Recomended pass through the study plan

Name of the pass: Branch Data Science - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Pass through the study plan: Open Informatics - Data Science
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
BE4M33PAL	**Advanced Algorithms** *Max Hollmann, Ondřej Drbohlav, Daniel Průša **Daniel Průša** Daniel Průša (Gar.)*	Z,ZK	6	2P+2C	Z	P
BEEZM	**Safety in Electrical Engineering for a master´s degree** *Vladimír Kůla, Ivana Nová, Josef Černohous, Radek Havlíček **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
BE4M36DS2	**Database systems 2** *Yuliia Prokop **Yuliia Prokop** Yuliia Prokop (Gar.)*	Z,ZK	6	2P+2C	Z	PO
BE4M36SAN	**Statistical data analysis** *Jiří Kléma **Jiří Kléma** Jiří Kléma (Gar.)*	Z,ZK	6	2P+2C	Z	PO
2018_MOIEVOL	**Elective subjects**	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
BE4M35KO	**Combinatorial Optimization** *Zdeněk Hanzálek **Zdeněk Hanzálek** Zdeněk Hanzálek (Gar.)*	Z,ZK	6	3P+2C	L	P
BE4M01TAL	**Theory of Algorithms** *Marie Demlová, Natalie Žukovec **Marie Demlová** Marie Demlová (Gar.)*	Z,ZK	6	3P+2S	L	P
BE4M36SMU	**Symbolic Machine Learning** *Filip Železný, Ondřej Kuželka, Gustav Šír **Ondřej Kuželka** Ondřej Kuželka (Gar.)*	Z,ZK	6	2P+2C	L	PO
BE4M39VIZ	**Visualization** *Ladislav Čmolík **Ladislav Čmolík** Ladislav Čmolík (Gar.)*	Z,ZK	6	2P+2C	L	PO
2018_MOIEVOL	**Elective subjects**	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
BE4MSVP	**Software or Research Project** *Jiří Šebek, Petr Pošík, Jaroslav Sloup, Katarína Žmolíková, Tomáš Drábek **Petr Pošík***	KZ	6		Z,L	P
BE4M36OSW	**Ontologies and Semantic Web** *Petr Křemen **Petr Křemen** Petr Křemen (Gar.)*	Z,ZK	6	2P+2C	Z	PO

BE4M33SSU	**Statistical Machine Learning** *Jan Drchal, Vojtěch Franc **Vojtěch Franc** Vojtěch Franc (Gar.)*	Z,ZK	6	2P+2C	Z	PO
2018_MOIEVOL	**Elective subjects**	Min. cours. 0	Min/Max 0/999			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	P
2018_MOIEVOL	**Elective subjects**	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_MOIEVOL	**Elective subjects**	**Min. cours.** **0**	**Min/Max** 0/999			**v**

List of courses of this pass:

Code	**Name of the course**	**Completion**	**Credits**
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 her branch of study, which will be specified by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehensive final examination.			
BE4M01TAL	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 problems, secondly on the correctness of algorithms. Further it is dealt with the theory of complexity; the classes P, NP, NP-complete, PSPACE and NPSPACE are treated and properties of them investigated. Probabilistic algorithms are studied and the classes RP and ZZP introduced.			
BE4M33PAL	Advanced Algorithms	Z,ZK	6
Basic graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - pattern matching.			
BE4M33SSU	Statistical Machine Learning	Z,ZK	6
The aim of statistical machine learning is to develop systems (models and algorithms) for learning to solve tasks given a set of examples and some prior knowledge about 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.			
BE4M35KO	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 operations research). Following the courses on linear algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programming, heuristics, approximation algorithms and state space search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, planning of human resources, scheduling in production lines, message routing, scheduling in parallel computers.			
BE4M36DS2	Database systems 2	Z,ZK	6
The aim is to introduce new trends in database systems to students. We will focus primarily on the current issues of Big Data and the associated problems of distributed storage and processing of data. We will introduce a so-called basic types of NoSQL databases and also the related issue of cloud computing, data storage and distributed computations over large data files.			
BE4M36OSW	Ontologies and Semantic Web	Z,ZK	6
The course "Ontologies and Semantic Web" will guide students through current trends and technologies in the semantic web field. Students will learn designing complex ontologies, thesauri, formalizing them in a suitable formal language, querying them and creating semantic web applications on their top. The second part of the course will be devoted to the efficient management of ontological data and other selected topics.			
BE4M36SAN	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 multivariate statistical analysis and modelling, i.e., the methods that help to understand, interpret, visualize and model potentially high-dimensional data. It can be seen as a purely statistical counterpart to machine learning and data mining courses.			
BE4M36SMU	Symbolic Machine Learning	Z,ZK	6
This course consists 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 known as reinforcement learning. This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inference. The third part will cover			

	fundamental topics from natural language learning, starting from the basics and ending with state-of-the-art architectures such as transformer. Finally, the last part will provide an introduction to several topics from the computational learning theory, including the online and batch learning settings.		
BE4M39VIZ	Visualization	Z,ZK	6
	In this course, you will get the knowledge of theoretical background for visualization and the application of visualization in real-world examples. The visualization methods are aimed at exploiting both the full power of computer technologies and the characteristics (and limits) of human perception. Well-chosen visualization methods can help to reveal hidden dependencies in the data that are not evident at the first glance. This in turn enables a more precise analysis of the data or provides a deeper insight into the core of the particular problem represented by the data.		
BE4MSVP	Software or Research Project	KZ	6
	Independent work on a problem under the guidance of an advisor. Usually but not mandatory, the problem being solved is a subproblem of approaching diploma thesis and the project advisor is the diploma thesis supervisor too. Therefore, we recommend choosing the topic of the diploma thesis at the beginning of the 3rd semester and not underestimating its timely selection. The topic of the project should be relevant to the major branch of the study. The software and research project course must have a clearly defined output, such as a technical report or a computer program. The output is defended, evaluated and graded. Important note: - By default, it is not possible to complete more than one subject of this type. - An exception may be granted by the guarantor of the major branch of the study. A possible reason for granting an exemption is that the work-project has a different topic and is led by another supervisor. A typical example is working on a project abroad. Note: The student enrolls in the course of SVP at the department of the supervisor. If the course does not list the course, then at the department 13139 (variant A4M39SVP). The contact email in case of further questions: oi@fel.cvut.cz. More instructions for entering and elaborating the project can be found on the website of the Department of Computer Graphics and Interaction http: //dcgi.felk. cvut.cz/cs/study/predmetprojekt.		
BEEZM	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 http://bilakniha.cvut.cz/en/f3.html
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