively, and introduce them to mathematics as science.			
B4B17EAM	Electromagnetism	Z,ZK	6
The subject introduces the basics of electrical engineering, electromagnetic fields, and simple active/passive electronic circuits. We will also explore optics, acoustics, and antennas. Emphasis is placed on understanding the physical principles behind these phenomena. During the lessons, we not only write on the board but also demonstrate computer simulations and conduct small experiments.			
B4B32PKS	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 second part of the course introduces students to concepts of ensuring the information security in the communication networks. An integral part of the course is also an explanation of the principles for ensuring the adequate quality of services in data networks and features of some file sharing application protocols. The course is aimed rather primarily practically then theoretically			
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, Dynamic programming. Students are able to design and construct non-trivial algorithms and to evaluate their effectivity.			
B4B33RPH	Solving Problems and other Games	KZ	6
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 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.			

B4B35OSY	Operating Systems	Z,ZK	4
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.			
B4B35PSR	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.			
B4B36PDV	Parallel and Distributed Computing	Z,ZK	6
B4B38NVS	Embedded Systems Design	Z,ZK	6
The course deals with design of embedded systems using ARM based microcontrollers.			
B4B38PSIA	Computer Networks	Z,ZK	5
B4BPROJ6	Unassisted project	Z	6
BBAP20	Bachelor thesis	Z	20
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 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 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.			

For updated information see http://bilakniha.cvut.cz/en/f3.html
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