## Study plan

# Name of study plan: Geodézie a kartografie, specializace Geomatika

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Geodesy and Cartography Type of study: Follow-up master full-time Required credits: 120 Elective courses credits: 0 Sum of credits in the plan: 120 Note on the plan: platí pro nástup od akad. roku 2023/24

Name of the block: Compulsory courses Minimal number of credits of the block: 54 The role of the block: Z

## Code of the group: NH20230001

Name of the group: Geodézie a kartografie, spec. Geomatika, 1. semestr Requirement credits in the group: In this group you have to gain at least 26 credits Requirement courses in the group: In this group you have to complete at least 6 courses Credits in the group: 26

## 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
101MM4G	Mathematics 4G Jozef Bobok Jozef Bobok Jozef Bobok (Gar.)	Z,ZK	4	2P+2C	Z	Z
155DPRZ	Remote Sensing Karel Pavelka <b>Eva Matoušková</b> Karel Pavelka (Gar.)	Z,ZK	5	2P+2C	Z	Z
155GPL2	Survey Sketches 2 Zden k Valenta Zden k Valenta (Gar.)	KZ	2	2C	Z	Z
155KAT3	Cartography 3 Ji í Cajthaml, Tomáš Janata, Petra Justová, Josef Münzberger <b>Ji í Cajthaml</b> Ji í Cajthaml (Gar.)	Z,ZK	5	2P+2C	Z	Z
155TGD3	<b>Theoretical geodesy 3</b> Jan Holešovský <b>Jan Holešovský</b> Jan Holešovský (Gar.)	Z,ZK	5	2P+2C	Z	Z
155UZPR	Introduction to Spatial Data Processing Martin Landa Martin Landa Martin Landa (Gar.)	Z,ZK	5	2P+2C	Z	Z

# Characteristics of the courses of this group of Study Plan: Code=NH20230001 Name=Geodézie a kartografie, spec. Geomatika, 1. semestr

101MM4G Mathematics 4G Z,ZK 4 https://mat.fsv.cvut.cz/bobok/ 155DPRZ Z.ZK 5 Remote Sensing The subject is focused on explanation of physical bases allowing to use remote sensing, on technical explanation of methods of data collection/measurement, on behavior of individual materials/land covers as an interaction with electromagnetic radiation, and on possibility to use RS for many applications. 155GPL2 Survey Sketches 2 ΚZ 2 Students will learn about the preparation of geometric plans through practical exercises. It is mainly about the orientation of changes for updating the cadastral register by various measuring technologies and the subsequent processing of geometric plans as a technical basis for the introduction of these changes into the cadastral register in locations with different technical conditions - analogue cadastral map, digital cadastral map (DKM, KMD, etc.) 155KAT3 Z,ZK 5 Cartography 3 Advanced cartography, web map services and applications, dynamic maps, spatial data formats, data sources, standardization, web maps, trends in cartography. 155TGD3 Theoretical geodesy 3 Z,ZK 5 Vector and scalar description of gravitational field of the Earth. Properties of gravitational potential and its derivatives for basic bodies. Description of gravity field of the Earth. Normal gravity field of normal bodies. Approximation of the shape of the Earth in form of geoid or level ellipsoid. Stokes' and Molodensky's solution of the shape of the Earth. Consequences of this procedures for geodesy (geoid, quasigeoid, heights). Construction and models of (quasi)geoid. Physical priciples of gravity surveying. Introduction to Spatial Data Processing 155UZPR Z,ZK The course focuses on automated processing of geospatial data. Practical exercises are divided into two parts. In the first part, the Python scripting language is used for data processing in combination with GeoPandas, Rasterio, Fiona and other libraries. The second part of the course is focused on geospatial data management in object-relational database systems and their processing using spatial SQL. Free connection to the courses Informatics 2 - Database Systems, Informatics 3 - Object-oriented programming, GIS1 and GIS2.

### Code of the group: NH20230002 Name of the group: Geodézie a kartografie, spec. Geomatika, 2. semestr Requirement credits in the group: In this group you have to gain at least 16 credits Requirement courses in the group: In this group you have to complete at least 4 courses Credits in the group: 16

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
155FTG2	Photogrammetry 2 Karel Pavelka, Jan Pacina Karel Pavelka Karel Pavelka (Gar.)	Z,ZK	5	2P+2C	L	Z
155PKAR	Project - Cartography Ji í Cajthaml, Tomáš Janata <b>Ji í Cajthaml</b> Ji í Cajthaml (Gar.)	KZ	5	3C	L	Z
155TG4	Theoretical geodesy 4 Jakub Kostelecký Jakub Kostelecký Leoš Mervart (Gar.)	Z,ZK	5	2P+2C	L	Z
155VTTG	Fieldwork Training in Theoretical Geodesy Zden k Vysko il Zden k Vysko il Zden k Vysko il (Gar.)	KZ	1	2C	L	Z

#### Characteristics of the courses of this group of Study Plan: Code=NH20230002 Name=Geodézie a kartografie, spec. Geomatika, 2. semestr

155FTG2	Photogrammetry 2	Z,ZK	5					
Aerial photogrammetry. Relative and absolute orientation of aerial photos. Analogue, analytic and digital interpreting devices, computer support. Photogrammetric methods in mapping.								
Orthophoto, its accurac	y. Photo triangulation, AAT, block and bundle adjustments, analytical photogrammetry. Digital photogrammetry, digital orthoph	oto, digital photo	grammetric					
stations, optical correlation	tion systems, aerial laser scanning, using of drones (RPAS).							
155PKAR	Project - Cartography	KZ	5					
Map creation in GIS, ge	odatabase, data model, symbology, compositional elements of maps, geographical nomenclature, errors in maps.							
155TG4	Theoretical geodesy 4	Z,ZK	5					
Theoretical Geodesy 4	introduces students to the field of space geodesy, i.e. using satellite observations of the Earth to define and maintain global	oordinate system	is, the Earth					
orientation parameters,	models of the Earth's gravity field and ocean topography. The outputs of space geodesy form the basis from which one of the	e most widely use	d measurement					
techniques in geodesy	GNSS is based.							
155VTTG	Fieldwork Training in Theoretical Geodesy	KZ	1					
Landsurveying in terrain is intended for the practice of measurement methods of geodesy and data processing work in the creation of a point field. Includes tasks: Long Range								
Triangulation and Trilateration (TRG) Determining the course of the quasi-geoid (GEO) Remeasurement and adjustment of height points with very precise leveling (VPN) Azimuth								
determination using the	determination using the gyrotheodolite, gravimetric measurements							

#### Code of the group: NH20230003

Name of the group: Geodézie a kartografie, spec. Geomatika, 3. semestr Requirement credits in the group: In this group you have to gain at least 12 credits Requirement courses in the group: In this group you have to complete at least 3 courses Credits in the group: 12 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
155MSPD	Modern Methods of Spatial Data Acquisition Karel Pavelka, Jan Pacina Karel Pavelka Karel Pavelka (Gar.)	Z,ZK	5	2P+2C	Z	Z
155PKAZ	Law in Cadastre and Surveying Iveta Bláhová Iveta Bláhová Iveta Bláhová (Gar.)	ZK	2	2P	Z	Z
155VFG	Photogrammetry -Project Karel Pavelka, Jind ich Hoda Karel Pavelka Karel Pavelka (Gar.)	KZ	5	3C	Z	Z

#### Characteristics of the courses of this group of Study Plan: Code=NH20230003 Name=Geodézie a kartografie, spec. Geomatika, 3. semestr

155MSPD	Modern Methods of Spatial Data Acquisition	Z,ZK	5			
The course focuses on new modern and unconventional methods of geospatial data collection and presentation. Contains information on terrestrial, aerial and mobile laser scanning,						
about remote sensing and its methods, about hyperspectral imaging. Further, it focuses on the progressive method in geomathics - on RPAS. It informs about types, usage, legislation						
as well as about sensors and software for automatically processing for image data. Finally, geophysical methods and virtual reality technologies are presented.						

155PKAZ Law in Cadastre and Surveying	ZK	2					
Public and private, substantive and procedural law. Overview of legal regulations governing the cadastre of real estate (CN) and land surveying. Predecessors of surveying and cadastr							
authorities in the past. Surveying and cadastral authorities today. Thing, thing in the legal sense, division of things, immovable things, part of a thing a	and accessories	of a thing. Land,					
parcel of land, land in jurisprudence, building, building in jurisprudence, small buildings, temporary buildings, building, unit. Origin of the CN and its pr	redecessors, the	Cadastral Act					
and implementing regulations, definition and purpose of the CN. Content of the CN, cadastral register, registration of rights in the CN, basic provision	ns. Rights entered	d into the CN by					
deposit, title deed, proposal for deposit, annexes to the proposal, deposit procedure. Deposit procedure, record, note. Administration of the CN, entrie	es of other data,	acceptance of					
data, time limits for entry in the CN, deposit of documents in the collection of documents, revision of the CN, correction of errors, obligations of owner	rs and other ben	eficiaries,					
municipalities and public authorities. Surveying activities and geometrical plans, publicity of the CN, provision of CN data, offences, common, transitic	onal and final pro	visions of the					
Cadastral Act. Real estate contracts. Previous legislation on land surveying, Land Surveying Act, introductory provisions, surveying activities. Rights a	and obligations i	n carrying out					
surveying activities, verification of results of surveying activities, geodetic reference systems and state mapping works, offences. Visit to the land registre	er in the building	of the Surveying					
and Cadastral Authorities in Prague Kobylisy.							
155VFG Photogrammetry - Project	KZ	5					
practical metrical documentation of historical objects and sites, technology of documentation and data processing by modern methods							

#### Name of the block: Compulsory elective courses Minimal number of credits of the block: 36 The role of the block: S

#### Code of the group: NH20230001\_1

Name of the group: Geodézie a kartografie, spec. Geomatika, PV p edm ty, 1. semestr Requirement credits in the group: In this group you have to gain at least 4 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 4

#### 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
128TG	Graph Theory Ji í Demel <b>Ji í Demel</b> Ji í Demel (Gar.)	Z,ZK	4	2P+2C	Z	S
155YCN1	<b>Real Estate Valuation</b> Eliška Housarová <b>Eliška Housarová</b> Eliška Housarová (Gar.)	Z,ZK	4	2P+2C	Z	S
155YGEI	Geoinformatics Ji í Cajthaml, Tomáš Janata, Lena Halounová, Tomáš Bayer, Markéta Pot ková Tomáš Bayer Tomáš Bayer (Gar.)	Z,ZK	4	2P+2C	z	S

# Characteristics of the courses of this group of Study Plan: Code=NH20230001\_1 Name=Geodézie a kartografie, spec. Geomatika, PV p edm ty, 1. semestr

128TG	Graph Theory	Z,ZK	4			
Graph theory - basic elements, graph tasks formulations, basic algorithms with recognition of calculation efficiency. Connectivity, strong connectivity, trees, spanning trees, flows in						
networks, matchings, eulerian trails, hamiltonian paths, independent sets, cliques, coloring, plannar graphs.						
155YCN1	55YCN1 Real Estate Valuation Z,ZK					
Real estate valuation is	a very large field that intersects various areas such as construction, insurance, government, banking and land registry. Durir	ng the lectures we	will cover the			
basic concepts of real e	state, methods of real estate valuation, for what purpose and when to use them. Market valuation - cost, comparative and inc	come methods. A	dministrative			
valuation of real estate, valuation of easements and valuation of real estate in special cases such as loans, inheritance, community property, for insurance companies, etc.						
155YGEI	Geoinformatics	Z,ZK	4			

#### Code of the group: NH20230002\_1

Name of the group: Geodézie a kartografie, spec. Geomatika, PV p edm ty, 2. semestr Requirement credits in the group: In this group you have to gain at least 14 credits Requirement courses in the group: In this group you have to complete at least 3 courses Credits in the group: 14

#### Note on the group:

<b>U</b>						
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
101STAG	Statistics Jana Nosková Jana Nosková Jana Nosková (Gar.)	Z,ZK	5	2P+2C	L	S
128YNAA	Design and Analysis of Algorithms Ji í Demel <b>Ji í Demel</b> Ji í Demel (Gar.)	Z,ZK	4	2P+2C	L	S
155ADKI	Algorithms in Digital Cartography and GIS Tomáš Bayer Tomáš Bayer Tomáš Bayer (Gar.)	Z,ZK	5	2P+2C	L	S
155FGIS	Free Software GIS Martin Landa, Ond ej Pešek, Linda Karlovská <b>Martin Landa</b> Lena Halounová (Gar.)	Z,ZK	5	2P+2C	L	S

155IN4G	Informatics 4 Jan Pytel Jan Pytel (Gar.)	Z,ZK	5	2P+2C	L	S
155YWEK	Web Cartography Ji í Cajthaml, Tomáš Janata, Petra Justová, František Mužík <b>Ji í Cajthaml</b> Ji í Cajthaml (Gar.)	Z,ZK	5	2P+2C	L	S
155YZPZ	Processing of Remote Sensing Data Eva Matoušková, Tomáš Bou ek	Z,ZK	5	2P+2C	L	S

# Characteristics of the courses of this group of Study Plan: Code=NH20230002\_1 Name=Geodézie a kartografie, spec. Geomatika, PV

p eam ty, z. seme	Sti							
101STAG	Statistics	Z,ZK	5					
Advanced methods of mathematical statistics. Sequential tests, bayesian and robust methods. Software R-project.								
128YNAA	Design and Analysis of Algorithms	Z,ZK	4					
Design and analysis of	alorithms. Models of a computation. Proofs of correctness, time complexity of algorithms. Basic data structures. P and NP cla	sses of problems	-					
155ADKI	Algorithms in Digital Cartography and GIS	Z,ZK	5					
Automation of digital ca	rtography tasks using rule-based strategies. Implementation of selected cartographic problems in a chosen programming lan	guage. Preparatio	on and design of					
graphical outputs in Qt	ibrary.							
155FGIS	Free Software GIS	Z,ZK	5					
Free and open source s	oftware in geoinformation technologies. Emphasis is placed on the framework orientation in the issue. A comprehensive over	view of available	tools, their use					
and deployment in prac	tical applications is provided during the course. In the exercises, students are introduced to desktop tools such as GRASS G	IS, QGIS, SAGA o	or gvSig, GDAL,					
PROJ, PDAL libraries a	nd other similar tools. Part of the course focuses on active scripting and developing plugins using the Python programming la	nguage. In additio	on, the students					
will get a general introd	uction to publishing geographic data and implementing GIS analyses in the Internet environment, GeoServer and MapServer	, pygeoapi and O	WSLib libraries,					
publishing platforms suc	h as Gisquick, GeoNode and Margin Maps. Also mentioned are the issues of freely available geographic data, open geodata	, and active data	collection for the					
OpenStreetMap commu	inity project. Automation of deployment using Ansible and Docker technologies is mentioned in passing. Teaching is impleme	nted on the open	source platform					
GIS.lab.								
155IN4G	Informatics 4	Z,ZK	5					
In the course, students	are introduced to techniques how to handle big amount of data. The course starts with data preprocessing by command tools	s before import inf	to DB. The focus					
is related to relation dat	abases, NoSQL databases, ElasticSearch, R and cloud.							
155YWEK	Web Cartography	Z,ZK	5					
155YZPZ	Processing of Remote Sensing Data	Z,ZK	5					
Digital image data proce	essing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classific	cation. Individual f	themes depend					
on goals and themes of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric corrections of the processed data and								
their accuracy 4. Radiometric corrections of the processed data 5. Enhancement of individual bands 6. Multi-channel enhancement for DT - new channels calculation 7. Calculation of								
new channels by transformation to other systems - IHS, PCA, PCCA, 8. Classification pixel per pixel focused on DT goal 9. Image segmentation with various number of channels 10.								
Object oriented classific	ation 11. Comparison of results - total, user's, producer's accuracy 12. Post-classification procedures to improve accuracy 13	<ol> <li>Outputs - statist</li> </ol>	tical, image, GIS					
types								

#### Code of the group: NH20230003\_1

Name of the group: Geodézie a kartografie, spec. Geomatika, PV p edm ty, 3. semestr Requirement credits in the group: In this group you have to gain at least 18 credits Requirement courses in the group: In this group you have to complete at least 4 courses Credits in the group: 18

#### 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
101PJS	Statistics Jana Nosková Jana Nosková Jana Nosková (Gar.)	KZ	5	3C	Z	S
143YKIG	GIS in Landscape Engineering Josef Krása Josef Krása Josef Krása (Gar.)	KZ	4	3C	Z	S
155YDPD	Visualization and Distribution of Spatial Data David Zahradník David Zahradník David Zahradník (Gar.)	Z,ZK	5	2P+2C	Z	S
155YFD	Photogrammetric Documentation of Historical Buildings and Sites Jind ich Hoda Jind ich Hoda Jind ich Hoda (Gar.)	КZ	4	3C	Z	S
155YOPR	Object Oriented Programming Jan Pytel Jan Pytel Jan Pytel (Gar.)	Z,ZK	5	2P+2C	Z	S
155YSKN	Information System of Cadastre of Real Estate Petr Sou ek Petr Sou ek (Gar.)	KZ	5	1P+2C	Z	S
155YUSU	Introduction to Machine Learning in Remote Sensing Martin Landa, Ond ej Pešek, Tomáš Bayer Martin Landa Martin Landa (Gar.)	Z,ZK	5	2P+2C	Z	S
155YV3D	Visualization of 3D Models with Modern Technologies Karel Pavelka, Ji í Cajthaml, František Mužík, Karel Pavelka, Vojt ch Cehák, Pavel Tobiáš, Michal Janovský Karel Pavelka Karel Pavelka (Gar.)	Z,ZK	5	2P+2C	Z	S

# Characteristics of the courses of this group of Study Plan: Code=NH20230003\_1 Name=Geodézie a kartografie, spec. Geomatika, PV p edm ty, 3. semestr

101PJS	Statistics	KZ	5		
Students solve one particular problem of probability, mathematical statistics, geodesis or data analysis using advanced packages of software R-project.					

	1/7	4				
143YKIG GIS in Landscape Engineering	κz	4				
Basic tasks of landscape engineering and their connection to geoinformation technologies (agriculture, water management, landscape planning).						
155YDPD Visualization and Distribution of Spatial Data	Z,ZK	5				
This course focuses on the digital modelling of a historic city and the subsequent presentation of the results on the web. Students will learn about the v	arious tools and	techniques used				
in digital modeling and spatial visualization. The main objective is to create a historical city model using Blender and then present it on a web page.						
155YFD Photogrammetric Documentation of Historical Buildings and Sites	KZ	4				
This course is organized in a project-based manner. Students will gain an overview of the methods and technologies currently used in the measurem	This course is organized in a project-based manner. Students will gain an overview of the methods and technologies currently used in the measurement documentation of historical					
objects and archaeological sites. The students will learn in detail about the production of various types of measurement documentation (2D building plans	s, 3D models, 2D	photogrammetric				
outputs - photoplan, orthophoto, etc.) and the specifics of this type of work. Students will acquire theoretical knowledge and practical skills that will er	hable them to use	e individual				
documentation methods and technologies in their practice in projects in the field of heritage conservation. The course includes several lectures/semir	nars with invited	practitioners				
(surveyor, archaeologist, conservationist). In the practical part, students will prepare a measurement documentation of a part of a selected object (incl	luding data colle	ction in the field).				
Students of the Faculty of Architecture also participate in this practical part within the "sister" course Monument Conservation III.						
155YOPR Object Oriented Programming	Z,ZK	5				
This course extends "Informatics 3" course by object-oriented techniques demonstrated in C++ and Python programming languages.						
155YSKN Information System of Cadastre of Real Estate	KZ	5				
The aim of the course is to familiarize students with the Information System of the Cadastre of Real Estate (ISKN) and its connection to other information	ation systems of	the state				
administration, especially to the system of Basic Registers as defined by Act No. 111/2009 Coll.						
155YUSU Introduction to Machine Learning in Remote Sensing	Z,ZK	5				
Machine learning is an integral part of data analysis and predictive modelling in many fields, including remote sensing. The aim of the course is to acquire basic knowledge of machine						
learning algorithms and principles of model generalization and practical design of process lines. In the course, students work independently on assigned examples of machine learning						
applications using remote sensing data. A prerequisite for the course is correct generalization of the trained model, including theoretical evaluation of overfitting and underfitting. In the						
projects, students create their own Python scripts and critically evaluate the results.						
155YV3D Visualization of 3D Models with Modern Technologies	Z,ZK	5				

Name of the block: Povinn volitelné p edm ty, doporu ení S1 Minimal number of credits of the block: 30 The role of the block: S1

Code of the group: NH20230004

Name of the group: Geodézie a kartografie, spec. Geomatika, diplomová práce Requirement credits in the group: In this group you have to gain at least 30 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 30

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
154DPM	Diploma Thesis Martin Štroner Martin Štroner (Gar.)	Z	30	24C	Z,L	S1
155DPM	Diploma Thesis Eva Matoušková, Ji í Cajthaml, Tomáš Janata, Jan Holešovský, Jind ich Hoda, Zden k Vysko il, Lena Halounová, Jan Pytel, Petr Sou ek, Ji í Cajthaml Ji í Cajthaml (Gar.)	Z	30	24C	Z,L	S1

Characteristics of the courses of this group of Study Plan: Code=NH20230004 Name=Geodézie a kartografie, spec. Geomatika, diplomová

prace				
154DPM	Diploma Thesis	Z	30	
Final thesis, prepared according to the assignment.				
155DPM	Diploma Thesis	Z	30	
in accordance with the thesis proposal				

### List of courses of this pass:

Code	Name of the course	Completion	Credits	
101MM4G	Mathematics 4G	Z,ZK	4	
https://mat.fsv.cvut.cz/bobok/				
101PJS	Statistics	KZ	5	
Students solve one particular problem of probability, mathematical statistics, geodesis or data analysis using advanced packages of software R-project.				
101STAG	Statistics	Z,ZK	5	
Advanced methods of mathematical statistics. Sequential tests, bayesian and robust methods. Software R-project.				

128TG	Graph Theory	Z.ZK	4	
Graph theory - b	asic elements, graph tasks formulations, basic algorithms with recognition of calculation efficiency. Connectivity, strong connectivity, tr networks, matchings, eulerian trails, hamiltonian paths, independent sets, cliques, coloring, plannar graphs.	rees, spanning tree	s, flows in	
128YNAA Design and	Design and Analysis of Algorithms d analysis of alorithms. Models of a computation. Proofs of correctness, time complexity of algorithms. Basic data structures. P and N	Z,ZK P classes of proble	4 ms.	
143YKIG	GIS in Landscape Engineering Basic tasks of landscape engineering and their connection to geoinformation technologies (agriculture, water management, landscape	KZ	4	
154DPM	Diploma Thesis	Z	30	
	Algorithms in Digital Cartography and GIS	7 7K	5	
Automation of digit	Algorithms in Digital Cartography and Gio	age Preparation ar	d design of	
, atomaton or alg	graphical outputs in Qt library.	Agori roparation at	ia accigit ci	
155DPM	Diploma Thesis	Z	30	
155DPR7	Remote Sensing	7 7K	5	
The subject is focu	ised on explanation of physical bases allowing to use remote sensing, on technical explanation of methods of data collection/measure materials/land covers as an interaction with electromagnetic radiation, and on possibility to use RS for many applications.	ment, on behavior o	of individual	
155FGIS	Free Software GIS	Z.ZK	5	
Free and open so and deployment in PROJ, PDAL libra will get a general i publishing platform OpenStreetMap co	urce software in geoinformation technologies. Emphasis is placed on the framework orientation in the issue. A comprehensive overvious practical applications is provided during the course. In the exercises, students are introduced to desktop tools such as GRASS GIS, ries and other similar tools. Part of the course focuses on active scripting and developing plugins using the Python programming lang introduction to publishing geographic data and implementing GIS analyses in the Internet environment, GeoServer and MapServer, priss such as Gisquick, GeoNode and Margin Maps. Also mentioned are the issues of freely available geographic data, open geodata, and pommunity project. Automation of deployment using Ansible and Docker technologies is mentioned in passing. Teaching is implemented GIS.lab.	w of available tool QGIS, SAGA or gv uage. In addition, th ygeoapi and OWSL nd active data colle d on the open sour	s, their use Sig, GDAL, he students Lib libraries, ction for the rce platform	
155FTG2	Photogrammetry 2	7 7K	5	
Aerial photogramm	1 hotogrammetry 2 here and absolute orientation of aerial photos. Analogue, analytic and digital interpreting devices, computer support. Photogrammetry 2	ammetric methods	in mapping.	
Orthophoto, its	accuracy. Photo triangulation, AAT, block and bundle adjustments, analytical photogrammetry. Digital photogrammetry, digital orthoph stations, optical correlation systems, aerial laser scanning, using of drones (RPAS).	oto, digital photogra	ammetric	
155GPL2	Survey Sketches 2	KZ	2	
Students will lea	rn about the preparation of geometric plans through practical exercises. It is mainly about the orientation of changes for updating the	cadastral register t	by various	
measuring technol	ogies and the subsequent processing of geometric plans as a technical basis for the introduction of these changes into the cadastral re technical conditions - analogue cadastral map, digital cadastral map (DKM, KMD, etc.)	gister in locations w	with different	
155IN4G	Informatics 4	Z,ZK	5	
In the course, stud	ents are introduced to techniques how to handle big amount of data. The course starts with data preprocessing by command tools be	efore import into DE	B. The focus	
	is related to relation databases, NoSQL databases, ElasticSearch, R and cloud.	. <u> </u>		
155KAT3 Advance	Cartography 3 ed cartography, web map services and applications, dynamic maps, spatial data formats, data sources, standardization, web maps, tr	C,ZK ends in cartograph	5 y.	
155MSPD	Modern Methods of Spatial Data Acquisition	Z,ZK	5	
The course focuse	is on new modern and unconventional methods of geospatial data collection and presentation. Contains information on terrestrial, ae	rial and mobile lase	er scanning,	
about remote sens	sing and its methods, about hyperspectral imaging. Further, it focuses on the progressive method in geomathics - on RPAS. It informs	about types, usage	e,legislation	
as well	as about sensors and software for automatically processing for image data. Finally, geophysical methods and virtual reality technology	gies are presented.		
155PKAR	Project - Cartography	KZ	5	
	Map creation in GIS, geodatabase, data model, symbology, compositional elements of maps, geographical nomenclature, errors	in maps.		
155PKAZ	Law in Cadastre and Surveying	ZK	2	
Public and private,	substantive and procedural law. Overview of legal regulations governing the cadastre of real estate (CN) and land surveying. Predeces	sors of surveying ar	nd cadastral	
authorities in the p	ast. Surveying and cadastral authorities today. Thing, thing in the legal sense, division of things, immovable things, part of a thing and	d accessories of a t	thing. Land,	
parcel of land, lar	nd in jurisprudence, building, building in jurisprudence, small buildings, temporary buildings, building, unit. Origin of the CN and its pre	decessors, the Ca	dastral Act	
and implementing	regulations, definition and purpose of the CN. Content of the CN, cadastral register, registration of rights in the CN, basic provisions.	Rights entered into	the CN by	
deposit, title deed	i, proposal for deposit, annexes to the proposal, deposit procedure. Deposit procedure, record, note. Administration of the CN, entries	s of other data, acc	eptance of	
	s for entry in the CN, deposit of accuments in the collection of accuments, revision of the CN, correction of errors, obligations of own	ars and other bener	riciaries,	
municipalities and	a public authornites. Surveying activities and geometrical plans, publicity of the CN, provision of CN data, oriences, common, transitio	hal and final provisi	ions of the	
	sal estate contracts. Previous registration on rando surveying, Land Surveying Act, introductory provisions, surveying activities, estate contracts and the formation of the land surveying activities and the maximum surveying activities and the second surveying activities activities and the second surveying activities and the second surveying activities activ	in the building of th		
	and Cadastral Authorities in Prague Kobylisy.			
1551G4	I neoretical geodesy 4	∠,∠K	5	
I neoretical Geo	desy 4 introduces students to the field of space geodesy, i.e. using satellite observations of the Earth to define and maintain global of	ordinate systems,	the Earth	
onentation parame	eters, models of the Earth's gravity field and ocean topography. The outputs of space geodesy form the basis from which one of the free techniques in geodesy. CNISS is based	lost widely used me	easurement	
4557000	Theoretical way down of the second second	771	-	
1551GD3	I neoretical geodesy 3	Z,ZK	5	
vector and scalar	description or gravitational field of the ⊨arth. Properties of gravitational potential and its derivatives for basic bodies. Description of gr	avity field of the Ea	rtn. Normal	
gravity field of nor	mai boures. Approximation of the snape of the Earth in form of geold of level ellipsoid. Stokes and Molodensky's solution of the shap	e of the Earth. Con	isequences	
4.5511355	or this procedures for geodesy (geola, quasigeola, neights). Construction and models of (quasi)geold. Physical priciples of gravity s	surveying.	-	
155UZPR	Introduction to Spatial Data Processing	Z,ZK	5	
The course focuse	s on automated processing of geospatial data. Practical exercises are divided into two parts. In the first part, the Python scripting language	age is used for data	processing	
in combination with GeoPandas, Rasterio, Fiona and other libraries. The second part of the course is focused on geospatial data management in object-relational database systems				
and their pro	pocessing using spatial SQL. Free connection to the courses Informatics 2 - Database Systems, Informatics 3 - Object-oriented progra	mming, GIS1 and (	S2.	
155VFG	Photogrammetry -Project	KZ	5	
	practical metrical documentation of historical objects and sites, technology of documentation and data processing by modern m	ethods		

155VTTG	Fieldwork Training in Theoretical Geodesy	KZ	1		
Landsurveying in terrain is intended for the practice of measurement methods of geodesy and data processing work in the creation of a point field. Includes tasks: Long Range					
Triangulation and	Trilateration (TRG) Determining the course of the quasi-geoid (GEO) Remeasurement and adjustment of height points with very pre	cise leveling (VPN	) Azimuth		
	determination using the gyrotheodolite, gravimetric measurements				
155YCN1	Real Estate Valuation	Z,ZK	4		
Real estate valuat	ion is a very large field that intersects various areas such as construction, insurance, government, banking and land registry. During	the lectures we wil	I cover the		
basic concepts of	real estate, methods of real estate valuation, for what purpose and when to use them. Market valuation - cost, comparative and incc	me methods. Adm	inistrative		
valuation of re	al estate, valuation of easements and valuation of real estate in special cases such as loans, inheritance, community property, for in	surance companie	s, etc.		
155YDPD	Visualization and Distribution of Spatial Data	Z,ZK	5		
This course focuses	s on the digital modelling of a historic city and the subsequent presentation of the results on the web. Students will learn about the varie	ous tools and tech	niques used		
in	digital modeling and spatial visualization. The main objective is to create a historical city model using Blender and then present it on	a web page.			
155YFD	Photogrammetric Documentation of Historical Buildings and Sites	KZ	4		
This course is orga	anized in a project-based manner. Students will gain an overview of the methods and technologies currently used in the measuremer	nt documentation c	of historical		
objects and archaed	logical sites. The students will learn in detail about the production of various types of measurement documentation (2D building plans, 3I	D models, 2D photo	ogrammetric		
outputs - photop	an, orthophoto, etc.) and the specifics of this type of work. Students will acquire theoretical knowledge and practical skills that will er	able them to use i	ndividual		
documentation m	ethods and technologies in their practice in projects in the field of heritage conservation. The course includes several lectures/semin	ars with invited pra	actitioners		
(surveyor, archaeol	ogist, conservationist). In the practical part, students will prepare a measurement documentation or a part or a selected object (includ	ing data collection	in the field).		
	Students of the Faculty of Architecture also participate in this practical part within the "sister" course Monument Conservation	III.			
155YGEI	Geoinformatics	Z,ZK	4		
155YOPR	Object Oriented Programming	Z,ZK	5		
	This course extends "Informatics 3" course by object-oriented techniques demonstrated in C++ and Python programming langu	ages.			
155YSKN	Information System of Cadastre of Real Estate	KZ	5		
The aim of the	course is to familiarize students with the Information System of the Cadastre of Real Estate (ISKN) and its connection to other inform	ation systems of the	he state		
	administration, especially to the system of Basic Registers as defined by Act No. 111/2009 Coll.				
155YUSU	Introduction to Machine Learning in Remote Sensing	Z,ZK	5		
Machine learning is	an integral part of data analysis and predictive modelling in many fields, including remote sensing. The aim of the course is to acquir	e basic knowledge	of machine		
learning algorithms	and principles of model generalization and practical design of process lines. In the course, students work independently on assigned	examples of mach	ine learning		
applications using r	emote sensing data. A prerequisite for the course is correct generalization of the trained model, including theoretical evaluation of over	erfitting and underf	itting. In the		
projects, students create their own Python scripts and critically evaluate the results.					
			_		
155YV3D	Visualization of 3D Models with Modern Technologies	Z,ZK	5		
155YV3D 155YWEK	Visualization of 3D Models with Modern Technologies Web Cartography	Z,ZK Z,ZK	5 5		
155YV3D 155YWEK 155YZPZ	Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data	Z,ZK Z,ZK Z,ZK	5 5 5		
155YV3D 155YWEK 155YZPZ Digital image data	Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati	Z,ZK Z,ZK Z,ZK on. Individual them	5 5 5 nes depend		
155YV3D 155YWEK 155YZPZ Digital image data on goals and them	Visualization of 3D Models with Modern Technologies Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati es of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric correction	Z,ZK Z,ZK Z,ZK on. Individual them ns of the processe	5 5 5 nes depend ed data and		
155YV3D 155YWEK 155YZPZ Digital image data on goals and them their accuracy 4. Ra	Visualization of 3D Models with Modern Technologies Veb Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati es of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric correctic adiometric corrections of the processed data 5. Enhancement of individual bands 6. Multi-channel enhancement for DT - new channel	Z,ZK Z,ZK Z,ZK on. Individual them ns of the processe Is calculation 7. Ca	5 5 5 es depend ed data and alculation of		
155YV3D 155YWEK 155YZPZ Digital image data on goals and them their accuracy 4. Ra new channels by tr	Visualization of 3D Models with Modern Technologies Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati es of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric correctic adiometric corrections of the processed data 5. Enhancement of individual bands 6. Multi-channel enhancement for DT - new channe ansformation to other systems - IHS, PCA, PCCA, 8. Classification pixel per pixel focused on DT goal 9. Image segmentation with value	Z,ZK Z,ZK Z,ZK on. Individual them ns of the processe Is calculation 7. Ca rious number of cf	5 5 5 d data and alculation of nannels 10.		
155YV3D 155YWEK 155YZPZ Digital image data on goals and them their accuracy 4. Ra new channels by tr Object oriented class	Visualization of 3D Models with Modern Technologies Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati es of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric correctic adiometric corrections of the processed data 5. Enhancement of individual bands 6. Multi-channel enhancement for DT - new channe ansformation to other systems - IHS, PCA, PCCA, 8. Classification pixel per pixel focused on DT goal 9. Image segmentation with va ssification 11. Comparison of results - total, user's, producer's accuracy 12. Post-classification procedures to improve accuracy 13. O	Z,ZK Z,ZK Z,ZK on. Individual them ns of the processe Is calculation 7. Ca rious number of ch utputs - statistical,	5 5 5 hes depend ed data and alculation of hannels 10. image, GIS		
155YV3D 155YWEK 155YZPZ Digital image data on goals and them their accuracy 4. Ra new channels by tr Object oriented class	Visualization of 3D Models with Modern Technologies Web Cartography Processing of Remote Sensing Data processing collected mainly by satellite apparatuses. Practical methods of image data processing, their interpretation and classificati es of individual diploma thesis. 1. The Diploma Thesis (DT) topic analysis 2. Suitable source material selection 3. Geometric correctic adiometric corrections of the processed data 5. Enhancement of individual bands 6. Multi-channel enhancement for DT - new channe ansformation to other systems - IHS, PCA, PCCA, 8. Classification pixel per pixel focused on DT goal 9. Image segmentation with va ssification 11. Comparison of results - total, user's, producer's accuracy 12. Post-classification procedures to improve accuracy 13. O types	Z,ZK Z,ZK Z,ZK on. Individual them ns of the processe Is calculation 7. Ca rious number of ch utputs - statistical,	5 5 es depend ed data and alculation of nannels 10. image, GIS		

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2025-06-04, time 10:25.