Recomended pass through the study plan

Name of the pass: Specialization Bioinformatics - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

Pass through the study plan: Open Informatics - Bioinformatics Branch of study guranteed by the department: Welcome page

Guarantor of the study branch: Program of study: Open Informatics Type of study: Follow-up master 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
BEZM	Safety in Electrical Engineering for a master's degree Vladimír Kůla, Radek Havlíček, Ivana Nová, Josef Černohous, Pavel Mlejnek Radek Havlíček Vladimír Kůla (Gar.)	Z	0	2BP+2BC	Z	Р
B4M33PAL	Advanced algorithms Ondřej Drbohlav, Daniel Průša Daniel Průša (Gar.)	Z,ZK	6	2P+2C	Z	Р
B4M36SAN	Statistical Data Analysis Jiří Kléma Jiří Kléma Jiří Kléma (Gar.)	Z,ZK	6	2P+2C	Z	РО
2018_MOIVOL	Volitelné odborné předměty	Min. cours.	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
B4M35KO	Combinatorial Optimization Zdeněk Hanzálek Zdeněk Hanzálek (Gar.)	Z,ZK	6	3P+2C	L	Р
B4M01TAL	Theory of Algorithms Marie Demlová, Natalie Žukovec Marie Demlová Marie Demlová (Gar.)	Z,ZK	6	3P+2S	L	Р
B4M36BIN	Bioinformatics Jiří Kléma Jiří Kléma Jiří Kléma (Gar.)	Z,ZK	5	2P+2C	L	РО
B4M36MBG	Molecular Biology and Genetics Martin Pospíšek Martin Pospíšek (Gar.)	Z,ZK	6	3P+1C	L	РО
B4M36SMU	Symbolic Machine Learning Filip Železný, Ondřej Kuželka, Gustav Šír Ondřej Kuželka Ondřej Kuželka (Gar.)	Z,ZK	6	2P+2C	L	РО

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
B4MSVP	Software or Research Project Ivan Jelínek, Jaroslav Sloup, Jiří Šebek, Martin Šipoš, Drahomíra Hejtmanová, Jana Zichová, Petr Pošík, Martin Hlinovský, Katarína Žmolíková, Ivan Jelínek Ivan Jelínek (Gar.)	KZ	6		Z,L	Р
B4M33DZO	Digital image Ondřej Drbohlav, Daniel Sýkora Daniel Sýkora (Gar.)	Z,ZK	6	2P+2C	Z,L	РО
BE4M33SSU	Statistical Machine Learning Jan Drchal, Voitéch Franc Voitéch Franc (Gar.)	Z,ZK	6	2P+2C	Z	РО

2018 MOIVOL	Valitalná adharná přadmětu	Min. cours.	Min/Max		V
2018_MOIVOL	Volitelné odborné předměty		V		

Number of semester: 4

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BDIP25	Diploma Thesis	Z	25	22s	L	Р
2018 MOIVOL	Vallada é adhana é a Yadaa Ya	Min. cours.	Min/Max			V
2016_WOTVOL	Volitelné odborné předměty	0 0/999			'	

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
2010 MOIVOI		Min. cours.	Min/Max			.,
2018_MOIVOL	Volitelné odborné předměty	0	0/999			V

List of courses of this pass:

Code	Name of the course	Completion	Credits
B4M01TAL	Theory of Algorithms	Z,ZK	6
•	heoretical background of the theory of algorithms with the focus at first on the time and space complexity of algorithms and problems	•	
of algorithms. Furt	her it is dealt with the theory of complexity; the classes P, NP, NP-complete, PSPACE and NPSPACE are treated and properties of th algorithms are studied and the classes RP and ZZP introduced.	em investigated. P	robabilistic
B4M33DZO	Digital image	Z,ZK	6
This course pres	ents an overview of basic methods for digital image processing. It deals with practical techniques that have an interesting theoretical	basis but are not	difficult to
implement. Seem	ingly abstract concepts from mathematical analysis, probability theory, or optimization come to life through visually engaging applica	tions. The course f	ocuses on
fundamental princip	oles (signal sampling and reconstruction, monadic operations, histogram, Fourier transform, convolution, linear and non-linear filterin	g) and more advar	nced editing
techniques, includ	ling image stitching, deformation, registration, and segmentation. Students will practice the selected topics through six implementatic	n tasks, which will	help them
	learn the theoretical knowledge from the lectures and use it to solve practical problems		
B4M33PAL	Advanced algorithms	Z,ZK	6
Basic	graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - p	battern matching.	
B4M35KO	Combinatorial Optimization	Z,ZK	6
The goal is to show	the problems and algorithms of combinatorial optimization (often called discrete optimization; there is a strong overlap with the term of	perations research	n). Following
the courses on li	near algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programmin	ıg, heuristics, appr	oximation
algorithms and st	ate space search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, pl	anning of human r	esources,
	scheduling in production lines, message routing, scheduling in parallel computers.		
B4M36BIN	Bioinformatics	Z,ZK	5
B4M36MBG	Molecular Biology and Genetics	Z,ZK	6
B4M36SAN	Statistical Data Analysis	Z,ZK	6
This course builds of	on the skills developed in introductory statistics courses. It is practically oriented and gives an introduction to applied statistics. It mainly	, aims at multivaria	te statistical
analysis and mode	lling, i.e., the methods that help to understand, interpret, visualize and model potentially high-dimensional data. It can be seen as a p	urely statistical co	unterpart to
	machine learning and data mining courses.		
B4M36SMU	Symbolic Machine Learning	Z,ZK	6
This course cons	sists of four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its of	environment, also	known as
reinforcement lea	arning. This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inferer	nce. The third part	will cover
fundamental topi	cs from natural language learning, starting from the basics and ending with state-of-the-art architectures such as transformer. Finally	, the last part will p	rovide an
	introduction to several topics from the computational learning theory, including the online and batch learning settings.		
B4MSVP	Software or Research Project	KZ	6
BDIP25	Diploma Thesis	Z	25
Independent final	comprehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his or h	ner branch of study	, which will
be specified b	by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the compreh	ensive final exami	nation.
BE4M33SSU	Statistical Machine Learning	Z,ZK	6
The aim of statistic	cal machine learning is to develop systems (models and algorithms) for learning to solve tasks given a set of examples and some pri	or knowledge abo	ut the task.

This includes typical tasks in speech and image recognition. The course has the following two main objectives 1. to present fundamental learning concepts such as risk minimisation,

maximum likelihood estimation and Bayesian learning including their theoretical aspects, 2. to consider important state-of-the-art models for classification and regression and to show how they can be learned by those concepts.

BEZM Safety in Electrical Engineering for a master's degree

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The course provides for students of all programs periodic training guidelines for health and occupational safety and gives knowledge of electrical hazard of given branch of study.

Students receive indispensable qualification according to the current Directive of the Dean.

For updated information see http://bilakniha.cvut.cz/en/f3.html Generated: day 2025-11-29, time 10:48.