Study plan

Name of study plan: Open Informatics - Data Science

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:
Program of study: Open Informatics
Type of study: Follow-up master full-time

Required credits: 85

Elective courses credits: 35 Sum of credits in the plan: 120

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 49

The role of the block: P

Code of the group: 2018_MOIEP

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 24 credits

Requirement courses in the group: In this group you have to complete 4 courses

Credits in the group: 24 Note on the group:

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, Ond ej Drbohlav, Daniel Pr ša Daniel Pr ša Daniel Pr ša (Gar.)	Z,ZK	6	2P+2C	Z	Р
BE4M35KO	Combinatorial Optimization	Z,ZK	6	3P+2C	L	Р
BE4MSVP	Software or Research Project Ji í Šebek, Petr Pošík, Jaroslav Sloup, Katarína Žmolíková, Tomáš Drábek Petr Pošík	KZ	6		Z,L	Р
BE4M01TAL	Theory of Algorithms	Z,ZK	6	3P+2S	L	Р

Characteristics of the courses of this group of Study Plan: Code=2018_MOIEP Name=Compulsory subjects of the programme

BE4M33PAL	Advanced Algorithms	Z,ZK	6				
Basic graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - pattern matching.							
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							

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.

BE4MSVP Software or Research Project

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.

BE4M01TAL Theory of Algorithms

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.

Code of the group: 2018_MOIEDIP Name of the group: Diploma Thesis

Requirement credits in the group: In this group you have to gain 25 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 25

Note on the group:

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

Characteristics of the courses of this group of Study Plan: Code=2018_MOIEDIP Name=Diploma Thesis

BDIP25 Diploma Thesis Ζ

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

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 36

The role of the block: PO

Code of the group: 2018_MOIEPO9

Name of the group: Compulsory subjects of the branch

Requirement credits in the group: In this group you have to gain 36 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 36 Note on the group:

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
BE4M36DS2	Database systems 2 Yuliia Prokop Yuliia Prokop Yuliia Prokop (Gar.)	Z,ZK	6	2P+2C	Z	РО
BE4M36OSW	Ontologies and Semantic Web Petr K emen Petr K emen Petr K emen (Gar.)	Z,ZK	6	2P+2C	Z	РО
BE4M36SAN	Statistical data analysis Ji í Kléma Ji í Kléma Ji í Kléma (Gar.)	Z,ZK	6	2P+2C	Z	РО
BE4M33SSU	Statistical Machine Learning Jan Drchal, Vojt ch Franc Vojt ch Franc (Gar.)	Z,ZK	6	2P+2C	Z	PO
BE4M36SMU	Symbolic Machine Learning	Z,ZK	6	2P+2C	L	PO
BE4M39VIZ	Visualization	Z,ZK	6	2P+2C	L	PO

Characteristics of the courses of this group of Study Plan: Code=2018 MOIEPO9 Name=Compulsory subjects of the branch

Database systems 2

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

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

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

BE4M33SSU Statistical Machine Learning Z,ZK

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.

Symbolic Machine Learning

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

Completion

Credits

25

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.

Name of the block: Elective courses Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 2018_MOIEVOL Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group: Credits in the group: 0

Code

BDIP25

Note on the group: ~Student can choose arbitrary subject of themagister's program (EEM - Electrical Engineering, Power Engineering and Management, EK - Electronics and Communications, KYR - Cybernetics and Robotics, OI - Open Informatics, OES - Open Electronics Systems) which is not part of his curriculum. Student can choose with consideration of recommendation of the branch guarantee. You can find a selection of optional

courses organized by the departments on the web site http://www.fel.cvut.cz/cz/education/volitelne-predmety.html

List of courses of this pass:

Name of the course

Diploma Thesis

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	rehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his or h		
be specified by bra	anch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehe	ensive final examin	nation.
BE4M01TAL	Theory of Algorithms	Z,ZK	6
The course brings theore	etical 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 the	em investigated. P	robabilistic
	algorithms are studied and the classes RP and ZZP introduced.		
BE4M33PAL	Advanced Algorithms	Z,ZK	6
Basic graph	n algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - p	attern matching.	
BE4M33SSU	Statistical Machine Learning	Z,ZK	6
The aim of statistical m	achine 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 tas	ks 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 estir	mation and Bayesian learning including their theoretical aspects, 2. to consider important state-of-the-art models for classificatio	n and regression	and to show
	how they can be learned by those concepts.		
BE4M35KO	Combinatorial Optimization	Z,ZK	6
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the courses on linear	algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programmin	g, heuristics, appr	oximation
algorithms and state s	pace search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, pla	anning of human r	esources,
	scheduling in production lines, message routing, scheduling in parallel computers.		
BE4M36DS2	Database systems 2	Z,ZK	6
	new trends in database systems to students. We will focus primarily on the current issues of Big Data and the associated proble		
processing of data. We w	vill introduce a so-called basic types of NoSQL databases and also the related issue of cloud computing, data storage and distrit	outed computation	s over large
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BE4M36OSW	Ontologies and Semantic Web	Z,ZK	6
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thesauri, formalizing ther	m 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
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This course builds on the	e 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 modelling,	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
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BE4M36SMU	Symbolic Machine Learning	Z,ZK	6
This course consists of	of four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its e	nvironment, also	known as
reinforcement learning	g. This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inferen	ce. 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

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For updated information see http://bilakniha.cvut.cz/en/f3.html Generated: day 2025-10-22, time 03:12.