Study plan

Name of study plan: Civil Engineering

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: Bachelor full-time
Required credits: 240
Elective courses credits: 0
Sum of credits in the plan: 240
Note on the plan: valid from 2020/21 to 2022/23

Name of the block: Compulsory courses
Minimal number of credits of the block: 214
The role of the block: Z

Code of the group: BD20200100
Name of the group: Civil Engineering, 1st semester
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 8 courses
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
101CG01	**Constructive Geometry** *Hana Lakomá, Jozef Bobok* ***Hana Lakomá*** *Hana Lakomá (Gar.)*	Z,ZK	5	2P+2C	Z	z
101MT01	**Mathematics 1** *Jozef Bobok, Yuliya Namlyeyeva* ***Yuliya Namlyeyeva*** *Yuliya Namlyeyeva (Gar.)*	Z,ZK	6	2P+3C	Z	z
123BM01	**Building Materials** *Václav Kočí, Alena Vimmrová* ***Alena Vimmrová*** *Alena Vimmrová (Gar.)*	Z,ZK	5	2P+2C	Z	z
126BIME	**BIM** *Robert Bouška, Petr Matějka, Josef Žák* ***Robert Bouška*** *Josef Žák (Gar.)*	Z	1	1P+1C	Z	z
132ST01	**Structural Mechanics 1** *Michal Šejnoha* ***Michal Šejnoha*** *Michal Šejnoha (Gar.)*	Z,ZK	6	2P+2C	Z	z
154FS01	**Fieldwork Surveying** *Tomáš Křemen* ***Tomáš Křemen*** *Tomáš Křemen (Gar.)*	Z,ZK	6	2P+3C	Z	z
104CFL1	**Czech/Foreign Language 1** *Tereza Novotná* ***Sandra Giormani*** *Svatava Boboková Bartíková (Gar.)*	Z	1	2C	Z	z
TV1	**Physical Education**	Z	0	0+2	Z	z

Characteristics of the courses of this group of Study Plan: Code=BD20200100 Name=Civil Engineering, 1st semester

101CG01	Constructive Geometry	Z,ZK	5
Description of space and main methods of the projection - multiview projection as a basis for orientation in 3D CAD systems, axonometry, linear perspective. Surfaces in building practice - graphic law, geometric characteristic and image in appropriate projection, realization and application. Namely: Cylinders and Cones, Hyperboloid of Revolution, Helical Surfaces, Quadrics. Visualization of objects in 3D program SketchUp. Curves in building practice - types of mathematical description.			
101MT01	Mathematics 1	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/zs/MT01/syllabus			
123BM01	Building Materials	Z,ZK	5
Main aim of course is giving basic information about the structure and properties of the building materials and about their testing methods on the base of the contemporary knowledge and materials engineering approach. The laboratory work (exercise) consists in the testing of building materials from the point of view of physically - chemical properties and their quality control.			
126BIME	BIM	Z	1
The course is focused on basic knowledge in the field of building information modeling (BIM) in theoretical and practical areas, usable across various construction industry specializations and fields. Students will be acquainted not only with the basic knowledge of BIM (on the theoretical and practical level), data formats, IT systems typical for the building industry, but also with the context of BIM in the current construction industry in relation to the whole project life cycle and its specifics (delivery, expert focus, construction projects phases, etc.) Theoretical knowledge is complemented by practical exercises aimed at mastering and understanding the basic principles of object-oriented parametric modeling.			
132ST01	Structural Mechanics 1	Z,ZK	6
The principal objective of the course is to familiarize students with basic principles of mechanics such as equilibrium and equivalency applied to statically determined structures			

154FS01	Fieldwork Surveying	Z,ZK	6
Introduction to surveying, basic geodetic calculations, evaluation of precision and accuracy of a measurement, theory of errors, instrumentation, topographic survey, angular and distance measurements, determination of heights, photogrammetry, laser scanning, mapping, setting-out in construction, surveying for monitoring of displacements, cadastre of real estates.			
104CFL1	Czech/Foreign Language 1	Z	1
Czech courses are intended for international students. The course is aimed to provide training in basic language means necessary for communication in everyday situations. After successful completion the student gains a credit. End of course level according to CEFR: A1 (Beginners) A2 (Elementary) Course code: 104 CFL1 Duration: 2 hours / 1 semester CEFR Level: A1 Literature: Hand-outs given by teacher; Lída Holá: Czech Step by Step 1 For further information: sandra.giormani@fsv.cvut.cz			
TV1	Physical Education	Z	0

Code of the group: BD20200200
Name of the group: Civil Engineering, 2nd semester
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 8 courses
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
101MT02	**Mathematics 2** *Jozef Bobok, Yuliya Namlyeyeva, Iva Malechová* ***Yuliya Namlyeyeva*** *Yuliya Namlyeyeva (Gar.)*	Z,ZK	6	2P+3C	L	z
102PHD	**Physics** *Jiří Konfršt* ***Jiří Konfršt*** *Jiří Konfršt (Gar.)*	Z,ZK	4	3P+1C	L	z
105SOSC	**Social Sciences** *Jitka Cirklová, Jan Gazda* ***Jitka Cirklová*** *Jitka Cirklová (Gar.)*	Z,ZK	5	4P+1C	L	z
123BUC	**Chemistry** *Jana Nábělková, Martin Keppert* ***Martin Keppert*** *Martin Keppert (Gar.)*	Z,ZK	4	3P+1C	L	z
132ST02	**Structural Mechanics 2** *Jan Vorel* ***Jan Vorel*** *Jan Vorel (Gar.)*	Z,ZK	6	2P+2C	L	z
135SOM1	**Soil Mechanics 1** *Tomáš Štor, Tomáš Hroch* ***Kateřina Kovářová*** *Tomáš Štor (Gar.)*	Z	3	2P+1C	L	z
104CL2	**Czech/Foreign Language 2** *Svatava Boboková Bartíková, Naděžda Bonaventurová* ***Sandra Giormani*** *Svatava Boboková Bartíková (Gar.)*	Z,ZK	2	2C	L	z
TV2	**Physical Education**	Z	0	0+2	L	z

Characteristics of the courses of this group of Study Plan: Code=BD20200200 Name=Civil Engineering, 2nd semester

101MT02	Mathematics 2	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/ls/MT02/			
102PHD	Physics	Z,ZK	4
This is a basic physics course in the English language for students of the study programmes Civil Engineering; Management and Economics in Construction. The course is also open to students from other CTU faculties within the Erasmus programmes. The course focuses on mechanics and basic thermodynamics. The following areas are covered in the course: Mechanics of material points (particles) and deformable bodies. Discrete and continuous model of matter. Kinematics and dynamics of a material point (particle). Mechanical force fields. Gravitational field. Mechanical vibrations. Material deformation. Elastic waves. Acoustics. Hydromechanics. Fundamentals of thermodynamics. Heat transfer.			
105SOSC	Social Sciences	Z,ZK	5
The course Social Sciences encompasses a broader, multidisciplinary, framework (sociology, economy, marketing, politology, social anthropology, and media). The economics part of the course covers basic economic terms, demand, supply, market equilibrium, and rational consumer choice. Firm and production functions in the short and long run as well as long-run and short-run costs are discussed. Market structures and markets for productive inputs and public goods are other topics. Also presented are macroeconomic aggregates and the basics of macroeconomics. Social theories presented in the course are considered an analytical reflection on the concepts and formal cognitive schemes of all social sciences. Students will get familiar with social theories/paradigms that are used to study and interpret social phenomena. Seminars will focus on everyday life, its interactions, and opinion polemics, which often interfere in negotiations about the direction and goals of society. The course also provides students with conceptual tools for their own further studies based on critical thinking.			
123BUC	Chemistry	Z,ZK	4
Lectures deal with the basic chemical principles in the branches as general, inorganic, organic and physical chemistry. Instances of topics are composition, properties and behaviour of water, soil, air, wood, macromolecular compounds, inorganic binders, metals and other materials used in civil engineering.			
132ST02	Structural Mechanics 2	Z,ZK	6
The principal objective of the course is to familiarise students with the application of basic principles of mechanics to the determination of the distribution of internal forces in statically determined structures, cross-sectional properties and the elementary definition of stress.			
135SOM1	Soil Mechanics 1	Z	3
The course focuses on the understanding of basic geological laws and principles in relation to architecture, civil engineering and urban planning. Emphasis is placed on explaining the influence of geological processes, both endogenous and exogenous, on the rock environment and how the geological situation affects the design of structures and their interaction with the rock environment. At the same time, attention is paid to the technical properties of rocks with regard to their practical applications. The course also includes a brief introduction to the regional geology of the Czech Republic.			
104CL2	Czech/Foreign Language 2	Z,ZK	2
This course accents the communicative approach to language teaching. Therefore, individual lessons are primarily centred around an underlying topic that is complemented by the communicative language function. Further appropriate language aspects (i.e. grammar, lexis, pronunciation, skills) arise from the given communicative need. Basic communication in common situations is further enriched by communicative skills in a more specific university environment. The Czech course is intended for students in the English Programme, who have already gained some basic knowledge in the Czech language, i.e. they are at A1/A2 level. The course is aimed to provide training in language means necessary for communication in everyday situations and at university. After successful completion the student gains a credit and exam. End of course level according to CEFR: A2			
TV2	Physical Education	Z	0

Code of the group: BD20200300
Name of the group: Civil Engineering, 3rd semester
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 6 courses
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
101MT03	**Mathematics 3** *Jozef Bobok, Yuliya Namlyeyeva, Ondřej Zindulka, Martin Hála **Yuliya Namlyeyeva** Yuliya Namlyeyeva (Gar.)*	Z,ZK	6	3P+2C	Z	z
124BSD1	**Building Structures 1** *Eva Burgetová, Hana Gattermayerová **Ctislav Fiala** Hana Gattermayerová (Gar.)*	Z	4	2P+1C	Z	z
132TELA	**Theory of Elasticity** *Jan Vorel **Jan Vorel** Jan Vorel (Gar.)*	Z,ZK	6	3P+2C	Z	z
135SOM2	**Soil Mechanics 2** *Jan Záleský, Daniel Jirásko **Daniel Jirásko** Jan Záleský (Gar.)*	Z,ZK	5	2P+1C	Z	z
141HYAE	**Hydraulics** *Václav Matoušek **Václav Matoušek** Václav Matoušek (Gar.)*	Z,ZK	5	2P+2C	Z	z
142WEE	**Water and Environmental Engineering** *Petr Nowak, Petr Sklenář, David Zumr, Václav David, Tomáš Dostál, Martina Sobotková, Martin Šanda, Milan Zukal, Ladislav Satrapa, ... **Milan Zukal** Milan Zukal (Gar.)*	Z,ZK	4	3P+1C	Z	z

Characteristics of the courses of this group of Study Plan: Code=BD20200300 Name=Civil Engineering, 3rd semester

101MT03	Mathematics 3	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/zs/MT03/syllabus			
124BSD1	Building Structures 1	Z	4
Introducing in civil engineering, basic elements and structures			
132TELA	Theory of Elasticity	Z,ZK	6
Basic assumptions and basic equations of theory of elasticity. Assumptions on deformation and stress distribution in beams. Tension and compression, pure bending, bending moments in two planes, combination of axial and bending stresses. Core of a cross section. Differential equation of elasticity curve. Shear stresses in flexural beams. Free torsion. Elastic-plastic and plastic state of cross-section. Stability of beams. 2D problems, walls and plates.			
135SOM2	Soil Mechanics 2	Z,ZK	5
Basic course of Soil Mechanics for Civil Engineers. Introduction to origin of soils, soil description, multi-phase media behaviour, soil classification, compressibility and shear resistance, soil testing, earth pressures, assessment of stability and deformation of soil mass, applications in civil engineering.			
141HYAE	Hydraulics	Z,ZK	5
Water as medium and natural resource, water in civil engineering. Physical properties of fluids/liquids. Hydrostatics - pressures, Pascal's law, hydrostatic forces, buoyancy force. Fundamentals of hydrodynamics - flow quantities, regimes and types of flow, hydraulic resistance, basic hydrodynamic equations. Flow in pressurized pipes - head loss due to friction and obstacles, simple hydraulic calculations. Pump-pipe systems. Flow in open channels - steady uniform flow, hydraulic design of open channel, subcritical, critical and supercritical flow, non-uniform flow and longitudinal profiles of water level, hydraulic jump. Hydraulics of structures - outflow from orifice, overflow on weirs and spillways, flow through bridge and culvert. Flow around obstacles, impact force of flows and jets, drag force. Measurement of discharge. Groundwater flow - types and effects, Darcy's law, seepage.			
142WEE	Water and Environmental Engineering	Z,ZK	4
In the course students will obtain basic knowledge about water and environmental management. The course focuses on practical knowledge with close relation to other disciplines of civil engineering. The subject is taught in form of lectures and tutorials. The stress is laid on presentations with case studies (positive and negative) using all audio visual forms. Lectures of this course are divided into two parts Water Engineering and Environmental Engineering.			

Code of the group: BD20200400
Name of the group: Civil Engineering, 4th semester
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 6 courses
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
124BSD2	**Building Structures 2** *Eva Burgetová, Hana Gattermayerová **Malila Noori** Eva Burgetová (Gar.)*	Z,ZK	5	2P+1C	L	z
126ECM	**Economics and Management** *Renáta Schneiderová Heralová, Aleš Tomek, Radan Tomek **Aleš Tomek** Aleš Tomek (Gar.)*	Z,ZK	7	4P+2C	L	z
132SM3E	**Structural Mechanics 3** *Jan Zeman **Jan Zeman** Jan Zeman (Gar.)*	Z,ZK	5	2P+2C	L	z

133FSTC	**Fundamentals of Structural Design - Concrete** *Petr Štemberk, Yuliia Khmurovska* ***Petr Štemberk*** *Petr Štemberk (Gar.)*	Z,ZK	4	2P+1C	L	z
134FSTT	**Fundamentals of Structural Design - Steel** *Zdeněk Sokol* ***Zdeněk Sokol*** *Zdeněk Sokol (Gar.)*	Z,ZK	3	2P+1C	L	z
136TSUP	**Transp. Structures and Urban Planning** *Leoš Horníček, Jan Valentin, Jiří Kugl, Václav Jetel, Ivan Horký* ***Jan Valentin*** *Jan Valentin (Gar.)*	Z,ZK	6	5P+1C	L	z

Characteristics of the courses of this group of Study Plan: Code=BD20200400 Name=Civil Engineering, 4th semester

124BSD2	Building Structures 2	Z,ZK	5

Staircases, sloping ramps, lift shafts - structural and material solutions, statical principles, load, requirements. Building foundations - classification of subsoil, types of foundations, principles, requirements. Basement - statical principles, load, requirements, waterproofing. Expansion joints of bearing structures - volume changes, diferencial settlement. Roof truss systems.

126ECM	Economics and Management	Z,ZK	7

A-Z of construction engineering and management both at the corporate and project level. All participants, processes and aspects of the construction industry are introduced. Course concentrates on all major topics of company and project management, e.g. business development and marketing, bidding, planning and controlling of all vital processes, financial management, cost control, risk management, etc. Lectures are based on the real practice experience of all course''s lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects.

132SM3E	Structural Mechanics 3	Z,ZK	5

Analysis of statically indeterminate structures by the slope-deflection method and the force method. Principle of virtual work.

133FSTC	Fundamentals of Structural Design - Concrete	Z,ZK	4

The course is focused on design of concrete structures based on ultimate state design method. The focal topics are design of reinforced concrete members for basic types of straining (bending, shear, combination of normal forces and bending moments) including determination of load effects; introduction to serviceability limit states. Other topics are technology of production and material properties of concrete and their testing, properties of steel reinforcement and interaction of reinforcement and concrete. The prerequisite courses are Structural mechanics, Theory of Elasticity, Building materials, Building structures.

134FSTT	Fundamentals of Structural Design - Steel	Z,ZK	3

The course is focused on design of steel, steel and concrete concrete composite load-bearing structures. The students will learn how to design of simple structural elements (beams, columns, trusses) and structural bolted and welded connections.

136TSUP	Transp. Structures and Urban Planning	Z,ZK	6

Introduction to the transportation engineering with the focus on road and railroad infrastructure. Rail transport and its advantages and disadvantages. Railway track and tram track construction. Noise and anti-noise measures. Road design and principles, Environmental aspects of road infrastructure. Pavement design (thickness design) and principles of the pavement structure functions. Crossings and junctions. Construction materials for highway and rail road engineering. Introduction to urban zoning and planning including urbanism. Relationships of urban planning and environmental, economic, culture-social, space and operational aspects of landscape and urban areas. Information to planning tools, procedures and used applications.

Code of the group: BD20200500
Name of the group: Civil Engineering, 5th semester
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 5 courses
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**
124BPH	**Building Physics** *Jiří Nováček, Zbyněk Svoboda* ***Jiří Nováček*** *Zbyněk Svoboda (Gar.)*	Z,ZK	6	3P+2C	Z	z
132STA	**Structural Analysis** *Jan Zeman* ***Jan Zeman*** *Jan Zeman (Gar.)*	Z,ZK	5	2P+2C	Z	z
133CM01	**Concrete and Masonry Structures 1** *Petr Bílý, Iva Broukalová* ***Iva Broukalová*** *Iva Broukalová (Gar.)*	Z,ZK	6	3P+2C	Z	z
134ST01	**Steel Structures** *Zdeněk Sokol* ***Zdeněk Sokol*** *Zdeněk Sokol (Gar.)*	Z,ZK	6	3P+2C	Z	z
135FS01	**Foundation of Structures** *Jan Záleský, Jan Kos* ***Daniel Jirásko*** *Jan Záleský (Gar.)*	Z,ZK	7	3P+3C	Z	z

Characteristics of the courses of this group of Study Plan: Code=BD20200500 Name=Civil Engineering, 5th semester

124BPH	Building Physics	Z,ZK	6

Basic review of the thermal protection of buildings, building acoustics and daylighting (heat transfer, thermal conductivity, thermal resistence and thermal transmitance, multidimensional heat transfer, thermal bridges and thermal joints, difusion of water vapour and vapour condensation, mould growth, transient heat transfer, risk of overheating, low-energy, passive and zero-energy buildings, sound in the living and working environment, perception and description of sound: intensity, frequency, time factor, information value, interindividual sensitivity, point, line and plane sound sources, sound power level, directivity factor, sound propagation in the free field conditions, sound propagation in the diffuse field conditions, definable and indefinable sounds, airborne and structureborne sound, definition, measurement, evaluation and the limits, sound reduction index of double structures, mass-air-mass resonance, standing waves in a cavity, definition, measurement, evaluation, the sun and the environment, basics of spherical astronomy, horizons and equatorial coordinates, calculating of the sun azimuth and altitude, daylight and lighting, visual perception, basics of photometry, daylight factor and calculation models of the sky, methods for determining daylight factor, influence of environment on a daylighting: photometric characteristics of shielding barriers, technical characteristics of lighting openings).

132STA	Structural Analysis	Z,ZK	5

Extreme effects of live load, influence lines. Matrix form of the direct stiffness method and its computer implementation for trusses and frames. Two-dimensional elasticity and its finite element treatment. Governing equations of thin plates and their finite element treatment.

133CM01	Concrete and Masonry Structures 1	Z,ZK	6
Structural design of concrete structures; prerequisite course 133FSTC Fundamentals of Structural Design - Concrete. Calculation models, methods of analysis (focus on simplified and empirical methods), reinforcing and detailing for particular structures and structural elements: slabs, frames, shear walls, staircase, basement and retaining walls, foundations.			
134ST01	Steel Structures	Z,ZK	6
The purpose of this course is to learn basic principles and general arrangement and structural detailing of multi-storey buildings and single-storey buildings. Brief information about structural analysis, load, design codes and structural stability is also given. The course gives some examples of large span, tall and industrial buildings.			
135FS01	Foundation of Structures	Z,ZK	7
Basic design methods for shallow footings, piles, retaining structures, foundation pits, sheet pile walls, anchors and soil improvement. Principles of monitoring in foundation engineering. Use of Eurocode 7. Selected case histories.			

Code of the group: BD20200600
Name of the group: Civil Engineering, 6th semester
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 5 courses
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
124BC01	**Non-loadbearing Construction** *Vladimír Žďára* ***Vladimír Žďára*** *Vladimír Žďára (Gar.)*	Z,ZK	7	2P+3C	L	z
124SDP1	**Structural Design Project 1** *Hana Gattermayerová, Iva Broukalová, Martin Jiránek* ***Martin Jiránek*** *Hana Gattermayerová (Gar.)*	KZ	6	4C	L	z
125BSE	**Buildings Services Systems** *Karel Kabele, Michal Kabrhel* ***Karel Kabele*** *Karel Kabele (Gar.)*	Z,ZK	5	2P+2C	L	z
133CM02	**Concrete and Masonry Structures 2** *Iva Broukalová, Jan Vítek, Radek Hájek, Roman Lenner* ***Iva Broukalová*** *Jan Vítek (Gar.)*	Z,ZK	7	4P+2C	L	z
134TS01	**Timber Structures** *Petr Kuklík, Lukáš Velebil* ***Petr Kuklík*** *Petr Kuklík (Gar.)*	Z,ZK	5	3P+1C	L	z

Characteristics of the courses of this group of Study Plan: Code=BD20200600 Name=Civil Engineering, 6th semester

124BC01	Non-loadbearing Construction	Z,ZK	7
Course is focused on complex approach to practice design of the building envelope, flat and sloped roofing, doors and windows, partition walls, floor structures and ceilings. This course introduces theoretical foundations and computational approaches about two fields of building design: building physics and structure interaction. Integrated design of the nonbearing structures together with other building systems.			
124SDP1	Structural Design Project 1	KZ	6
Converting an architectural study of a smaller or medium-sized building for housing, administration, education, culture or sports into a detailed design of a building structure based on static analysis, interaction of load-bearing and non-load-bearing elements and building physics. Focus on complex approach to practical design, analysis and optimalization of a building structures. Design of variants of the load-bearing system, preliminary static analysis (calculation of load-bearing elements - slabs, columns, walls, etc), calculation of foundations, design of structures on the building envelope with respect to thermal protection of buildings, building physics, fire protection of buildings and protection against water and soil moisture. Elaboration of detailed drawings including floor plans, sections and details. Public presentation.			
125BSE	Buildings Services Systems	Z,ZK	5
Introductory Course of Building Services is focused on sanitary installations, gas supply system and heating systems. Sanitary installations - introduction, hydraulic pipes, water supply facilities, balance water needs. Internal water supply systems - installation, materials, calculation, waste water and disposal, sewage systems, internal drainage, types of fixtures. Gas - external pipelines, connections, balance of gas, internal pipeline systems, flue gas. Central heating and design of heating surfaces. Calculation of heat balance. Heating system. Preparation of hot water. Heat sources - boiler, electric heating, district heating, renewable sources.			
133CM02	Concrete and Masonry Structures 2	Z,ZK	7
Design of concrete structures on serviceability. Limit states approach. Stress control, cracking and crack width analysis, allowable crack width in concrete structures. Deformation of reinforced concrete structures, numerical and simplified analysis, criteria of acceptance. Prestressed concrete. Introduction, basic principles, design philosophy, prestress losses, technology of prestressing, pre-tensioning and post-tensioning, verification of serviceability and ultimate limit states. Masonry structures, introduction, terminology, design of structural elements, reinforced masonry. Strengthening of masonry structures. Precast concrete structures, design situations, specific problems. Strut and tie models. Joints. Industrial halls. Composite concrete-concrete structures. Introduction to concrete bridges and introduction to engineering structures.			
134TS01	Timber Structures	Z,ZK	5
The course is focused on basic rules for mechanical resistance, serviceability, durability of timber structures in normal temperature and in fire.			

Code of the group: BD20200700
Name of the group: Civil Engineering, 7th semester
Requirement credits in the group: In this group you have to gain at least 22 credits
Requirement courses in the group: In this group you have to complete at least 6 courses
Credits in the group: 22
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
100ODPR	**Industrial Training (3 weeks)** *Kateřina Sojková, Jan Růžička, Petr Hájek* ***Michal Jandera*** *Michal Jandera (Gar.)*	Z	0	6C	Z,L	z
122TCD	**Technology of Construction** *Alexander Ilkström Kravcov, Čeněk Jarský, Mária Párová* ***Čeněk Jarský*** *Čeněk Jarský (Gar.)*	Z,ZK	6	4P+2C	Z	z
123MED	**Material Engineering** *Alena Vimmrová, Igor Medveď, Jan Fořt* ***Alena Vimmrová*** *Igor Medveď (Gar.)*	Z,ZK	5	2P+2C	Z	z
124BSD3	**Building Structures 3** *Vladimír Žďára* ***Vladimír Žďára*** *Vladimír Žďára (Gar.)*	Z,ZK	3	2P+1C	Z	z
124PDRD	**Failures, Deterioration, Renovations** *Eva Burgetová* ***Eva Burgetová*** *Eva Burgetová (Gar.)*	Z,ZK	3	2P+1C	Z,L	z
125BSE2	**Buildings Services Systems 2** *Michal Kabrhel, Zuzana Veverková* ***Michal Kabrhel*** *Michal Kabrhel (Gar.)*	Z,ZK	5	2P+2C	Z	z

Characteristics of the courses of this group of Study Plan: Code=BD20200700 Name=Civil Engineering, 7th semester

100ODPR	Industrial Training (3 weeks)	Z	0

Professional practice is an important part of academic education in undergraduate degree programmes. The student will gain a basic understanding of duties and professional responsibilities. The professional practice evaluates the sum of all knowledge acquired through previous theoretical studies and is a proof of their acquisition.

122TCD	Technology of Construction	Z,ZK	6

Goal: To learn students to know construction processes and their design and to create a model of the building process of a project for planning and management of its implementation Contents: 1. Introduction to construction technology, construction processes, basic terminology. 2. Earthworks, excavation of rock classes, types of excavation, shoring, compaction, drainage. 3. Production and transport of concrete mixture. Formwork and traditional system, placement of reinforcement, storage and compaction of fresh concrete, curing of fresh concrete. 4. Construction Equipment (equipment for mining, transportation and compaction of rocks, concrete transport equipment, lifting equipment, tower and mobile cranes, trucks, elevators, hoists, trays, tools for finishing work). 6. Excursion to construction site. 7. Finishing works in building industry. Plasters, facings, paintings, soffits, wallpapers floors. 8. Facades, fronts. Internal installations, sewerage, water, gas, electricity mains. 9. Health and safety at work. Environmental protection during construction. Quality requirements for construction processes. 10. Implementation of buildings and projects. Main concepts and terms. Technological, spatial and time analysis of the building process, 11. Technological stages and their characteristics for homogenous and non homogenous buildings.Long term and short term construction planning and scheduling. Construction technology design. 12. Flow method in building industry, use of construction technology network analysis for project management. Use of computers in project planning and management. 13. Principles of design of site facilities and equipment

123MED	Material Engineering	Z,ZK	5

Subject gives information on principles of designing and development of new types of materials having directed properties for specific building applications and structures.

124BSD3	Building Structures 3	Z,ZK	3

The subject is focused on the complex design of load-bearing structures of roofs, large-span structures and structures of multi-storey buildings. In the first part, the attention is focused on span structures of pitched roofs and hall buildings and on the supporting structures of multi-storey buildings. In the second part, students will learn about the design of prefabricated indoor and multi-storey structures.

124PDRD	Failures, Deterioration, Renovations	Z,ZK	3

Types of defects, symptoms, significance, criticality, causes, reason for failures, Records of faults: origin, frequency, performance Agencies causing deterioration, durability of materials, role of external forces, instability and deficiency of structures, failure patterns Failures of foundation, walls and DPCs, claddings and roofs

125BSE2	Buildings Services Systems 2	Z,ZK	5

Introduction to the indoor environmental quality, building ventilation and basic artificial lighting and electrical installation.

Code of the group: BD20200800
Name of the group: Civil Engineering, 8th semester
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 2 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
124FSHB	**Fire Safety and Healthy Buildings** *Martin Jiránek, Petr Hejtmánek, Pavla Ryparová, Zuzana Rácová, Veronika Kačmaříková, Vladimír Mózer* ***Vladimír Mózer*** *Martin Jiránek (Gar.)*	Z,ZK	6	3P+2C	L	z
126CMAN	**Construction Management** *Aleš Tomek, Radan Tomek* ***Aleš Tomek*** *Aleš Tomek (Gar.)*	Z,ZK	6	3P+2C	L	z

Characteristics of the courses of this group of Study Plan: Code=BD20200800 Name=Civil Engineering, 8th semester

124FSHB	Fire Safety and Healthy Buildings	Z,ZK	6

Healthy Buildings Constituents of indoor microclimate, hazardous substances (VOCs, HFRs, heavy metals, moulds, microbes, aerosols, radionuclides, etc.), their sources and health effects. Influence of building structures and materials on quality of indoor microclimate. Design of buildings with respect to optimisation of indoor microclimate. Fire Safety Analysis of fire - course of fire, burning process, fire loading; legislation and European Standards; fire safety solutions - fire project, requirement for fire resistance of buildings, escape ways, distance separation, fire-fighting equipment; fire behaviour of the most used materials (wood, steel, concrete, plastics); protection of building materials against fire (brickwork, concreting, plasters and sprays, coatings, impregnates of wood, encasements, glued facings of mineral fibres); sandwiches from fire point of view; influence of claddings on the course fire; passive protection of building structures - fire walls, fire glazed structures, fire ceiling, draft stops and seals; repressive measures - electric fire signalling, stationary extinguishing devices, smoke extract, hydrant systems.

126CMAN	Construction Management	Z,ZK	6

Course is oriented mainly on practical applications of corporate construction management systems. It includes corporate strategy, corporate finance and budgeting, marketing and methods of business development, etc. Sustainable profitability of the construction business and the best practice at both - field and corporate level is explained. Lectures are based on the real practice experience of all course's lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects.

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 8
The role of the block: PV

Code of the group: BD20200700_2
Name of the group: Civil Engineering, Optional subjects, 7-8th semester
Requirement credits in the group: In this group you have to gain at least 8 credits
Requirement courses in the group: In this group you have to complete at least 4 courses
Credits in the group: 8
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
102PHS	**Physics - Seminar** *Jiří Konfršt **Jiří Konfršt** Jiří Konfršt (Gar.)*	Z	2	2C	Z	PV
124CADE	**CAD 1 (E)** *Pavel Chour **Pavel Chour** Pavel Chour (Gar.)*	KZ	3	3C	Z,L	PV
124YEOT	**Energy Optimised Timber Buildings** *Jan Růžička **Jan Růžička** Jan Růžička (Gar.)*	Z	2	1P+1C	Z	PV
124YKSE	**Complex Construction Detailing** ***Jiří Pazderka***	Z	2	1P+1C	Z	PV
128CGR	**Computer Graphics** *Tomáš Vaníček **Tomáš Vaníček** Tomáš Vaníček (Gar.)*	Z,ZK	4	2P+2C	Z,L	PV
132MMO	**Modern Methods of Optimization** *Jan Zeman, Matěj Lepš **Jan Zeman** Matěj Lepš (Gar.)*	Z	2	1P+1C	Z	PV
133YBBD	**Basis of Bridges Design** *Roman Lenner **Roman Lenner** Roman Lenner (Gar.)*	Z	2	1P+1C	Z	PV
134TBS	**Timber Based Structures** *Petr Kuklík **Petr Kuklík** Petr Kuklík (Gar.)*	Z	2	1P+1C	Z	PV
137TENV	**Rail Traffic and Environment** *Leoš Horníček, Vít Lojda, Lenka Lomoz **Leoš Horníček** Leoš Horníček (Gar.)*	Z,ZK	2	1P+1C	Z	PV
143ESP	**Soil Physics for Engineers** *David Zumr, Jakub Jeřábek, Milena Císlerová, Tailin Li **David Zumr** Milena Císlerová (Gar.)*	Z,ZK	4	2P+2C	Z	PV
144BT1	**Balneotechnology** *Bohumil Šťastný, Filip Horký **Filip Horký** Bohumil Šťastný (Gar.)*	ZK	2	2P	Z	PV
144WS	**Drinking Water Management** *Kateřina Slavíčková, Filip Horký **Filip Horký** Kateřina Slavíčková (Gar.)*	KZ	2	2P	Z	PV
101MPRS	**Probability and Statistics** *Jozef Bobok, Daniela Jarušková **Daniela Jarušková** Daniela Jarušková (Gar.)*	ZK	4	2P+2C	Z,L	PV
124BIMR	**BIM - Revit Architecture** *Pavel Chour, Renáta Hoďánková, Kristýna Schulzová **Pavel Chour** Renáta Hoďánková (Gar.)*	KZ	2	1P+1C	Z,L	PV
124EDC	**Civil Engineering in Developing Countries** *Jan Tilinger **Jan Tilinger** Jan Tilinger (Gar.)*	Z,ZK	4	2P+2C	Z,L	PV
126YMCC	**Management in Construction Company** *Aleš Tomek, Radan Tomek **Petr Matějka***	Z	2	1P+1C	L	PV
128CS1	**C# Programming and Application Development** *Miroslav Sůra **Miroslav Sůra** Miroslav Sůra (Gar.)*	Z,ZK	4	2P+2C	Z,L	PV
128CS2	**C# 2 - Advanced Application Development** *Miroslav Sůra **Miroslav Sůra** Miroslav Sůra (Gar.)*	Z,ZK	4	2P+2C	Z,L	PV
128YIND	**Computer Use Fundamentals** *Miroslav Sůra **Miroslav Sůra** Miroslav Sůra (Gar.)*	Z	2	2C	Z,L	PV
129ACM1	**Architectural CAD Modelling 1** *Vojtěch Dvořák, Klára Škodová, Anna Marie Černá **Vojtěch Dvořák** Vojtěch Dvořák (Gar.)*	KZ	3	3C	Z,L	PV
129ACM2	**Architectural CAD Modelling 2** *Vojtěch Dvořák, Klára Škodová, Anna Marie Černá **Vojtěch Dvořák** Vojtěch Dvořák (Gar.)*	KZ	3	3C	Z,L	PV
129CTA	**Composition and Theory of Architecture** *Lenka Popelová, Klára Ciesarová **Lenka Popelová** Lenka Popelová (Gar.)*	KZ	2	2C	Z,L	PV

133CASD	**Computer Aided Structural Design** *Josef Novák **Josef Novák** Josef Novák (Gar.)*	Z	2	1P+1C	Z,L	PV
133YCB	**Concrete Bridges** *Roman Lenner **Roman Lenner** Roman Lenner (Gar.)*	Z,ZK	4	2P+2C	L	PV
134FSTS	**Fire Design of Steel, Concrete and Timber Str.** *Kamila Cábová **Kamila Cábová** Kamila Cábová (Gar.)*	Z	2	1P+1C		PV
134GSTR	**Glass Structures** *Martina Eliášová **Martina Eliášová** Martina Eliášová (Gar.)*	Z	2	1P+1C	L	PV
134SAL	**Stainless Steel and Aluminium Structures** *Michal Jandera **Michal Jandera** Michal Jandera (Gar.)*	Z	2	1P+1C	L	PV
143ENE	**Environmental Engineering** *David Zumr, Tomáš Dostál, Martina Sobotková, Martin Šanda **Martin Šanda** Tomáš Dostál (Gar.)*	Z,ZK	4	2P+1C	Z,L	PV

Characteristics of the courses of this group of Study Plan: Code=BD20200700_2 Name=Civil Engineering, Optional subjects, 7-8th semester

102PHS	Physics - Seminar	Z	2
This course serves as a supplementary one for 102PH01. Students will solve many problems which provide better understanding of the topics discussed in the lectures.			
124CADE	CAD 1 (E)	KZ	3
The seminar familiarizes students with the AutoCAD drawing software. This includes working with 2D & 3D geometry, wire models, prints, SGC/ACIS/Parasolid geometry models, meshes, Bool operations, solid objects creation methods and advanced edits and modifications of the model.			
124YEOT	Energy Optimised Timber Buildings	Z	2
The aim is to present a complex overview on energy efficient timber structures. Basic theoretical and design principals are presented. The lectures are focused on following technologies of timber structures: (i) heavy timber skeleton systems, (ii) light timber structures based on 2x4. (iii) CLT, (iv) log house. All technologies of timber structures are presented in structural and building physics context of low energy and passive buildings.			
124YKSE	Complex Construction Detailing	Z	2
The aim of the course is to extend the knowledge gained in previous courses - it is intended for students who have already reached advanced level of knowledge about structural problems in buildings. The content of the course is focused on the complex solution of construction details, following all legislative requirements and taking into account the maximum efficiency and durability of the chosen solution.			
128CGR	Computer Graphics	Z,ZK	4
Foundation of using various types of computer graphics programs. Grid graphics, digital photography, vector drawing, 3D modelling, visualisation. Based computer graphics algorithms.			
132MMO	Modern Methods of Optimization	Z	2
The course is aimed at an overview of numerical optimization methods applicable not only in the Civil Engineering area. The emphasis is put more on the introduction of driving principles, however, practical applications in MATLAB environment are also conducted during exercises.			
133YBBD	Basis of Bridges Design	Z	2
The course Basis of Bridge Design is focused on principal problems related to design of bridges - spatial arrangement and equipment of road and railway bridges, types of bridge structures and technologies of construction of concrete bridges.			
134TBS	Timber Based Structures	Z	2
Examples of timber structures and bridges. Structural systems and details. Recommended design.			
137TENV	Rail Traffic and Environment	Z,ZK	2
Basic principles for designing of railway and tramway structures, European railway network, rail transport, environmental impacts - acoustics, traffic noise and vibrations, noise control, modelling and attenuation of traffic noise.			
143ESP	Soil Physics for Engineers	Z,ZK	4
Engineering description of water movement and solute transport in a soil profile. Hydraulic characteristics of porous media. Retention curve and hydraulic conductivity definition and estimation. Field vs laboratory measurements. Preferential flow. Basics of modelling. Basics of transport processes..			
144BT1	Balneotechnology	ZK	2
Water treatment, design and operation of circulation water for swimmnig pool, natural and artificial complexes for water recreation and spas.			
144WS	Drinking Water Management	KZ	2
Water treatment and water supply			
101MPRS	Probability and Statistics	ZK	4
The goal is to get a basic knowledge in probability and inferential statistics. Probability. Discrete and continuous random variables. Normal distribution. Asymptotic distribution of a mean. Multivariate distribution. Independence and correlation. Parameter estimation. Hypothesis testing. Simple linear regression.			
124BIMR	BIM - Revit Architecture	KZ	2
The seminar introduces the basic principles of building design as an information model. Teaching takes place on the Autodesk platform. Teaching is focused on the interpretation of the principle of modeling building elements, their relationships and properties. During the exercise, students will create a simple BIM model, they will learn to work with other SW - data export and import, they will learn basic principles of creating 2D documentation, scheduling, 3D presentation - render, animation.			
124EDC	Civil Engineering in Developing Countries	Z,ZK	4
For a long time, organizations operating in developing and climatically or culturally diverse regions have been struggling with the lack of construction experts who would be able to work in a setting that is culturally, climatically, socially and economically different. The aim of the course is to provide students with basic information about the specifics of work in such regions. Within the subject we will deal with constructional approaches with respect to different climate, use of non-standard procedures, materials and organizational approaches and other factors different from the standards in the Europe or Czech Republic (e.g. building requirements, seismic activity, tsunami, animals, insects, monsoon rain , absence of networks, etc.).			
126YMCC	Management in Construction Company	Z	2
Nature of Construction Business Primary Causes of Business Failure, External and Internal Influences Business Strategies to Minimize the Risk of Business Failure Business Development, Marketing and Bidding Planning Strategies Plan Implementation/Control Strategies Financial Management Strategies Construction Risk Management Leadership Challenges Organizational Behavior Corporate & Employee Ethics Company Performance Checklist Managing Profitable Construction Business Lectures are based on the real practice experience of all course's lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects. Active participation in the online game and meeting the attendance requirement is required to receive course credit (zápočet). The awarding of the course credit is a condition for being allowed to take the exam (zkouška).			

128CS1	C# Programming and Application Development	Z,ZK	4
Students will become acquainted with one of the currently most popular programming language from C-family languages containing next to C# also a well-known Java. The simple syntax of C# enables to study the language incrementally by developing real applications since the very beginning. Thus students can develop their own applications after a very short time of study. Thanks to this fact students can pursue themes like advanced use of objects, some of design patterns and application architecture, or user class libraries.			
128CS2	C# 2 - Advanced Application Development	Z,ZK	4
Synopsis: Students will get more familiar with one (C#) of the most popular programming language of the C-family languages, where next to C# also the Java is a member. Students will pursue themes like advanced usage and design of objects, user class libraries and re-use of objects in application development, as well as design patterns and application architecture.			
128YIND	Computer Use Fundamentals	Z	2
Annotation: Documents and data processing - focused on documents and data that are not one-use only or not "use once then discard". Exploiting Office utilities (Microsoft Office, OpenOffice) for advanced document management. Documents (Word), spreadsheets (Excel) and automated data calculations. Desk-top databases (Access). Information systems (IS), basic principles, what is an IS and what is not an IS. Other problem-oriented programs and user interfaces (e.g. np++). With an option: Computer aided processes and activities.			
129ACM1	Architectural CAD Modelling 1	KZ	3
The students are acquainted with the possibilities of BIM using ArchiCAD software. Basic tools, functions and principles are demonstrated. Students practice the newly acquired knowledge on a simplified BIM model of a family house or another appropriate building or structure. Objective of this course is to teach prospective architects and civil engineers an effective method of creation BIM model that is base for 2D and 3D documentation (including VR model, IFC etc.).			
129ACM2	Architectural CAD Modelling 2	KZ	3
The subject enhances and develops skills acquired in the basic course 129ACM1. The course is focused on methods and tools for creating of complicated shapes and library elements.			
129CTA	Composition and Theory of Architecture	KZ	2
Seminars are focused on the composition of architecture, which will be analyzed through the basic ordering principles, pattern making process and application of the theoretical concepts.			
133CASD	Computer Aided Structural Design	Z	2
Computer-Aided Structural Design has been implemented as an optional compulsory course which provides students to gain knowledge in a computer-aided design and analysis of reinforced concrete structures. The objective of the course is to demonstrate the practical use of selected FEM software for the limit state design of various concrete structures. Namely, the focus is on computational models, reinforcement design, numerical modelling, crack control, deformation control and internal forces distribution.			
133YCB	Concrete Bridges	Z,ZK	4
The course of Concrete Bridges is focused on design and construction of this type of bridge structures. Lectures are devoted to spatial arrangement and equipment of road and railway bridges, bridge substructure, effects and realization of prestressing, types of concrete bridge structures and technologies of their construction. Seminars are split into interesting issues and provide an opportunity to apply the learnt principles.			
134FSTS	Fire Design of Steel, Concrete and Timber Str.	Z	2
The course is focused on basic principles of design of structural elements exposed to fire. The principles of loads applied at fire and methods for evaluating gas temperature and temperature of structural elements are explained. The design methods for simple steel, composite and timber structures are given.			
134GSTR	Glass Structures	Z	2
The course is intending to introduce the students the field of structural applications of glass and to give them some specific skills for calculation and detailing of for basic glass structures: panes beams and fins, columns and walls, point-supported glass, as well as for glazing systems such as glass facades, canopies and roofs, stairs and floors. On this purpose the properties of glass as structural material will be presented in comparison with other basic building materials, together with selected examples of glass/glazing applications. Design details and connecting technology, relevant technical regulations, specification and current methods applied in design will be described. Worked examples will accompany the lectures for better understanding, and design project will help to fix specific knowledge.			
134SAL	Stainless Steel and Aluminium Structures	Z	2
The course covers two parts, design of aluminium and stainless steel structures. The first part covers evolution of stainless steel materials/structures and examples of realized structures. Stainless steels suitable for structures are described in a detail, including their properties. Dissimilarities in assessments of members under common loadings with respect to low-carbon steels is described for both ultimate and serviceability limit states. In the end the possibilities concerning connections of stainless steel members, erection and installation of stainless steel members are described. In the second part of the subject, the same topics are covered for aluminium structures. Welding and heat-affected zones are discussed in detail in terms of weld design, section design and local welds effect in members.			
143ENE	Environmental Engineering	Z,ZK	4
General information about interaction between human beings and their environment. Information about water quality and pollution, flood hazard, air and soil pollution, landscape utilization and protection, soil erosion, climate change, sustainability, waste production and disposal, energy production and consumption. Questions of ethics, philosophy and globalization are discussed together. The topics are given on basic information level, respecting various backgrounds of the students.			

Name of the block: Povinně volitelné předměty, doporučení S1
Minimal number of credits of the block: 18
The role of the block: S1

Code of the group: BD20200700_1
Name of the group: Civil Engineering, Project, 7th semester
Requirement credits in the group: In this group you have to gain at least 6 credits
Requirement courses in the group: In this group you have to complete at least 1 course
Credits in the group: 6
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
124SDP2	**Structural Design Project 2** *Tomáš Vlach* ***Tomáš Vlach*** *Tomáš Vlach (Gar.)*	KZ	6	4C	Z	S1
133SDP2	**Structural Design Project 2** ***Iva Broukalová***	KZ	6	4C	Z	S1
134SDP2	**Structural Design Project 2** ***Michal Jandera*** *Michal Jandera (Gar.)*	KZ	6	4C	Z	S1

135SDP2	**Structural Design Project 2** ***Michal Jandera*** *Jan Salák (Gar.)*	KZ	6	4C	Z	S1

Characteristics of the courses of this group of Study Plan: Code=BD20200700_1 Name=Civil Engineering, Project, 7th semester

124SDP2	Structural Design Project 2	KZ	6
The subject of the course is a technical solution design of advanced structures. Structural design project 2 focus on complex approach to practice design, analysis and optimalization of advanced multistorey or long span building structures, or their reconstruction. Analysis of load, functional and technologic requirements, design of load-bearing system alternatives including foundations, preliminary bearing elements dimensions calculation, choice of most suitable version. Preliminary statical design of chosen version, technical report, and drawings.			
133SDP2	Structural Design Project 2	KZ	6
Elaboration of the structural part of the project documentation for the given structure (part of the structure). The design of the selected variant of the structure with regard to the requirements of other professions. Structural analysis and drawing documentation to the extent specified during consultations. The Department of Architectural Engineering (K124) and Geotechnics (K135) collaborate in teaching in the course.			
134SDP2	Structural Design Project 2	KZ	6
Design of steel / timber load bearing building structure according to external requirements in relation to interaction of load bearing and final completion structural elements. The project is assigned by the seminar leader.			
135SDP2	Structural Design Project 2	KZ	6
Design, static calculation and drawing documentation of the building substructure			

Code of the group: BD20200800_1
Name of the group: Civil Engineering, Bachelor Project
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 1 course
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
102BPRO	**Bachelor Project** ***Jiří Novák***	Z	12	10C	L,Z	S1
122BPRO	**Bachelor Project** *Čeněk Jarský* ***Rostislav Šulc*** *Čeněk Jarský (Gar.)*	Z	12	10C	L,Z	S1
123BPRO	**Bachelor Project** *Alena Vimmrová* ***Jan Pruška*** *Jan Pruška (Gar.)*	Z	12	10C	L,Z	S1
124BPRO	**Bachelor Project** ***Petr Hájek***	Z	12	10C	L,Z	S1
125BPRO	**Bachelor Project** ***Karel Kabele*** *Karel Kabele (Gar.)*	Z	12	10C	L,Z	S1
132BPRO	**Bachelor Project** *Jan Vorel, Aleš Jíra, Milan Jirásek* ***Aleš Jíra***	Z	12	10C	L,Z	S1
133BPRO	**Bachelor Thesis**	Z	12	10C	L,Z	S1
134BPRO	**Bachelor Project** ***Michal Jandera*** *Michal Jandera (Gar.)*	Z	12	10C	L,Z	S1
135BPRO	**Bachelor Project** ***Jan Salák***	Z	12	10C	L,Z	S1

Characteristics of the courses of this group of Study Plan: Code=BD20200800_1 Name=Civil Engineering, Bachelor Project

102BPRO	Bachelor Project	Z	12
in accordance with the thesis proposal			
122BPRO	Bachelor Project	Z	12
The bachelor's thesis ends the bachelor study. The student demonstrates that he / she can apply the knowledge gained during the study on a specific project. The work may take the form of theoretical or project. Students consult the issue with the thesis supervisors and experts from the predetermined departments.			
123BPRO	Bachelor Project	Z	12
In accordance with the thesis proposal			
124BPRO	Bachelor Project	Z	12
The topics of bachelor's theses are based on the needs of practice or the scientific research activities of the department, scope and difficulty correspond to the student's knowledge acquired during bachelor's studies. The supervisor of the bachelor's thesis can designate additional consultants to the student.			
125BPRO	Bachelor Project	Z	12
Bachelor Thesis is the result of the Bachelor degree study programme. It should prove student`s ability to work independently in the area of Building Services Systems. The thesis can cover theoretical aspects or to focus on practical application on an object within building services systems. Students consult the supervisor and specialists from other departments. The thesis is presented in front of the commission.			
132BPRO	Bachelor Project	Z	12
The assignment of the final thesis is always individual based on the agreement of the teacher and the student. The vast majority of assignments are connected with the scientific and research activities of the respective employee. The output of the solution may be a brief research study of the given problem, experimental activity, programming and others according to the respective assignment.			
133BPRO	Bachelor Thesis	Z	12
A bachelor thesis is the qualification thesis of a bachelor's degree. It can take the form of processing the structural part of the building design project or research study on the topic of designing and application of a structural element with a variant comparative analysis or parametric study or performing and analysing experiments, etc.			
134BPRO	Bachelor Project	Z	12
In this course, student formulates a bachelor's thesis that is necessary to reach the bachelor's degree. This course is focused on steel or timber structural design.			

135BPRO	Bachelor Project	Z	12
Individual assignment in accordance with the thesis proposal			

List of courses of this pass:

Code	Name of the course	Completion	Credits
100ODPR	Industrial Training (3 weeks)	Z	0
Professional practice is an important part of academic education in undergraduate degree programmes. The student will gain a basic understanding of duties and professional responsibilities. The professional practice evaluates the sum of all knowledge acquired through previous theoretical studies and is a proof of their acquisition.			
101CG01	Constructive Geometry	Z,ZK	5
Description of space and main methods of the projection - multiview projection as a basis for orientation in 3D CAD systems, axonometry, linear perspective. Surfaces in building practice - graphic law, geometric characteristic and image in appropriate projection, realization and application. Namely: Cylinders and Cones, Hyperboloid of Revolution, Helical Surfaces, Quadrics. Visualization of objects in 3D program SketchUp. Curves in building practice - types of mathematical description.			
101MPRS	Probability and Statistics	ZK	4
The goal is to get a basic knowledge in probability and inferential statistics. Probability. Discrete and continuous random variables. Normal distribution. Asymptotic distribution of a mean. Multivariate distribution. Independence and correlation. Parameter estimation. Hypothesis testing. Simple linear regression.			
101MT01	Mathematics 1	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/zs/MT01/syllabus			
101MT02	Mathematics 2	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/ls/MT02/			
101MT03	Mathematics 3	Z,ZK	6
https://mat.fsv.cvut.cz/vyuka/bakalari/eng/zs/MT03/syllabus			
102BPRO	Bachelor Project	Z	12
in accordance with the thesis proposal			
102PHD	Physics	Z,ZK	4
This is a basic physics course in the English language for students of the study programmes Civil Engineering; Management and Economics in Construction. The course is also open to students from other CTU faculties within the Erasmus programmes. The course focuses on mechanics and basic thermodynamics. The following areas are covered in the course: Mechanics of material points (particles) and deformable bodies. Discrete and continuous model of matter. Kinematics and dynamics of a material point (particle). Mechanical force fields. Gravitational field. Mechanical vibrations. Material deformation. Elastic waves. Acoustics. Hydromechanics. Fundamentals of thermodynamics. Heat transfer.			
102PHS	Physics - Seminar	Z	2
This course serves as a supplementary one for 102PH01. Students will solve many problems which provide better understanding of the topics discussed in the lectures.			
104CFL1	Czech/Foreign Language 1	Z	1
Czech courses are intended for international students. The course is aimed to provide training in basic language means necessary for communication in everyday situations. After successful completion the student gains a credit. End of course level according to CEFR: A1 (Beginners) A2 (Elementary) Course code: 104 CFL1 Duration: 2 hours / 1 semester CEFR Level: A1 Literature: Hand-outs given by teacher; Lída Holá: Czech Step by Step 1 For further information: sandra.giormani@fsv.cvut.cz			
104CL2	Czech/Foreign Language 2	Z,ZK	2
This course accents the communicative approach to language teaching. Therefore, individual lessons are primarily centred around an underlying topic that is complemented by the communicative language function. Further appropriate language aspects (i.e. grammar, lexis, pronunciation, skills) arise from the given communicative need. Basic communication in common situations is further enriched by communicative skills in a more specific university environment. The Czech course is intended for students in the English Programme, who have already gained some basic knowledge in the Czech language, i.e. they are at A1/A2 level. The course is aimed to provide training in language means necessary for communication in everyday situations and at university. After successful completion the student gains a credit and exam. End of course level according to CEFR: A2			
105SOSC	Social Sciences	Z,ZK	5
The course Social Sciences encompasses a broader, multidisciplinary, framework (sociology, economy, marketing, politology, social anthropology, and media). The economics part of the course covers basic economic terms, demand, supply, market equilibrium, and rational consumer choice. Firm and production functions in the short and long run as well as long-run and short-run costs are discussed. Market structures and markets for productive inputs and public goods are other topics. Also presented are macroeconomic aggregates and the basics of macroeconomics. Social theories presented in the course are considered an analytical reflection on the concepts and formal cognitive schemes of all social sciences. Students will get familiar with social theories/paradigms that are used to study and interpret social phenomena. Seminars will focus on everyday life, its interactions, and opinion polemics, which often interfere in negotiations about the direction and goals of society. The course also provides students with conceptual tools for their own further studies based on critical thinking.			
122BPRO	Bachelor Project	Z	12
The bachelor's thesis ends the bachelor study. The student demonstrates that he / she can apply the knowledge gained during the study on a specific project. The work may take the form of theoretical or project. Students consult the issue with the thesis supervisors and experts from the predetermined departments.			
122TCD	Technology of Construction	Z,ZK	6
Goal: To learn students to know construction processes and their design and to create a model of the building process of a project for planning and management of its implementation Contents: 1. Introduction to construction technology, construction processes, basic terminology. 2. Earthworks, excavation of rock classes, types of excavation, shoring, compaction, drainage. 3. Production and transport of concrete mixture. Formwork and traditional system, placement of reinforcement, storage and compaction of fresh concrete, curing of fresh concrete. 4. Construction Equipment (equipment for mining, transportation and compaction of rocks, concrete transport equipment, lifting equipment, tower and mobile cranes, trucks, elevators, hoists, trays, tools for finishing work). 6. Excursion to construction site. 7. Finishing works in building industry. Plasters, facings, paintings, soffits, wallpapers floors. 8. Facades, fronts. Internal installations, sewerage, water, gas, electricity mains. 9. Health and safety at work. Environmental protection during construction. Quality requirements for construction processes. 10. Implementation of buildings and projects. Main concepts and terms. Technological, spatial and time analysis of the building process, 11. Technological stages and their characteristics for homogenous and non homogenous buildings.Long term and short term construction planning and scheduling. Construction technology design. 12. Flow method in building industry, use of construction technology network analysis for project management. Use of computers in project planning and management. 13. Principles of design of site facilities and equipment			
123BM01	Building Materials	Z,ZK	5
Main aim of course is giving basic information about the structure and properties of the building materials and about their testing methods on the base of the contemporary knowledge and materials engineering approach. The laboratory work (exercise) consists in the testing of building materials from the point of view of physically - chemical properties and their quality control.			

123BPRO	Bachelor Project	Z	12
	In accordance with the thesis proposal		
123BUC	Chemistry	Z,ZK	4
	Lectures deal with the basic chemical principles in the branches as general, inorganic, organic and physical chemistry. Instances of topics are composition, properties and behaviour of water, soil, air, wood, macromolecular compounds, inorganic binders, metals and other materials used in civil engineering.		
123MED	Material Engineering	Z,ZK	5
	Subject gives information on principles of designing and development of new types of materials having directed properties for specific building applications and structures.		
124BC01	Non-loadbearing Construction	Z,ZK	7
	Course is focused on complex approach to practice design of the building envelope, flat and sloped roofing, doors and windows, partition walls, floor structures and ceilings. This course introduces theoretical foundations and computational approaches about two fields of building design: building physics and structure interaction. Integrated design of the nonbearing structures together with other building systems.		
124BIMR	BIM - Revit Architecture	KZ	2
	The seminar introduces the basic principles of building design as an information model. Teaching takes place on the Autodesk platform. Teaching is focused on the interpretation of the principle of modeling building elements, their relationships and properties. During the exercise, students will create a simple BIM model, they will learn to work with other SW - data export and import, they will learn basic principles of creating 2D documentation, scheduling, 3D presentation - render, animation.		
124BPH	Building Physics	Z,ZK	6
	Basic review of the thermal protection of buildings, building acoustics and daylighting (heat transfer, thermal conductivity, thermal resistence and thermal transmitance, multidimensional heat transfer, thermal bridges and thermal joints, difusion of water vapour and vapour condensation, mould growth, transient heat transfer, risk of overheating, low-energy, passive and zero-energy buildings, sound in the living and working environment, perception and description of sound: intensity, frequency, time factor, information value, interindividual sensitivity, point, line and plane sound sources, sound power level, directivity factor, sound propagation in the free field conditions, sound propagation in the diffuse field conditions, definable and indefinable sounds, airborne and structureborne sound, definition, measurement, evaluation and the limits, sound reduction index of double structures, mass-air-mass resonance, standing waves in a cavity, definition, measurement, evaluation, the sun and the environment, basics of spherical astronomy, horizons and equatorial coordinates, calculating of the sun azimuth and altitude, daylight and lighting, visual perception, basics of photometry, daylight factor and calculation models of the sky, methods for determining daylight factor, influence of environment on a daylighting: photometric characteristics of shielding barriers, technical characteristics of lighting openings).		
124BPRO	Bachelor Project	Z	12
	The topics of bachelor's theses are based on the needs of practice or the scientific research activities of the department, scope and difficulty correspond to the student's knowledge acquired during bachelor's studies. The supervisor of the bachelor's thesis can designate additional consultants to the student.		
124BSD1	Building Structures 1	Z	4
	Introducing in civil engineering, basic elements and structures		
124BSD2	Building Structures 2	Z,ZK	5
	Staircases, sloping ramps, lift shafts - structural and material solutions, statical principles, load, requirements. Building foundations - classification of subsoil, types of foundations, principles, requirements. Basement - statical principles, load, requirements, waterproofing. Expansion joints of bearing structures - volume changes, diferencial settlement. Roof truss systems.		
124BSD3	Building Structures 3	Z,ZK	3
	The subject is focused on the complex design of load-bearing structures of roofs, large-span structures and structures of multi-storey buildings. In the first part, the attention is focused on span structures of pitched roofs and hall buildings and on the supporting structures of multi-storey buildings. In the second part, students will learn about the design of prefabricated indoor and multi-storey structures.		
124CADE	CAD 1 (E)	KZ	3
	The seminar familiarizes students with the AutoCAD drawing software. This includes working with 2D & 3D geometry, wire models, prints, SGC/ACIS/Parasolid geometry models, meshes, Bool operations, solid objects creation methods and advanced edits and modifications of the model.		
124EDC	Civil Engineering in Developing Countries	Z,ZK	4
	For a long time, organizations operating in developing and climatically or culturally diverse regions have been struggling with the lack of construction experts who would be able to work in a setting that is culturally, climatically, socially and economically different. The aim of the course is to provide students with basic information about the specifics of work in such regions. Within the subject we will deal with constructional approaches with respect to different climate, use of non-standard procedures, materials and organizational approaches and other factors different from the standards in the Europe or Czech Republic (e.g. building requirements, seismic activity, tsunami, animals, insects, monsoon rain , absence of networks, etc.).		
124FSHB	Fire Safety and Healthy Buildings	Z,ZK	6
	Healthy Buildings Constituents of indoor microclimate, hazardous substances (VOCs, HFRs, heavy metals, moulds, microbes, aerosols, radionuclides, etc.), their sources and health effects. Influence of building structures and materials on quality of indoor microclimate. Design of buildings with respect to optimisation of indoor microclimate. Fire Safety Analysis of fire - course of fire, burning process, fire loading; legislation and European Standards; fire safety solutions - fire project, requirement for fire resistance of buildings, escape ways, distance separation, fire-fighting equipment; fire behaviour of the most used materials (wood, steel, concrete, plastics); protection of building materials against fire (brickwork, concreting, plasters and sprays, coatings, impregnates of wood, encasements, glued facings of mineral fibres); sandwiches from fire point of view; influence of claddings on the course fire; passive protection of building structures - fire walls, fire glazed structures, fire ceiling, draft stops and seals; repressive measures - electric fire signalling, stationary extinguishing devices, smoke extract, hydrant systems.		
124PDRD	Failures, Deterioration, Renovations	Z,ZK	3
	Types of defects, symptoms, significance, criticality, causes, reason for failures, Records of faults: origin, frequency, performance Agencies causing deterioration, durability of materials, role of external forces, instability and deficiency of structures, failure patterns Failures of foundation, walls and DPCs, claddings and roofs		
124SDP1	Structural Design Project 1	KZ	6
	Converting an architectural study of a smaller or medium-sized building for housing, administration, education, culture or sports into a detailed design of a building structure based on static analysis, interaction of load-bearing and non-load-bearing elements and building physics. Focus on complex approach to practical design, analysis and optimalization of a building structures. Design of variants of the load-bearing system, preliminary static analysis (calculation of load-bearing elements - slabs, columns, walls, etc), calculation of foundations, design of structures on the building envelope with respect to thermal protection of buildings, building physics, fire protection of buildings and protection against water and soil moisture. Elaboration of detailed drawings including floor plans, sections and details. Public presentation.		
124SDP2	Structural Design Project 2	KZ	6
	The subject of the course is a technical solution design of advanced structures. Structural design project 2 focus on complex approach to practice design, analysis and optimalization of advanced multistorey or long span building structures, or their reconstruction. Analysis of load, functional and technologic requirements, design of load-bearing system alternatives including foundations, preliminary bearing elements dimensions calculation, choice of most suitable version. Preliminary statical design of chosen version, technical report, and drawings.		
124YEOT	Energy Optimised Timber Buildings	Z	2
	The aim is to present a complex overview on energy efficient timber structures. Basic theoretical and design principals are presented. The lectures are focused on following technologies of timber structures: (i) heavy timber skeleton systems, (ii) light timber structures based on 2x4. (iii) CLT, (iv) log house. All technologies of timber structures are presented in structural and building physics context of low energy and passive buildings.		

124YKSE	Complex Construction Detailing	Z	2
The aim of the course is to extend the knowledge gained in previous courses - it is intended for students who have already reached advanced level of knowledge about structural problems in buildings. The content of the course is focused on the complex solution of construction details, following all legislative requirements and taking into account the maximum efficiency and durability of the chosen solution.			
125BPRO	Bachelor Project	Z	12
Bachelor Thesis is the result of the Bachelor degree study programme. It should prove student`s ability to work independently in the area of Building Services Systems. The thesis can cover theoretical aspects or to focus on practical application on an object within building services systems. Students consult the supervisor and specialists from other departments. The thesis is presented in front of the commission.			
125BSE	Buildings Services Systems	Z,ZK	5
Introductory Course of Building Services is focused on sanitary installations, gas supply system and heating systems. Sanitary installations - introduction, hydraulic pipes, water supply facilities, balance water needs. Internal water supply systems - installation, materials, calculation, waste water and disposal, sewage systems, internal drainage, types of fixtures. Gas - external pipelines, connections, balance of gas, internal pipeline systems, flue gas. Central heating and design of heating surfaces. Calculation of heat balance. Heating system. Preparation of hot water. Heat sources - boiler, electric heating, district heating, renewable sources.			
125BSE2	Buildings Services Systems 2	Z,ZK	5
Introduction to the indoor environmental quality, building ventilation and basic artificial lighting and electrical installation.			
126BIME	BIM	Z	1
The course is focused on basic knowledge in the field of building information modeling (BIM) in theoretical and practical areas, usable across various construction industry specializations and fields. Students will be acquainted not only with the basic knowledge of BIM (on the theoretical and practical level), data formats, IT systems typical for the building industry, but also with the context of BIM in the current construction industry in relation to the whole project life cycle and its specifics (delivery, expert focus, construction projects phases, etc.) Theoretical knowledge is complemented by practical exercises aimed at mastering and understanding the basic principles of object-oriented parametric modeling.			
126CMAN	Construction Management	Z,ZK	6
Course is oriented mainly on practical applications of corporate construction management systems. It includes corporate strategy, corporate finance and budgeting, marketing and methods of business development, etc. Sustainable profitability of the construction business and the best practice at both - field and corporate level is explained. Lectures are based on the real practice experience of all course's lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects.			
126ECM	Economics and Management	Z,ZK	7
A-Z of construction engineering and management both at the corporate and project level. All participants, processes and aspects of the construction industry are introduced. Course concentrates on all major topics of company and project management, e.g. business development and marketing, bidding, planning and controlling of all vital processes, financial management, cost control, risk management, etc. Lectures are based on the real practice experience of all course''s lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects.			
126YMCC	Management in Construction Company	Z	2
Nature of Construction Business Primary Causes of Business Failure, External and Internal Influences Business Strategies to Minimize the Risk of Business Failure Business Development, Marketing and Bidding Planning Strategies Plan Implementation/Control Strategies Financial Management Strategies Construction Risk Management Leadership Challenges Organizational Behavior Corporate & Employee Ethics Company Performance Checklist Managing Profitable Construction Business Lectures are based on the real practice experience of all course's lecturers and various case studies are studied and solved. Online Building Industry Game (BIG) will be played by all course participants through the whole semester (a computer simulation of a realistic business environment where participants play the role of contractors, competing in a market with variable demand for construction work). In this online game, developed and directly operated by the California Polytechnic State University, students act as contractors, managing both, their companies and projects. Active participation in the online game and meeting the attendance requirement is required to receive course credit (zápočet). The awarding of the course credit is a condition for being allowed to take the exam (zkouška).			
128CGR	Computer Graphics	Z,ZK	4
Foundation of using various types of computer graphics programs. Grid graphics, digital photography, vector drawing, 3D modelling, visualisation. Based computer graphics algorithms.			
128CS1	C# Programming and Application Development	Z,ZK	4
Students will become acquainted with one of the currently most popular programming language from C-family languages containing next to C# also a well-known Java. The simple syntax of C# enables to study the language incrementally by developing real applications since the very beginning. Thus students can develop their own applications after a very short time of study. Thanks to this fact students can pursue themes like advanced use of objects, some of design patterns and application architecture, or user class libraries.			
128CS2	C# 2 - Advanced Application Development	Z,ZK	4
Synopsis: Students will get more familiar with one (C#) of the most popular programming language of the C-family languages, where next to C# also the Java is a member. Students will pursue themes like advanced usage and design of objects, user class libraries and re-use of objects in application development, as well as design patterns and application architecture.			
128YIND	Computer Use Fundamentals	Z	2
Annotation: Documents and data processing - focused on documents and data that are not one-use only or not "use once then discard". Exploiting Office utilities (Microsoft Office, OpenOffice) for advanced document management. Documents (Word), spreadsheets (Excel) and automated data calculations. Desk-top databases (Access). Information systems (IS), basic principles, what is an IS and what is not an IS. Other problem-oriented programs and user interfaces (e.g. np++). With an option: Computer aided processes and activities.			
129ACM1	Architectural CAD Modelling 1	KZ	3
The students are acquainted with the possibilities of BIM using ArchiCAD software. Basic tools, functions and principles are demonstrated. Students practice the newly acquired knowledge on a simplified BIM model of a family house or another appropriate building or structure. Objective of this course is to teach prospective architects and civil engineers an effective method of creation BIM model that is base for 2D and 3D documentation (including VR model, IFC etc.).			
129ACM2	Architectural CAD Modelling 2	KZ	3
The subject enhances and develops skills acquired in the basic course 129ACM1. The course is focused on methods and tools for creating of complicated shapes and library elements.			
129CTA	Composition and Theory of Architecture	KZ	2
Seminars are focused on the composition of architecture, which will be analyzed through the basic ordering principles, pattern making process and application of the theoretical concepts.			
132BPRO	Bachelor Project	Z	12
The assignment of the final thesis is always individual based on the agreement of the teacher and the student. The vast majority of assignments are connected with the scientific and research activities of the respective employee. The output of the solution may be a brief research study of the given problem, experimental activity, programming and others according to the respective assignment.			
132MMO	Modern Methods of Optimization	Z	2
The course is aimed at an overview of numerical optimization methods applicable not only in the Civil Engineering area. The emphasis is put more on the introduction of driving principles, however, practical applications in MATLAB environment are also conducted during exercises.			

132SM3E	Structural Mechanics 3	Z,ZK	5
Analysis of statically indeterminate structures by the slope-deflection method and the force method. Principle of virtual work.			
132ST01	Structural Mechanics 1	Z,ZK	6
The principal objective of the course is to familiarize students with basic principles of mechanics such as equilibrium and equivalency applied to statically determined structures			
132ST02	Structural Mechanics 2	Z,ZK	6
The principal objective of the course is to familiarise students with the application of basic principles of mechanics to the determination of the distribution of internal forces in statically determined structures, cross-sectional properties and the elementary definition of stress.			
132STA	Structural Analysis	Z,ZK	5
Extreme effects of live load, influence lines. Matrix form of the direct stiffness method and its computer implementation for trusses and frames. Two-dimensional elasticity and its finite element treatment. Governing equations of thin plates and their finite element treatment.			
132TELA	Theory of Elasticity	Z,ZK	6
Basic assumptions and basic equations of theory of elasticity. Assumptions on deformation and stress distribution in beams. Tension and compression, pure bending, bending moments in two planes, combination of axial and bending stresses. Core of a cross section. Differential equation of elasticity curve. Shear stresses in flexural beams. Free torsion. Elastic-plastic and plastic state of cross-section. Stability of beams. 2D problems, walls and plates.			
133BPRO	Bachelor Thesis	Z	12
A bachelor thesis is the qualification thesis of a bachelor's degree. It can take the form of processing the structural part of the building design project or research study on the topic of designing and application of a structural element with a variant comparative analysis or parametric study or performing and analysing experiments, etc.			
133CASD	Computer Aided Structural Design	Z	2
Computer-Aided Structural Design has been implemented as an optional compulsory course which provides students to gain knowledge in a computer-aided design and analysis of reinforced concrete structures. The objective of the course is to demonstrate the practical use of selected FEM software for the limit state design of various concrete structures. Namely, the focus is on computational models, reinforcement design, numerical modelling, crack control, deformation control and internal forces distribution.			
133CM01	Concrete and Masonry Structures 1	Z,ZK	6
Structural design of concrete structures; prerequisite course 133FSTC Fundamentals of Structural Design - Concrete. Calculation models, methods of analysis (focus on simplified and empirical methods), reinforcing and detailing for particular structures and structural elements: slabs, frames, shear walls, staircase, basement and retaining walls, foundations.			
133CM02	Concrete and Masonry Structures 2	Z,ZK	7
Design of concrete structures on serviceability. Limit states approach. Stress control, cracking and crack width analysis, allowable crack width in concrete structures. Deformation of reinforced concrete structures, numerical and simplified analysis, criteria of acceptance. Prestressed concrete. Introduction, basic principles, design philosophy, prestress losses, technology of prestressing, pre-tensioning and post-tensioning, verification of serviceability and ultimate limit states. Masonry structures, introduction, terminology, design of structural elements, reinforced masonry. Strengthening of masonry structures. Precast concrete structures, design situations, specific problems. Strut and tie models. Joints. Industrial halls. Composite concrete-concrete structures. Introduction to concrete bridges and introduction to engineering structures.			
133FSTC	Fundamentals of Structural Design - Concrete	Z,ZK	4
The course is focused on design of concrete structures based on ultimate state design method. The focal topics are design of reinforced concrete members for basic types of straining (bending, shear, combination of normal forces and bending moments) including determination of load effects; introduction to serviceability limit states. Other topics are technology of production and material properties of concrete and their testing, properties of steel reinforcement and interaction of reinforcement and concrete. The prerequisite courses are Structural mechanics, Theory of Elasticity, Building materials, Building structures.			
133SDP2	Structural Design Project 2	KZ	6
Elaboration of the structural part of the project documentation for the given structure (part of the structure). The design of the selected variant of the structure with regard to the requirements of other professions. Structural analysis and drawing documentation to the extent specified during consultations. The Department of Architectural Engineering (K124) and Geotechnics (K135) collaborate in teaching in the course.			
133YBBD	Basis of Bridges Design	Z	2
The course Basis of Bridge Design is focused on principal problems related to design of bridges - spatial arrangement and equipment of road and railway bridges, types of bridge structures and technologies of construction of concrete bridges.			
133YCB	Concrete Bridges	Z,ZK	4
The course of Concrete Bridges is focused on design and construction of this type of bridge structures. Lectures are devoted to spatial arrangement and equipment of road and railway bridges, bridge substructure, effects and realization of prestressing, types of concrete bridge structures and technologies of their construction. Seminars are split into interesting issues and provide an opportunity to apply the learnt principles.			
134BPRO	Bachelor Project	Z	12
In this course, student formulates a bachelor's thesis that is necessary to reach the bachelor's degree. This course is focused on steel or timber structural design.			
134FSTS	Fire Design of Steel, Concrete and Timber Str.	Z	2
The course is focused on basic principles of design of structural elements exposed to fire. The principles of loads applied at fire and methods for evaluating gas temperature and temperature of structural elements are explained. The design methods for simple steel, composite and timber structures are given.			
134FSTT	Fundamentals of Structural Design - Steel	Z,ZK	3
The course is focused on design of steel, steel and concrete concrete composite load-bearing structures. The students will learn how to design of simple structural elements (beams, columns, trusses) and structural bolted and welded connections.			
134GSTR	Glass Structures	Z	2
The course is intending to introduce the students the field of structural applications of glass and to give them some specific skills for calculation and detailing of for basic glass structures: panes beams and fins, columns and walls, point-supported glass, as well as for glazing systems such as glass facades, canopies and roofs, stairs and floors. On this purpose the properties of glass as structural material will be presented in comparison with other basic building materials, together with selected examples of glass/glazing applications. Design details and connecting technology, relevant technical regulations, specification and current methods applied in design will be described. Worked examples will accompany the lectures for better understanding, and design project will help to fix specific knowledge.			
134SAL	Stainless Steel and Aluminium Structures	Z	2
The course covers two parts, design of aluminium and stainless steel structures. The first part covers evolution of stainless steel materials/structures and examples of realized structures. Stainless steels suitable for structures are described in a detail, including their properties. Dissimilarities in assessments of members under common loadings with respect to low-carbon steels is described for both ultimate and serviceability limit states. In the end the possibilities concerning connections of stainless steel members, erection and installation of stainless steel members are described. In the second part of the subject, the same topics are covered for aluminium structures. Welding and heat-affected zones are discussed in detail in terms of weld design, section design and local welds effect in members.			
134SDP2	Structural Design Project 2	KZ	6
Design of steel / timber load bearing building structure according to external requirements in relation to interaction of load bearing and final completion structural elements. The project is assigned by the seminar leader.			

134ST01	Steel Structures	Z,ZK	6
The purpose of this course is to learn basic principles and general arrangement and structural detailing of multi-storey buildings and single-storey buildings. Brief information about structural analysis, load, design codes and structural stability is also given. The course gives some examples of large span, tall and industrial buildings.			
134TBS	Timber Based Structures	Z	2
Examples of timber structures and bridges. Structural systems and details. Recommended design.			
134TS01	Timber Structures	Z,ZK	5
The course is focused on basic rules for mechanical resistance, serviceability, durability of timber structures in normal temperature and in fire.			
135BPRO	Bachelor Project	Z	12
Individual assignment in accordance with the thesis proposal			
135FS01	Foundation of Structures	Z,ZK	7
Basic design methods for shallow footings, piles, retaining structures, foundation pits, sheet pile walls, anchors and soil improvement. Principles of monitoring in foundation engineering. Use of Eurocode 7. Selected case histories.			
135SDP2	Structural Design Project 2	KZ	6
Design, static calculation and drawing documentation of the building substructure			
135SOM1	Soil Mechanics 1	Z	3
The course focuses on the understanding of basic geological laws and principles in relation to architecture, civil engineering and urban planning. Emphasis is placed on explaining the influence of geological processes, both endogenous and exogenous, on the rock environment and how the geological situation affects the design of structures and their interaction with the rock environment. At the same time, attention is paid to the technical properties of rocks with regard to their practical applications. The course also includes a brief introduction to the regional geology of the Czech Republic.			
135SOM2	Soil Mechanics 2	Z,ZK	5
Basic course of Soil Mechanics for Civil Engineers. Introduction to origin of soils, soil description, multi-phase media behaviour, soil classification, compressibility and shear resistance, soil testing, earth pressures, assessment of stability and deformation of soil mass, applications in civil engineering.			
136TSUP	Transp. Structures and Urban Planning	Z,ZK	6
Introduction to the transportation engineering with the focus on road and railroad infrastructure. Rail transport and its advantages and disadvantages. Railway track and tram track construction. Noise and anti-noise measures. Road design and principles, Environmental aspects of road infrastructure. Pavement design (thickness design) and principles of the pavement structure functions. Crossings and junctions. Construction materials for highway and rail road engineering. Introduction to urban zoning and planning including urbanism. Relationships of urban planning and environmental, economic, culture-social, space and operational aspects of landscape and urban areas. Information to planning tools, procedures and used applications.			
137TENV	Rail Traffic and Environment	Z,ZK	2
Basic principles for designing of railway and tramway structures, European railway network, rail transport, environmental impacts - acoustics, traffic noise and vibrations, noise control, modelling and attenuation of traffic noise.			
141HYAE	Hydraulics	Z,ZK	5
Water as medium and natural resource, water in civil engineering. Physical properties of fluids/liquids. Hydrostatics - pressures, Pascal's law, hydrostatic forces, buoyancy force. Fundamentals of hydrodynamics - flow quantities, regimes and types of flow, hydraulic resistance, basic hydrodynamic equations. Flow in pressurized pipes - head loss due to friction and obstacles, simple hydraulic calculations. Pump-pipe systems. Flow in open channels - steady uniform flow, hydraulic design of open channel, subcritical, critical and supercritical flow, non-uniform flow and longitudinal profiles of water level, hydraulic jump. Hydraulics of structures - outflow from orifice, overflow on weirs and spillways, flow through bridge and culvert. Flow around obstacles, impact force of flows and jets, drag force. Measurement of discharge. Groundwater flow - types and effects, Darcy's law, seepage.			
142WEE	Water and Environmental Engineering	Z,ZK	4
In the course students will obtain basic knowledge about water and environmental management. The course focuses on practical knowledge with close relation to other disciplines of civil engineering. The subject is taught in form of lectures and tutorials. The stress is laid on presentations with case studies (positive and negative) using all audio visual forms. Lectures of this course are divided into two parts Water Engineering and Environmental Engineering.			
143ENE	Environmental Engineering	Z,ZK	4
General information about interaction between human beings and their environment. Information about water quality and pollution, flood hazard, air and soil pollution, landscape utilization and protection, soil erosion, climate change, sustainability, waste production and disposal, energy production and consumption. Questions of ethics, philosophy and globalization are discussed together. The topics are given on basic information level, respecting various backgrounds of the students.			
143ESP	Soil Physics for Engineers	Z,ZK	4
Engineering description of water movement and solute transport in a soil profile. Hydraulic characteristics of porous media. Retention curve and hydraulic conductivity definition and estimation. Field vs laboratory measurements. Preferential flow. Basics of modelling. Basics of transport processes..			
144BT1	Balneotechnology	ZK	2
Water treatment, design and operation of circulation water for swimmnig pool, natural and artificial complexes for water recreation and spas.			
144WS	Drinking Water Management	KZ	2
Water treatment and water supply			
154FS01	Fieldwork Surveying	Z,ZK	6
Introduction to surveying, basic geodetic calculations, evaluation of precision and accuracy of a measurement, theory of errors, instrumentation, topographic survey, angular and distance measurements, determination of heights, photogrammetry, laser scanning, mapping, setting-out in construction, surveying for monitoring of displacements, cadastre of real estates.			
TV1	Physical Education	Z	0
TV2	Physical Education	Z	0

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