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 semes	ster: 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 K la, Radek Havlí ek, Ivana Nová, Josef ernohous, Pavel Mlejnek Radek Havlí ek Vladimír K la (Gar.)	Z	0	2BP+2BC	Z	Ρ
B4M33PAL	Advanced algorithms Marko Genyk-Berezovskyj, Daniel Pr ša, Ond ej Drbohlav Daniel Pr ša Daniel Pr ša (Gar.)	Z,ZK	6	2P+2C	z	Ρ
B4M36SAN	Statistical Data Analysis Ji í Kléma Ji í Kléma Ji í Kléma (Gar.)	Z,ZK	6	2P+2C	Z	PO
	Volitelné odborné p edm ty	Min. cours.	Min/Max			V
2018_IVIOIVOL		0	0/999			v

Number of sem	ester: 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 Zden k Hanzálek Zden k 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	Ρ
B4M36BIN	Bioinformatics Ji í Kléma Ji í Kléma Ji í Kléma (Gar.)	Z,ZK	5	2P+2C	L	PO
B4M36MBG	Molecular Biology and Genetics Martin Pospíšek Martin Pospíšek (Gar.)	Z,ZK	6	3P+1C	L	PO
B4M36SMU	Symbolic Machine Learning Filip Železný, Ond ej Kuželka, Gustav Šír Ond ej Kuželka Ond ej Kuželka (Gar.)	Z,ZK	6	2P+2C	L	PO

Number of semes	ster: 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, Ji í Šebek, Martin Šipoš, Drahomíra Hejtmanová, Jana Zichová, Petr Pošík, Martin Hlinovský, Katarína Žmolíková, Ivan Jelínek Ivan Jelínek (Gar.)	ΚZ	6		Z,L	Ρ
B4M33DZO	Digital image Ond ej Drbohlav, Daniel Sýkora Daniel Sýkora (Gar.)	Z,ZK	6	2P+2C	Z,L	PO
BE4M33SSU	Statistical Machine Learning Jan Drchal, Vojt ch Franc Vojt ch Franc (Gar.)	Z,ZK	6	2P+2C	Z	PO

2018_MOIVOL	Volitelné odborné p edm ty	Min. cours.	Min/Max		
		0	0/999		V

Number of semes	ster: 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	Volitelné odborné p edm ty	Min. cours.	Min/Max			V
		0	0/999			v

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

group	(for specification see here or below the list of courses)	Completion	Credits	Scope	Semester	Role
	Volitelné odborné p edm ty	Min. cours.	Min/Max			
2018_WOIVOL		0	0/999			v

List of courses of this pass:

Code	Name of the course	Completion	Credits
B4M01TAL	Theory of Algorithms	Z,ZK	6
The course brings	theoretical background of the theory of algorithms with the focus at first on the time and space complexity of algorithms and problem	s, secondly on the	correctness
of algorithms. Fur	her it is dealt with the theory of complexity; the classes P, NP, NP-complete, PSPACE and NPSPACE are treated and properties of the	em investigated. P	robabilistic
	algorithms are studied and the classes RP and ZZP introduced.		
B4M33DZO	Digital image	Z,ZK	6
This course pres	sents 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 for	ocuses on
fundamental princi	ples (signal sampling and reconstruction, monadic operations, histogram, Fourier transform, convolution, linear and non-linear filterin	g) and more advar	nced editing
techniques, includ	ting image stitching, deformation, registration, and segmentation. Students will practice the selected topics through six implementation	n tasks, which will	help them
D 41 400 DAL	learn the theoretical knowledge from the lectures and use it to solve practical problems	7 71/	
B4M33PAL	Advanced algorithms	Z,ZK	6
Basic	graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science -	pattern 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	1). Following
the courses on li	near algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programmir	ig, heuristics, appr	oximation
algorithms and s	tate space search methods, we focus on application of optimization in stores, ground transportation, flight transportation, logistics, pr	anning of numan r	esources,
	Scheduling in production lines, message routing, scheduling in parallel computers.	7 71/	
B4IVI36BIIN	Bioinformatics	Z,ZK	5
B4M36MBG	Molecular Biology and Genetics	Z,ZK	6
B4M36SAN	Statistical Data Analysis	Z,ZK	6
This course builds	on the skills developed in introductory statistics courses. It is practically oriented and gives an introduction to applied statistics. It mainly	/ aims at multivaria	ite 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	ourely statistical co	unterpart to
	machine learning and data mining courses.		
B4M36SMU	Symbolic Machine Learning	Z,ZK	6
This course con	sists of four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its	environment, also l	known as
reinforcement le	arning. This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inferei	ice. The third part	will cover
fundamental topi	cs from natural language learning, starting from the basics and enoung with state-or-ine-art architectures such as transformer. Finally	, the last part will p	provide an
	Introduction to several topics from the computational rearring theory, including the online and batch learning settings.	1/7	<u> </u>
BAINSVP	Software of Research Project	rz	6
BDIP25	Diploma Thesis		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 l	her branch of study	/, which will
be specified t	by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the compreh	ensive final examin	iation.
BE4M33SSU	Statistical Machine Learning	Z,ZK	6
The aim of statisti	cal machine learning is to develop systems (models and algorithms) for learning to solve tasks given a set of examples and some pr	or knowledge abou	ut the task.
I his includes typic	al tasks in speech and image recognition. The course has the following two main objectives 1. to present fundamental learning conce	pts such as risk m	inimisation,

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	Z	0				
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 <u>http://bilakniha.cvut.cz/en/f3.html</u> Generated: day 2025-06-07, time 11:43.