Study plan

Name of study plan: Open Informatics - Computer Graphics

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:

-	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, Ond ej Drbohlav, Daniel Pr ša Daniel Pr ša Daniel Pr ša (Gar.)	Z,ZK	6	2P+2C	Z	Р
BE4M35KO	Combinatorial Optimization Zden k Hanzálek Zden k Hanzálek (Gar.)	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 Marie Demlová. Natalie Žukovec Marie Demlová Marie Demlová (Gar.)	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 managements	atching.	
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.

ΚZ

Z,ZK

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 MOIEPO3

Name of the group: Compulsory subjects of the branch

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

Ladislav molík Ladislav molík Ladislav molík (Gar.)

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
BE4M39APG	Algorithms of Computer Graphics Ji í Žára, Ji í Bittner Ji í Bittner Ji í Žára (Gar.)	Z,ZK	6	2P+2C	Z	РО
BE4M39VG	Computational Geometry Petr Felkel Petr Felkel Petr Felkel (Gar.)	Z,ZK	6	2P+2S	Z	РО
BE4M39DPG	Data Structures for Computer Graphics Vlastimil Havran Vlastimil Havran (Gar.)	Z,ZK	6	2P+2S	Z	РО
BE4M33GVG	Geometry of Computer Vision and Graphics Torsten Sattler, Viktor Korotynskiy, Tomáš Pajdla Tomáš Pajdla Tomáš Pajdla (Gar.)	Z,ZK	6	2P+2C	L	РО
BE4M39MMA	Multimedia and Computer Animation	Z,ZK	6	2P+2L	Z	РО
BE4M39VIZ	Visualization	Z,ZK	6	2P+2C	L	PO

Characteristics of the courses of this group of Study Plan: Code=2018_MOIEPO3 Name=Compulsory subjects of the branch

BE4M39APG	Algorithms of Computer Graphics	
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In this course you will get acquainted with basic problems and their solutions in computer graphics. The main topic of the course are graphics primitives in 2D and 3D for modeling and rendering, color models, image representations, and basic photorealistic rendering algorithms.

Computational Geometry

Z.ZK

The goal of computational geometry is analysis and design of efficient algorithms for determining properties and relations of geometric entities. The lecture focuses on geometric search, point location, convex hull construction for sets of points in d-dimensional space, searching nearest neighbor points, computing intersection of polygonal areas, geometry of parallelograms. New directions in algorithmic design. Computational geometry is applied not only in geometric applications, but also in common database searching problems

Data Structures for Computer Graphics

This course provides you with the fundamentals of data structures commonly used in computer graphics. In contrast to standard binary search trees used in one dimension, the presented theory focuses on multidimensional data used to describe 3D scenes. In addition to the theory, the course emphasizes individual and team projects, where the importance and advantages of multidimensional data are demonstrated on practical examples. The students will gain practical experience through their own individual projects.

Geometry of Computer Vision and Graphics

We will explain fundamentals of image and space geometry including Euclidean, affine and projective geometry, the model of a perspective camera, image transformations induced by camera motion, and image normalization for object recognition. The theory will be demonstrated on practical task of creating mosaics from images, measuring the geometry of objects by a camera, and reconstructing geometrical properties of objects from their projections. We will build on linear algebra and optimization and lay down foundation for other subjects such as computational geometry, computer vision, computer graphics, digital image processing and recognition of objects in images.

BF4M39MMA Multimedia and Computer Animation

The course is focused on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typical problems of 3D animation (inverse kinematics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The last part of lectures will give information about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects).

Visualization

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

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

Completion Credits

List of courses of this pass:

Name of the course

	Name of the course	Completion	Cieuita
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	y branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehe	ensive final examin	ation.
BE4M01TAL	Theory of Algorithms	Z,ZK	6
The course brings	heoretical background of the theory of algorithms with the focus at first on the time and space complexity of algorithms and problems	s, secondly on the	correctness
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 the	em investigated. P	robabilistic
	algorithms are studied and the classes RP and ZZP introduced.		
BE4M33GVG	Geometry of Computer Vision and Graphics	Z,ZK	6
We will explain fur	damentals of image and space geometry including Euclidean, affine and projective geometry, the model of a perspective camera, im	age transformation	ns induced
by camera motion	n, and image normalization for object recognition. The theory will be demonstrated on practical task of creating mosaics from images,	measuring the ge	ometry of
objects by a cam-	era, and reconstructing geometrical properties of objects from their projections. We will build on linear algebra and optimization and la	ay down foundation	for other
	subjects such as computational geometry, computer vision, computer graphics, digital image processing and recognition of objects is	n images.	
BE4M33PAL	Advanced Algorithms	Z,ZK	6
Basic	graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - p	attern matching.	
BE4M35KO	Combinatorial Optimization	Z.ZK	6
	the problems and algorithms of combinatorial optimization (often called discrete optimization; there is a strong overlap with the term of	, ,	_
•	near algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programming	•	,
	ate space search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, pla		
_	scheduling in production lines, message routing, scheduling in parallel computers.	-	
BE4M39APG	Algorithms of Computer Graphics	Z,ZK	6
	will get acquainted with basic problems and their solutions in computer graphics. The main topic of the course are graphics primitives in	·	_
-	rendering, color models, image representations, and basic photorealistic rendering algorithms.		-
BE4M39DPG	Data Structures for Computer Graphics	Z,ZK	6
	s you with the fundamentals of data structures commonly used in computer graphics. In contrast to standard binary search trees used in	' '	_
theory focuses on n	oultidimensional data used to describe 3D scenes. In addition to the theory, the course emphasizes individual and team projects, where the	ne importance and	advantages
0,	multidimensional data are demonstrated on practical examples. The students will gain practical experience through their own individ	ual projects.	
BE4M39MMA	Multimedia and Computer Animation		
	ividilinedia and Computer Amination	Z,ZK	6
	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typi	Z,ZK ical problems of 3D	-
The course is focus	!	ical problems of 3	animation
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The course is focus	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typi ics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The li information about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects).	ical problems of 3D ast part of lectures	animation
The course is focus (inverse kinemat BE4M39VG	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The lainformation about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects). Computational Geometry	ical problems of 3D ast part of lectures Z,ZK	animation will give
The course is focus (inverse kinemat BE4M39VG The goal of comput	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typi ics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The li information about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects).	ical problems of 3D ast part of lectures Z,ZK focuses on geome	animation will give
The course is focus (inverse kinemat BE4M39VG The goal of comput point location, conve	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The lainformation about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects). Computational Geometry ational geometry is analysis and design of efficient algorithms for determining properties and relations of geometric entities. The lecture	ical problems of 3D ast part of lectures Z,ZK e focuses on geome s, geometry of para	animation will give 6 etric search
The course is focus (inverse kinemat BE4M39VG The goal of comput point location, conve New dir	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The lainformation about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects). Computational Geometry ational geometry is analysis and design of efficient algorithms for determining properties and relations of geometric entities. The lecture by hull construction for sets of points in d-dimensional space, searching nearest neighbor points, computing intersection of polygonal area	ical problems of 3D ast part of lectures Z,ZK e focuses on geome s, geometry of para	animation will give 6 etric search
The course is focus (inverse kinemat BE4M39VG The goal of comput point location, conve New dir BE4M39VIZ	sed on methods often applied in the area of computer animation. Studens will get an overview of algorithms and methods solving typics, animation of human body, dynamics, etc.). Part of the course is devoted to principles used during creative work with sound. The limitation information about methods and technologies used in movie production (MOCAP, stereoscopy, visual effects). Computational Geometry ational geometry is analysis and design of efficient algorithms for determining properties and relations of geometric entities. The lecture ex hull construction for sets of points in d-dimensional space, searching nearest neighbor points, computing intersection of polygonal area ections in algorithmic design. Computational geometry is applied not only in geometric applications, but also in common database se	Z,ZK control of sectors of 3C ast part of lectures Z,ZK control of sectors of sectors of paragraphic sectors of paragraphing problems. Z,ZK	2 animation will give 6 etric search allelograms
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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.

For updated information see http://bilakniha.cvut.cz/en/f3.html Generated: day 2025-11-16, time 15:31.