

# Study plan

## Name of study plan: obor Inženýrství životního prostředí

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Civil Engineering

Type of study: Follow-up master full-time

Required credits: 90

Elective courses credits: 0

Sum of credits in the plan: 90

Note on the plan: tento studijní plán platí do nástupu 2022/23

Name of the block: Compulsory courses

Minimal number of credits of the block: 38

The role of the block: Z

Code of the group: NZ20160100

Name of the group: obor Inženýrství životního prostředí, 1. semestr

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 at least 5 courses

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
101STM	<b>Stochastic Methods in EI</b> Daniela Jarušková <b>Daniela Jarušková</b> (Gar.)	Z,ZK	4	2P+1C	Z	z
102APOZ	<b>Applied physics and renewable energy</b> Vít zslav Vydra, Petr Semerák <b>Vít zslav Vydra</b> Petr Semerák (Gar.)	Z,ZK	6	2P+4C	Z	z
141HYGI	<b>Hydrology</b> Josef K e ek, Michal Dohnal, Tomáš Vogel, Ladislav Palán, Eva Pažourková, Marie Uhrová <b>Michal Dohnal</b> Josef K e ek (Gar.)	Z,ZK	5	2P+2C	Z	z
143HPVO	<b>Groundwater Hydraulics</b> Martin Šanda, Martina Sobotková <b>Martin Šanda</b> Martin Šanda (Gar.)	Z,ZK	5	2P+2C	Z	z
143RPZP	<b>Environmental Decision Making</b> Martin Do kal <b>Martin Do kal</b> Martin Do kal (Gar.)	Z,ZK	5	2P+2C	Z	z

### Characteristics of the courses of this group of Study Plan: Code=NZ20160100 Name=obor Inženýrství životního prostředí, 1. semestr

101STM	Stochastic Methods in EI Basic statistical methods and their application to problems arising in environmental sciences.	Z,ZK	4
102APOZ	Applied physics and renewable energy Physical monitoring of environmental variables. Measurement theory. Theory of measurement uncertainties. Principles of direct and indirect measurements. Fundamentals of electricity and magnetism. Principles of physical electronics. Measurement of various environmental and material parameters, e.g. noise and vibration, thermal conductivity coefficient, elastic modulus, temperature, etc. Renewable energy sources: use of solar radiation, use of wind, biomass combustion, biofuels. Nuclear energy.	Z,ZK	6
141HYGI	Hydrology The aim is to apply the study of hydrological processes in the conditions of a catchment affected by human activities. Meteorological processes in the near-surface layer of the atmosphere, global climate change, genesis of the precipitation-runoff process in the basin, water within the ecosystem and stability of landscape elements, influence of human activities on hydrological processes, application of mathematical models.	Z,ZK	5
143HPVO	Groundwater Hydraulics The course deals with the problem of groundwater flow in saturated rock environments. The introduction of the course is devoted to the theoretical background and mathematical description of groundwater flow. The next part is devoted to simplified solutions of basic problems - flow through phreatic and confined aquifers, seepage through an earth block, flow in the vicinity of wells. At the end of the semester, students will get acquainted with the method of numerical modelling of groundwater flow, using specialized software to solve an individual problem.	Z,ZK	5
143RPZP	Environmental Decision Making Decision making in water and environmental management - decision (individual and group decision), operational games	Z,ZK	5

Code of the group: NZ20160200

Name of the group: obor Inženýrství životního prostředí, 2. semestr

Requirement credits in the group: In this group you have to gain 13 credits

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 13

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
144EKOU	<b>Ecotoxicology and Urban drainage</b> <i>Jana Nekovářová, Jana Nábořková, David Stránský Jana Nábořková Jana Nábořková (Gar.)</i>	Z,ZK	6	4P+1C	L	Z
155SVPD	<b>Collection and visualization of spatial data</b> <i>Jan Pacina, Jindřich Hoda, Tomáš Janata Tomáš Janata Jindřich Hoda (Gar.)</i>	Z,ZK	7	4P+2C	L	Z

Characteristics of the courses of this group of Study Plan: Code=NZ20160200 Name=obor Inženýrství životního prostředí, 2. semestr

144EKOU	Ecotoxicology and Urban drainage	Z,ZK	6
Urban drainage: methods and tools in urban drainage, integral conception of the urban environment and landscape, understanding the context and designing measures for long-term sustainability of urban water management and environmental protection. Ecotoxicology: basic toxicological and ecological concepts in theory and practice. Groups of substances of toxicological and ecotoxicological significance present in different environmental compartments.			
155SVPD	Collection and visualization of spatial data	Z,ZK	7
* Photogrammetry - introduction * Photographic cameras * Photogrammetric methods * Intersection method, digital orthophoto * Stereophotogrammetry * Analytical aerotriangulation			

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 18

The role of the block: PV

Code of the group: NZ20160200\_2

Name of the group: obor Inženýrství životního prostředí, povinně volitelné předměty

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 3 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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
127YNUP	<b>Town and Country Planning Instruments</b> <i>Václav Jetel, František Pospíšil František Pospíšil Václav Jetel (Gar.)</i>	Z,ZK	6	3P+2C	Z	PV
141YTHH	<b>Methods of modelling in hydraulics nad hydrology</b> <i>Michal Dohnal, Vojtěch Bareš, Aleš Havlík, Tomáš Píček, Petr Sklenář Michal Dohnal Michal Dohnal (Gar.)</i>	KZ	5	4C	Z	PV
143YPVT	<b>Water Flow and Solute Transport in Soils</b> <i>Milena Číslerová, David Zumr David Zumr Milena Číslerová (Gar.)</i>	Z,ZK	6	3P+2C	Z	PV
144YCVD	<b>Wastewater treatment</b> <i>Jaroslav Pollert Jaroslav Pollert Jaroslav Pollert (Gar.)</i>	Z,ZK	6	3P+2C	Z	PV
127YKRP	<b>Landscape Planning</b> <i>Václav Jetel, Jiří Kupka, Lucie Nováková, Tereza Kubištová Jiří Kupka Jiří Kupka (Gar.)</i>	Z,ZK	6	3P+2C	L	PV
127YUZH	<b>Territorial Management</b> <i>Václav Jetel, Jan Čihlá Václav Jetel Václav Jetel (Gar.)</i>	Z,ZK	6	3P+2C	L	PV
137YKSZ	<b>Rail construction and environment</b> <i>Petra Váňová, Lenka Lomoz Lenka Lomoz Lenka Lomoz (Gar.)</i>	Z,ZK	6	3P+2C	L	PV
141YHPM	<b>Hydrological Processes in Urban Catchments</b> <i>Vojtěch Bareš Vojtěch Bareš Vojtěch Bareš (Gar.)</i>	Z,ZK	6	3P+2C	Z	PV
141YRIF	<b>Project Design 2</b> <i>Petr Sklenář, Václav Matoušek Petr Sklenář Petr Sklenář (Gar.)</i>	Z,ZK	6	2P+3C	L	PV
143YMPP	<b>Surface processess modelling</b> <i>Petr Kavka Petr Kavka Petr Kavka (Gar.)</i>	Z,ZK	6	3P+2C	L	PV
143YTUV	<b>Technical Structures on Small Watercourses</b> <i>Petr Koudelka, Adam Vokurka Petr Koudelka Adam Vokurka (Gar.)</i>	Z,ZK	6	2P+3C	L	PV
144YISB	<b>Urban networks and balneology</b> <i>Bohumil Štátný, Filip Horký Filip Horký Bohumil Štátný (Gar.)</i>	Z,ZK	6	4P+1C	L	PV
144YVCV	<b>Water treatment and water quality</b> <i>Filip Horký, Ivana Kabelková, Kateřina Slávková Filip Horký Ivana Kabelková (Gar.)</i>	Z,ZK	6	4P+1C	L	PV

Characteristics of the courses of this group of Study Plan: Code=NZ20160200\_2 Name=obor Inženýrství životního prostředí, povinně volitelné předměty

127YNUP	Town and Country Planning Instruments	Z,ZK	6
During the lectures, students will learn about spatial planning techniques, i.e. all spatial planning tools, their acquisition, processing and approval. The emphasis in the lectures is on land-use planning documents and land-use planning documentation as preparation for a special professional qualification or for the practice of a designer. As part of the exercise, students will practically verify their theoretical knowledge in the analysis of spatial planning tools and outputs using GIS-based programs.			
141YTHH	Methods of modelling in hydraulics nad hydrology	KZ	5
Mathematical modelling of 1D non-uniform flow in open channels. A constrained approach to modelling flow in a wide floodplain. Calibration of channel and inundation roughness. Initial and boundary conditions. 1D unsteady flow in open channels. Simulation of flood wave propagation in a river channel network. Modelling of 2D free-surface flow using the finite element method. Modelling of sediment movement in watercourses. Simulation of the temporal and spatial evolution of alluvial streambeds. Modelling of the rainfall-runoff process in a natural catchment and urbanized catchment.			
143YPVT	Water Flow and Solute Transport in Soils	Z,ZK	6
Flow of water and solute transport in soil profile in engineering practice. Hydraulic properties of soil and rocky materials, methods of data analyses. Approximation functions of retention curve, retention function parameter optimization, hydraulic conductivity function estimate. Dispersion characteristics determination. Field versus lab measurements. Basics of simulation modeling.			
144YCVD	Wastewater treatment	Z,ZK	6
To learn technology, design and operation of various types of wastewater treatment plants (WWTPs) for different pollution sources.			
127YKRP	Landscape Planning	Z,ZK	6
The aim of the course is to introduce students to landscape and landscape planning in different processes and phases of planning. The course will introduce the genesis of our landscape, the ways and forms of human influence on the landscape before and now, in the post-agrarian and post-industrial era, which are necessary for understanding the laws and processes occurring in today's landscape. Students are encouraged to look independently at the landscape, to search for its natural, cultural, historical and civilizational values. They are introduced to the forms and possibilities, mainly legislative, of its protection and to the various ways of landscape planning, including the application of land-use planning tools in the protection and creation of the landscape, with emphasis on respect for the ecological, productive, residential, recreational and aesthetic aspects of the territory. Lectures and exercises will be complemented by work with various information sources, with a focus on their interpretation, as well as specific examples of different types of territories.			
127YUZH	Territorial Management	Z,ZK	6
During the lectures, students will acquire knowledge of the organization of territorial self-governing units, especially with an emphasis on understanding the management of municipalities. In addition to the territorial development itself, emphasis is placed on understanding the financial ties in relation to the state budget, on the provision of necessary services mainly oriented towards public infrastructure and the economic aspects of territorial development. The lectures are supplemented by at least one excursion to a selected town hall and municipal office. The exercise is designed as an urban project of a development location with a simulation of real project management with participation.			
137YKSZ	Rail construction and environment	Z,ZK	6
Negative impacts of noise and vibration on human. Assessment of varied transport noise Acoustic levels. Noise maps. Noise study. Traffic noise characteristics of different transport means. Propagation of noise. Ways of environment protection before adverse impacts of transport noise (urban, architectural, traffic-organizing, technical).			
141YHPM	Hydrological Processes in Urban Catchments	Z,ZK	6
Fundamental hydrological processes in urbanized catchments and their mathematical description. Rainfall and rainfall data. Impacts of climate change on rainfall extremes and urban hydrology. Stormwater runoff from urbanized areas - generation and transport. Water transport in drainage systems. Hydrological processes in blue-green infrastructure objects. Measurement and monitoring of runoff, data processing. Simulation models and system analysis.			
141YRIF	Project Design 2	Z,ZK	6
The course consists of two parts: 1. river engineering, where the focus is not only on purely technical structural interventions but also on measures close to nature. Attention is also focused on the principles of considerate anthropogenic activities directly in and near watercourses. Such activities are aimed at ensuring the main required functions in the management, use and disposal of flowing surface waters, while not leading to damage and degradation of the river landscape, but promoting its protection against all relevant risks. 2. fluvial processes, which are the most important geomorphic manifestations in the river landscape in relation to the activities of flowing water. Their understanding provides the necessary basis for the successful application and synthesis of available knowledge on alluvial flows in the field of river engineering. The aim is to recognize the different characteristic channel types and flow development phases, including the dynamics of their changes, and to identify the processes shaping the river channel and its floodplain, including an understanding of their controlling mechanisms. It also includes a qualitative and quantitative description of processes such as the onset of sediment particle movement and sediment movement, erosion and sedimentation processes in the channel or the formation and development of bed formations, the mechanism of undercutting and bank slumping, deepening or softening of the cross-flow profile, etc. An important part of this is the study of the response of modified watercourses to channel intervention caused by sudden natural changes or anthropogenic activities in the river landscape. The common basis for both parts is a summary of the theoretical knowledge and practical principles of advanced hydraulics of fixed-bed channels in the field of non-uniform and spatially complex flow, turbulent phenomena or resistance caused by granular channel bed or (riparian) vegetation exposed to the flow.			
143YMPP	Surface processes modelling	Z,ZK	6
Getting in the principles of mathematical modeling within watershed management. There will be presented two up to three mathematical simulation models (depending on progress of the work within the seminars) of rainfall-runoff relations, soil erosion and sediment transport and possibly also concentrated flow within the channel.			
143YTUV	Technical Structures on Small Watercourses	Z,ZK	6
Small watercourses have often been modified in recent years. The reason for their modification was usually flood protection of the inner city or drainage works. In recent years, the trend towards the modification of watercourses has been reversed, with revitalisation measures and measures to increase water retention in the catchment area and to slow down runoff coming to the fore.			
144YISB	Urban networks and balneology	Z,ZK	6
The course is focused on the principles of designing engineering networks such as water supply, sewerage, gas, electrical installations and swimming pool and spas.			
144YVCV	Water treatment and water quality	Z,ZK	6
Composition of natural waters. Types of water pollution, its effects and characteristics. Pollution sources. Running waters. Reservoirs. Water quality monitoring. Water quality classification in the Czech Republic. Water quality protection. Water quality modelling. Drinking Water treatment. Distribution of drinking water.			

Name of the block: Povinn volitelné p edm ty, doporu ení S1

Minimal number of credits of the block: 34

The role of the block: S1

Code of the group: NZ20160200\_1

Name of the group: obor Inženýrství životního prostředí, projekt

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

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
101DISZ	<b>Project</b> <i>Jozef Bobok Jozef Bobok Jozef Bobok (Gar.)</i>	KZ	4	3C	L	S1
127DISZ	<b>Project</b> <i>Václav Jetel, František Pospíšil, Jiří Kupka, Simona Vondráková, Marek Janatka Václav Jetel Václav Jetel (Gar.)</i>	KZ	4	3C	L	S1
133DISZ	<b>Project</b> <i>Jitka Vašková</i>	KZ	4	3C	L	S1
135DISZ	<b>Project</b> <i>Jan Salák</i>	KZ	4	3C	L	S1
136DISZ	<b>Project</b> <i>Jaromíra Ježková Petr Mondschein Jaromíra Ježková (Gar.)</i>	KZ	4	3C	L	S1
137DISZ	<b>Project</b> <i>Petra Váňová, Lenka Lomoz Lenka Lomoz Lenka Lomoz (Gar.)</i>	KZ	4	3C	L	S1
141DISZ	<b>Project</b> <i>Josef Křížek, Michal Dohnal, Petr Sklenář Michal Dohnal Petr Sklenář (Gar.)</i>	KZ	4	3C	L	S1
142DISZ	<b>Project</b> <i>Martin Horský, Martin Králík, Ladislav Satrapa Martin Králík Ladislav Satrapa (Gar.)</i>	KZ	4	3C	L	S1
143DISZ	<b>Project</b> <i>Martin Šanda, Martina Sobotková, Martin Dokařal, Milena Císlerová, David Zúmr, Petr Kavka, Petr Koudelka, Adam Vokurka, Miroslav Bauer, ..... Miroslav Bauer Tomáš Dostál (Gar.)</i>	KZ	4	3C	L	S1
144DISZ	<b>Project</b> <i>Filip Horký Bohumil Štátný (Gar.)</i>	KZ	4	3C	L	S1
220DISZ	<b>Project</b> <i>Jiří Svoboda, Radek Vašíček Radek Vašíček Jiří Svoboda (Gar.)</i>	KZ	4	3C	L	S1

#### Characteristics of the courses of this group of Study Plan: Code=NZ20160200\_1 Name=obor Inženýrství životního prostředí, projekt

101DISZ	Project Please, contact the guarantor of this subject.	KZ	4
127DISZ	Project Semester project for the purpose of preparing for the preparation of a diploma thesis in the field of Environmental Engineering.	KZ	4
133DISZ	Project The subject is focused on concrete and masonry structures and materials in relation with the impact on the environment, aspects of sustainable construction, energy consumption, renewable sources, etc. The content of the work can be the elaboration of a research study comprising the processing of discoveries from the literature, the execution and analysis of experiments, etc.	KZ	4
135DISZ	Project	KZ	4
136DISZ	Project Preparation of the basic documents for the assignment of a master thesis and their processing. Lectures by experts from the practice (road design, construction technology, information about new procedures and software)	KZ	4
137DISZ	Project As part of the project, intensive preparation for the diploma thesis is already taking place. In After agreement with the teacher, a preliminary thesis topic is determined. The student should responsibly prepare for the creation of the work itself by studying the documents, creating research, and obtaining background materials (e.g. maps). Furthermore, he should determine the outline of the work and master the work with any measuring technique, etc.	KZ	4
141DISZ	Project Not applicable.	KZ	4
142DISZ	Project The diploma seminar is focused on the preparation of the student's final thesis. It is an independent work of the student under the guidance of the thesis supervisor. The student's activity is focused on research, preparation of documents and data and carrying out his/her own creative work with the obtained documents so that the actual preparation of the thesis plan and documentation proceeds smoothly and at the appropriate professional level. In the case of studies, this involves the preparation, processing and evaluation of data from various data sources. In the case of design work, the preparation of documents and data is even broader by the field work (site survey and any additional work - surveying, documentation of any changes compared to the documents, etc.).	KZ	4
143DISZ	Project collection and preparation of data and sources for diploma thesis according to individual specification	KZ	4
144DISZ	Project SEWERAGE: Data collection and processing for a given site, design of scenarios of foul water drainage and storm water drainage or infiltration. WATER SUPPLY: Design of water supply of a given site. Data collection, determination of the way of water supply. Design of feeding pipelines, water storage and main distribution pipelines. Drawing of situation and longitudinal profile.	KZ	4
220DISZ	Project Preparatory works on diploma thesis elaboration. Literature review, study on problematics to be solved - practical cases in geotechnical laboratory and the Josef underground laboratory ( <a href="http://ceg.fsv.cvut.cz">http://ceg.fsv.cvut.cz</a> ).	KZ	4

Code of the group: NZ20160300\_1

Name of the group: obor Inženýrství životního prostředí, diplomová práce

Requirement credits in the group: In this group you have to gain 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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
101DPM	<b>Diploma Thesis</b> <i>Daniela Jarušková, Michal Beneš, Milan Bořík, Jakub Šolc, Jana Nosková</i> <b>Michal Beneš</b> <i>Daniela Jarušková (Gar.)</i>	Z	30	24C	Z	S1
127DPM	<b>Diploma Thesis</b> <i>Václav Jetel, František Pospíšil, Marek Janatka, Jan Mužík, Jan Storch, Ivan Horký, Ivan Vorel, Petr Durdík, Ivan Kaplan</i> <b>František Pospíšil</b> <i>František Pospíšil (Gar.)</i>	Z	30	24C	Z	S1
133DPM	<b>Diploma Thesis</b> <b>Martin Típka</b>	Z	30	24C	Z	S1
135DPM	<b>Diploma Thesis</b> <i>Jan Pruška, Jan Masopust</i> <b>Jan Pruška</b> <i>Jan Pruška (Gar.)</i>	Z	30	24C	Z	S1
136DPM	<b>Diploma Thesis</b> <b>Petr Mondschein</b> <i>Ludvík Vébr (Gar.)</i>	Z	30	24C	Z	S1
137DPM	<b>Diploma Thesis</b> <i>Leoš Horníček, Hana Krejčíková</i> <b>Lenka Lomoz</b> <i>Leoš Horníček (Gar.)</i>	Z	30	24C	Z	S1
141DPM	<b>Diploma Thesis</b> <i>Josef Křížek, Michal Dohnal, Vojtěch Bareš, Aleš Havlík, Tomáš Píček, Petr Sklenář, Václav Matoušek, Jaromír Dušek</i> <b>Michal Dohnal</b> <i>Michal Dohnal (Gar.)</i>	Z	30	24C	Z	S1
142DPM	<b>Diploma Thesis</b> <i>Martin Horský, Martin Králík, Ladislav Satrapa, Miroslav Brouček, Michal Toman, Pavel Fošumpaur, Milan Zůkal, Petra Nešvarová Chvojková, Petr Nowak, .....</i> <b>Martin Horský</b> <i>Ladislav Satrapa (Gar.)</i>	Z	30	24C	Z	S1
143DPM	<b>Diploma Thesis</b> <b>Martin Šanda</b> <i>Tomáš Dostál (Gar.)</i>	Z	30	24C	Z	S1
144DPM	<b>Diploma Thesis</b> <b>Bronislava Rohanová</b> <i>Filip Horký (Gar.)</i>	Z	30	24C	Z	S1
154DPM	<b>Diploma Thesis</b> <b>Martin Štroner</b> <i>Martin Štroner (Gar.)</i>	Z	30	24C	Z,L	S1
220DPM	<b>Diploma Thesis</b> <i>Jiří Svoboda, Radek Vašíček, Jaroslav Pacovský</i> <b>Jiří Svoboda</b> <i>Jiří Svoboda (Gar.)</i>	Z	30	24C	Z	S1

## Characteristics of the courses of this group of Study Plan: Code=NZ20160300\_1 Name=obor Inženýrství životního prostředí, diplomová práce

101DPM	Diploma Thesis	Z	30
Please contact your teacher or guarantor of this subject.			
127DPM	Diploma Thesis	Z	30
Qualifying thesis completing the Master's degree. The Department of Urban Design, Town and Regional Planning enters theses in the study programme Architecture and Building Sciences (majoring in Architecture and Urbanism) and Civil Engineering, majoring in Environmental Engineering.			
133DPM	Diploma Thesis	Z	30
In accordance with a thesis proposal.			
135DPM	Diploma Thesis	Z	30
In the diploma thesis, the student deals with a topic chosen by the department from those regularly announced by the department. It addresses, for example, problems related to the design and construction of geotechnical structures, civil engineering structures, special foundations for industrial, transport, housing and water management structures, earth and rock structures in complex cases and waste disposal structures. The thesis builds on and develops the findings of the thesis project.			
136DPM	Diploma Thesis	Z	30
The assigned topic of diploma theses can be a project, traffic surveys, research of selected issues with application in practice for various technical solutions of road structures, laboratory tests to verify the functionality of various materials for pavements, etc. In terms of design, the most common topics of theses are, for example, the design of a new construction or reconstruction of a selected section of a road (bypass, flyover), the design of a road network in a selected area of the city, the design of a new construction or reconstruction of intersections, the design of an airport, heliport, etc. In terms of pavement structures and road construction technologies, the most frequent topics of work are, for example, comparison of different material solutions for asphalt or concrete pavements, including the relevant composite materials or input components (binders, aggregates, etc.), assessment of the behaviour of a particular material or type of structure by laboratory methods, or carrying out simulations, etc.			
137DPM	Diploma Thesis	Z	30
The diploma thesis is the final complex work prepared by students at the end of their university studies. The diploma thesis describes the given issue in a broader context, in which the student demonstrates the ability to work independently and an engineering approach. The diploma thesis takes the form of either a project (reconstruction of a section of a railway line, study of new railway lines), a research (processing of an overview in a certain area) or a laboratory (including the execution and evaluation of specified laboratory tests), or a combined one.			
141DPM	Diploma Thesis	Z	30
The course enables the student to prepare, write and submit a diploma thesis. The Department of Hydraulics and Hydrology provides consultations in the selected topic, especially in the person of the supervisor of the thesis.			
142DPM	Diploma Thesis	Z	30
The work is an individual activity of the student in the preparation of the topic of the final thesis for the period of study on the assigned professional topic.			
143DPM	Diploma Thesis	Z	30
Diploma thesis is selected by the student at one of departments, involved within study program, according to his specific interest.			
144DPM	Diploma Thesis	Z	30
Diploma Thesis concerning sewerage, waste water treatment, water supply, networks and bathology.			
154DPM	Diploma Thesis	Z	30
Final thesis, prepared according to the assignment.			

220DPM	Diploma Thesis	Z	30
Diploma thesis elaboration with possible use of geotechnical laboratory and underground facility the Josef underground laboratory ( <a href="http://ceg.fsv.cvut.cz">http://ceg.fsv.cvut.cz</a> ).			

### List of courses of this pass:

Code	Name of the course	Completion	Credits
101DISZ	Project Please, contact the guarantor of this subject.	KZ	4
101DPM	Diploma Thesis Please contact your teacher or guarantor of this subject.	Z	30
101STM	Stochastic Methods in EI Basic statistical methods and their application to problems arising in environmental sciences.	Z,ZK	4
102APOZ	Applied physics and renewable energy Physical monitoring of environmental variables. Measurement theory. Theory of measurement uncertainties. Principles of direct and indirect measurements. Fundamentals of electricity and magnetism. Principles of physical electronics. Measurement of various environmental and material parameters, e.g. noise and vibration, thermal conductivity coefficient, elastic modulus, temperature, etc. Renewable energy sources: use of solar radiation, use of wind, biomass combustion, biofuels. Nuclear energy.	Z,ZK	6
127DISZ	Project Semester project for the purpose of preparing for the preparation of a diploma thesis in the field of Environmental Engineering.	KZ	4
127DPM	Diploma Thesis Qualifying thesis completing the Master's degree. The Department of Urban Design, Town and Regional Planning enters theses in the study programme Architecture and Building Sciences (majoring in Architecture and Urbanism) and Civil Engineering, majoring in Environmental Engineering.	Z	30
127YKRP	Landscape Planning The aim of the course is to introduce students to landscape and landscape planning in different processes and phases of planning. The course will introduce the genesis of our landscape, the ways and forms of human influence on the landscape before and now, in the post-agrarian and post-industrial era, which are necessary for understanding the laws and processes occurring in today's landscape. Students are encouraged to look independently at the landscape, to search for its natural, cultural, historical and civilizational values. They are introduced to the forms and possibilities, mainly legislative, of its protection and to the various ways of landscape planning, including the application of land-use planning tools in the protection and creation of the landscape, with emphasis on respect for the ecological, productive, residential, recreational and aesthetic aspects of the territory. Lectures and exercises will be complemented by work with various information sources, with a focus on their interpretation, as well as specific examples of different types of territories.	Z,ZK	6
127YNUP	Town and Country Planning Instruments During the lectures, students will learn about spatial planning techniques, i.e. all spatial planning tools, their acquisition, processing and approval. The emphasis in the lectures is on land-use planning documents and land-use planning documentation as preparation for a special professional qualification or for the practice of a designer. As part of the exercise, students will practically verify their theoretical knowledge in the analysis of spatial planning tools and outputs using GIS-based programs.	Z,ZK	6
127YUZH	Territorial Management During the lectures, students will acquire knowledge of the organization of territorial self-governing units, especially with an emphasis on understanding the management of municipalities. In addition to the territorial development itself, emphasis is placed on understanding the financial ties in relation to the state budget, on the provision of necessary services mainly oriented towards public infrastructure and the economic aspects of territorial development. The lectures are supplemented by at least one excursion to a selected town hall and municipal office. The exercise is designed as an urban project of a development location with a simulation of real project management with participation.	Z,ZK	6
133DISZ	Project The subject is focused on concrete and masonry structures and materials in relation with the impact on the environment, aspects of sustainable construction, energy consumption, renewable sources, etc. The content of the work can be the elaboration of a research study comprising the processing of discoveries from the literature, the execution and analysis of experiments, etc.	KZ	4
133DPM	Diploma Thesis In accordance with a thesis proposal.	Z	30
135DISZ	Project	KZ	4
135DPM	Diploma Thesis In the diploma thesis, the student deals with a topic chosen by the department from those regularly announced by the department. It addresses, for example, problems related to the design and construction of geotechnical structures, civil engineering structures, special foundations for industrial, transport, housing and water management structures, earth and rock structures in complex cases and waste disposal structures. The thesis builds on and develops the findings of the thesis project.	Z	30
136DISZ	Project Preparation of the basic documents for the assignment of a master thesis and their processing. Lectures by experts from the practice (road design, construction technology, information about new procedures and software)	KZ	4
136DPM	Diploma Thesis The assigned topic of diploma theses can be a project, traffic surveys, research of selected issues with application in practice for various technical solutions of road structures, laboratory tests to verify the functionality of various materials for pavements, etc. In terms of design, the most common topics of theses are, for example, the design of a new construction or reconstruction of a selected section of a road (bypass, flyover), the design of a road network in a selected area of the city, the design of a new construction or reconstruction of intersections, the design of an airport, heliport, etc. In terms of pavement structures and road construction technologies, the most frequent topics of work are, for example, comparison of different material solutions for asphalt or concrete pavements, including the relevant composite materials or input components (binders, aggregates, etc.), assessment of the behaviour of a particular material or type of structure by laboratory methods, or carrying out simulations, etc.	Z	30
137DISZ	Project As part of the project, intensive preparation for the diploma thesis is already taking place. In After agreement with the teacher, a preliminary thesis topic is determined. The student should responsibly prepare for the creation of the work itself by studying the documents, creating research, and obtaining background materials (e.g. maps). Furthermore, he should determine the outline of the work and master the work with any measuring technique, etc.	KZ	4
137DPM	Diploma Thesis The diploma thesis is the final complex work prepared by students at the end of their university studies. The diploma thesis describes the given issue in a broader context, in which the student demonstrates the ability to work independently and an engineering approach. The diploma thesis takes the form of either a project (reconstruction of a section of a railway line,	Z	30

study of new railway lines), a research (processing of an overview in a certain area) or a laboratory (including the execution and evaluation of specified laboratory tests), or a combined one.			
137YKSZ	Rail construction and environment	Z,ZK	6
Negative impacts of noise and vibration on human. Assessment of varied transport noise Acoustic levels. Noise maps. Noise study. Traffic noise characteristics of different transport means. Propagation of noise. Ways of environment protection before adverse impacts of transport noise (urban, architectural, traffic-organizing, technical).			
141DISZ	Project Not applicable.	KZ	4
141DPM	Diploma Thesis	Z	30
The course enables the student to prepare, write and submit a diploma thesis. The Department of Hydraulics and Hydrology provides consultations in the selected topic, especially in the person of the supervisor of the thesis.			
141HYGI	Hydrology	Z,ZK	5
The aim is to apply the study of hydrological processes in the conditions of a catchment affected by human activities. Meteorological processes in the near-surface layer of the atmosphere, global climate change, genesis of the precipitation-runoff process in the basin, water within the ecosystem and stability of landscape elements, influence of human activities on hydrological processes, application of mathematical models.			
141YHPM	Hydrological Processes in Urban Catchments	Z,ZK	6
Fundamental hydrological processes in urbanized catchments and their mathematical description. Rainfall and rainfall data. Impacts of climate change on rainfall extremes and urban hydrology. Stormwater runoff from urbanized areas - generation and transport. Water transport in drainage systems. Hydrological processes in blue-green infrastructure objects. Measurement and monitoring of runoff, data processing. Simulation models and system analysis.			
141YRIF	Project Design 2	Z,ZK	6
The course consists of two parts: 1. river engineering, where the focus is not only on purely technical structural interventions but also on measures close to nature. Attention is also focused on the principles of considerate anthropogenic activities directly in and near watercourses. Such activities are aimed at ensuring the main required functions in the management, use and disposal of flowing surface waters, while not leading to damage and degradation of the river landscape, but promoting its protection against all relevant risks. 2. fluvial processes, which are the most important geomorphic manifestations in the river landscape in relation to the activities of flowing water. Their understanding provides the necessary basis for the successful application and synthesis of available knowledge on alluvial flows in the field of river engineering. The aim is to recognize the different characteristic channel types and flow development phases, including the dynamics of their changes, and to identify the processes shaping the river channel and its floodplain, including an understanding of their controlling mechanisms. It also includes a qualitative and quantitative description of processes such as the onset of sediment particle movement and sediment movement, erosion and sedimentation processes in the channel or the formation and development of bed formations, the mechanism of undercutting and bank slumping, deepening or softening of the cross-flow profile, etc. An important part of this is the study of the response of modified watercourses to channel intervention caused by sudden natural changes or anthropogenic activities in the river landscape. The common basis for both parts is a summary of the theoretical knowledge and practical principles of advanced hydraulics of fixed-bed channels in the field of non-uniform and spatially complex flow, turbulent phenomena or resistance caused by granular channel bed or (riparian) vegetation exposed to the flow.			
141YTHH	Methods of modelling in hydraulics nad hydrology	KZ	5
Mathematical modelling of 1D non-uniform flow in open channels. A constrained approach to modelling flow in a wide floodplain. Calibration of channel and inundation roughness. Initial and boundary conditions. 1D unsteady flow in open channels. Simulation of flood wave propagation in a river channel network. Modelling of 2D free-surface flow using the finite element method. Modelling of sediment movement in watercourses. Simulation of the temporal and spatial evolution of alluvial streambeds. Modelling of the rainfall-runoff process in a natural catchment and urbanized catchment.			
142DISZ	Project	KZ	4
The diploma seminar is focused on the preparation of the student's final thesis. It is an independent work of the student under the guidance of the thesis supervisor. The student's activity is focused on research, preparation of documents and data and carrying out his/her own creative work with the obtained documents so that the actual preparation of the thesis plan and documentation proceeds smoothly and at the appropriate professional level. In the case of studies, this involves the preparation, processing and evaluation of data from various data sources. In the case of design work, the preparation of documents and data is even broader by the field work (site survey and any additional work - surveying, documentation of any changes compared to the documents, etc.).			
142DPM	Diploma Thesis	Z	30
The work is an individual activity of the student in the preparation of the topic of the final thesis for the period of study on the assigned professional topic.			
143DISZ	Project collection and preparation of data and sources for diploma thesis according to individual specification	KZ	4
143DPM	Diploma Thesis Diploma thesis is selected by the student at one of departments, involved within study program, according to his specific interest.	Z	30
143HPVO	Groundwater Hydraulics	Z,ZK	5
The course deals with the problem of groundwater flow in saturated rock environments. The introduction of the course is devoted to the theoretical background and mathematical description of groundwater flow. The next part is devoted to simplified solutions of basic problems - flow through phreatic and confined aquifers, seepage through an earth block, flow in the vicinity of wells. At the end of the semester, students will get acquainted with the method of numerical modelling of groundwater flow, using specialized software to solve an individual problem.			
143RPZP	Environmental Decision Making Decision making in water and environmental management - decision (individual and group decision), operational games	Z,ZK	5
143YMPP	Surface processess modelling	Z,ZK	6
Getting in the principles of mathematical modeling within watershed management. There will be presented two up to three mathematical simulation models (depending on progress of the work within the seminars)of rainfall-runoff relations, soil erosion and sediment transport and possibly also concentrated flow within the channel.			
143YPVT	Water Flow and Solute Transport in Soils	Z,ZK	6
Flow of water amd solute transport in soil profile in engineering practice. Hydraulic properties of soil and rocky materials, methods of data analyses. Aproximation finctions of retention curve, retention function parameter optimization, hydraulic conductivity function estimate. Dispersion characteristics determination. Field versus lab measurements. basics of simulation modeling.			
143YTUV	Technical Structures on Small Watercourses	Z,ZK	6
Small watercourses have often been modified in recent years. The reason for their modification was usually flood protection of the inner city or drainage works. In recent years, the trend towards the modification of watercourses has been reversed, with revitalisation measures and measures to increase water retention in the catchment area and to slow down runoff coming to the fore.			
144DISZ	Project SEWERAGE: Data collection and processing for a given site, design of scenarios of foul water drainage and storm water drainage or infiltration. WATER SUPPLY: Design of water supply of a given site. Data collection, determination of the way of water supply. Design of feeding pipelines, water storage and main distribution pipelines. Drawing of situation and longitudinal profile.	KZ	4
144DPM	Diploma Thesis Diploma Thesis concerning sewerage, waste water treatment, water supply, networks and balnology.	Z	30

144EKOU	Ecotoxicology and Urban drainage	Z,ZK	6
Urban drainage: methods and tools in urban drainage, integral conception of the urban environment and landscape, understanding the context and designing measures for long-term sustainability of urban water management and environmental protection. Ecotoxicology: basic toxicological and ecological concepts in theory and practice. Groups of substances of toxicological and ecotoxicological significance present in different environmental compartments.			
144YCVD	Wastewater treatment	Z,ZK	6
To learn technology, design and operation of various types of wastewater treatment plants (WWTPs) for different pollution sources.			
144YISB	Urban networks and balneology	Z,ZK	6
The course is focused on the principles of designing engineering networks such as water supply, sewerage, gas, electrical installations and swimming pool and spas.			
144YVCV	Water treatment and water quality	Z,ZK	6
Composition of natural waters. Types of water pollution, its effects and characteristics. Pollution sources. Running waters. Reservoirs. Water quality monitoring. Water quality classification in the Czech Republic. Water quality protection. Water quality modelling. Drinking Water treatment. Distribution of drinking water.			
154DPM	Diploma Thesis	Z	30
Final thesis, prepared according to the assignment.			
155SVPD	Collection and visualization of spatial data	Z,ZK	7
* Photogrammetry - introduction * Photographic cameras * Photogrammetric methods * Intersection method, digital orthophoto * Stereophotogrammetry * Analytical aerotriangulation			
220DISZ	Project	KZ	4
Preparatory works on diploma thesis elaboration. Literature review, study on problematics to be solved - practical cases in geotechnical laboratory and the Josef underground laboratory ( <a href="http://ceg.fsv.cvut.cz">http://ceg.fsv.cvut.cz</a> ).			
220DPM	Diploma Thesis	Z	30
Diploma thesis elaboration with possible use of geotechnical laboratory and underground facility the Josef underground laboratory ( <a href="http://ceg.fsv.cvut.cz">http://ceg.fsv.cvut.cz</a> ).			

For updated information see <http://bilakniha.cvut.cz/en/FF.html>

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