Recomended pass through the study plan

Name of the pass: Specialization Artificial Intelligence and Computer Science - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department: Department of Cybernetics
Pass through the study plan: Open Informatics - Artificial Intelligence and Computer Science 2018
Branch of study guranteed by the department:
Guarantor of the study branch: prof. Dr. Michal Pěchouček, MSc.
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 Mathenatics** *Petr Habala **Petr Habala** Petr Habala (Gar.)*	Z,ZK	5	2P+2S	Z	P
B0B01LAG	**Linear Algebra** *Jiří Velebil, Paola Vivi, Kateřina Helisová, Matěj Dostál 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
BEZZ	**Basic health and occupational safety regulations** *Vladimír Kůla, Radek Havlíček, Ivana Nová **Vladimír Kůla** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
B4B33RPH	**Solving Problems and other Games** *Tomáš Svoboda, Petr Pošík **Tomáš Svoboda** Tomáš Svoboda (Gar.)*	KZ	6	2P+3C	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 **Vladimír Kůla** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z,L	P
B0B01LGR	**Logic anad Graphs** *Matěj Dostál, Alena Gollová, Anna Kalousová **Matěj Dostál** Marie Demlová (Gar.)*	Z,ZK	5	3P+2S	Z,L	P
B0B01MA1	**Mathematical Analysis 1** *Karel Pospíšil, Anna Kalousová, Josef Tkadlec, Veronika Sobotíková, Josef Hekrdla **Veronika Sobotíková** Josef Tkadlec (Gar.)*	Z,ZK	7	4P+2S	Z,L	P
B4B38PSIA	**Computer Networks** *Jan Holub, Jiří Novák **Jiří Novák** Jiří Novák (Gar.)*	Z,ZK	5	2P+2L	L	P
B0B36PJV	**Programming in Java** *Jiří Vokřínek **Jiří Vokřínek** Jiří Vokřínek (Gar.)*	Z,ZK	6	2P+3C	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** *Paola Vivi, Josef Hekrdla, Petr Hájek, Jaroslav Tišer, Miroslav Korbelář, Natalie Žukovec, Matěj Novotný, Martin Bohata **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** *Petr Hájek, Miroslav Korbelář, Matěj Novotný, Mirko Navara, Milan Petrík **Petr Hájek** Mirko Navara (Gar.)*	Z,ZK	7	4P+2S	Z,L	P
B4B01NUM	**Numerical Analysis** *Mirko Navara, Aleš Němeček **Aleš Němeček** Mirko Navara (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 Svoboda, Zdeněk Kouba*	Z,ZK	6	2P+2C	L	P
B0B33OPT	**Optimization** *Tomáš Kroupa, Tomáš Werner, Petr Olšák **Tomáš Kroupa** Tomáš Werner (Gar.)*	Z,ZK	7	4P+2C	Z,L	P
B4B36PDV	**Parallel and Distributed Computing** *Branislav Bošanský, Michal Jakob **Michal Jakob***	Z,ZK	6	2P+2C	L	P
B4B36FUP	**Functional Programming** *Viliam Lisý, Rostislav Horčík **Viliam Lisý** Michal Pěchouček (Gar.)*	Z,ZK	6	2P+2C	L	PZ
B4B36ZUI	**Introduction to Artificial Intelligence** *Michal Pěchouček, Jiří Kléma, Tomáš Krajník **Michal Pěchouček** Michal Pěchouček (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 Ťakušová **Jaroslav Sloup***	Z	6	0+2		P
B4B01JAG	**Languages, Automats and Gramatics** *Marie Demlová, Jiří Demel **Marie Demlová** Marie Demlová (Gar.)*	Z,ZK	6	2P+2S	Z	PZ
B4B33RPZ	**Recognition and machine learning** *Ondřej Drbohlav, Jiří Matas **Ondřej Drbohlav** Jiří Matas (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**	Z	20	0+12	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
B0B01LGR	Logic anad 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 semantic consequence andof 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
	Basics of probability theory and mathematical statistics. Includes descriptions of probability, random variables and their distributions, characteristics and operations with random variables. Basics of mathematical statistics: Point and interval estimates, methods of parameters estimation and hypotheses testing, least squares method. Basic notions and results of the theory of Markov chains.		
B0B33OPT	Optimization	Z,ZK	7
	The course provides the basics of mathematical optimization: using linear algebra for optimization (least squares, SVD), Lagrange multipliers, selected numerical algorithms (gradient, Newton, Gauss-Newton, Levenberg-Marquardt methods), linear programming, convex sets and functions, intro to convex optimization, duality.		
B0B35APO	Computer Architectures	Z,ZK	5
B0B36DBS	Database Systems	Z,ZK	6
B0B36PJV	Programming in Java	Z,ZK	6
B0B36PRP	Procedural Programming	Z,ZK	6
B4B01DMA	Discrete Mathenatics	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, induction, cardinality of sets, 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.		
B4B01JAG	Languages, Automats and Gramatics	Z,ZK	6
	Basic notions of the theory of finite automata and grammars: deterministic and non deterministic finite automata, languages accepted by finite automata, regular expressions. Grammars and languages generated by grammars with emphasis to context free grammars. A very brief introduction of Turing machines.		
B4B01NUM	Numerical Analysis	Z,ZK	6
	The course introduces to basic numerical methods of interpolation and approximation of functions, numerical differentiation and integration, solution of transcendent equations and systems of linear equations. Emphasis is put on estimation of errors, practical skills with the methods and demonstration of their properties using Maple and computer graphics.		
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.		
B4B33RPZ	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.		
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.		
B4B36FUP	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.			
B4B36PDV	Parallel and Distributed Computing	Z,ZK	6
B4B36ZUI	Introduction to Artificial Intelligence	Z,ZK	6
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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