Study plan

Name of study plan: Stavební Inženýrství - konstrukce a dopravní stavby, specializace Inženýrské konstrukce

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Civil Engineering - Structural and Transportation Engineering Type of study: Follow-up master full-time Required credits: 90 Elective courses credits: 0 Sum of credits in the plan: 90 Note on the plan: platí pro nástup od akad. roku 2023/24

Name of the block: Compulsory courses Minimal number of credits of the block: 18 The role of the block: Z

Code of the group: NK20230100

Name of the group: Stavební Inženýrství - konstrukce a dopravní stavby, spole ná ást, 1. semestr Requirement credits in the group: In this group you have to gain at least 14 credits Requirement courses in the group: In this group you have to complete at least 3 courses Credits in the group: 14

Note on the group:

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
101NRDR	Numerical Solution of Differential Equations Petr Mayer, Ivana Pultarová, Jozef Bobok Petr Mayer Ivana Pultarová (Gar.)	Z,ZK	4	2P+2C	Z	Z
132NAK	Numerical Analysis of Structures Bo ek Patzák, Martin Horák, Tomáš Krej í Bo ek Patzák Bo ek Patzák (Gar.)	Z,ZK	5	2P+2C	Z	Z
135GET	Geotechnics Jan Pruška, Jan Kos, Matouš Hilar, Alexandr Butovi , Jan Masopust Jan Pruška Jan Pruška (Gar.)	Z,ZK	5	2P+2C	Z	Z

Characteristics of the courses of this group of Study Plan: Code=NK20230100 Name=Stavební Inženýrství - konstrukce a dopravní stavby, spole ná ást, 1. semestr

101NRDR	Numerical Solution of Differential Equations	Z,ZK	4			
After elementary tools of linear algebra (matrix, determinant, Gaussian elimination) are recalled, iterative methods for solving systems of linear algebraic equations are in the focus.						
Then, the finite difference method and the finite element method are presented and their applications to problems based on differential equations are shown. Attention is also paid to						
basic methods for solvir	ng initial value problems in ordinary differential equations.					
132NAK	Numerical Analysis of Structures	Z,ZK	5			
Variational principles of	mechanics. Method of weighted residuals, conditions of convergence (continuity, integrity). Principles of FEM. Isoparametric	elements, area co	oordinates,			
numerical integration. Application of method to selected 1D and 2D problems (Elasticity, heat transfer, consolidation). Algorithmic aspects of the method.						
135GET	Geotechnics	Z,ZK	5			
Familiarization with specific issues of building foundation, mastering the basic methods of technology of implementation of individual elements and structures and the use of methods						
of their static assessment.						

Code of the group: NK20230200

Name of the group: Stavební Inženýrství - konstrukce a dopravní stavby, spole ná ást, 2. semestr Requirement credits in the group: In this group you have to gain at least 4 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 4 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
132EANK	Experimental Analysis and Diagnostics K Michal Polák Michal Polák Michal Polák (Gar.)	KZ	4	1P+2C	L	Z

Characteristics of the courses of this group of Study Plan: Code=NK20230200 Name=Stavební Inženýrství - konstrukce a dopravní stavby, spole ná ást, 2. semestr

132EANK	Experimental Analysis and Diagnostics K	KZ	4			
Experiments focused on monitoring of the amount of climatic loads on building and engineering structures (wind, snow, temperature loads), diagnostics of building and engineering						
structures, tests carried	structures, tests carried out on physical models of building and engineering structures (model similarity laws, seismic simulations on shake tables, wind tunnel simulations of wind					
effects, static load tests	effects, static load tests on physical models), monitoring of building and engineering structures, static load tests (building structures, engineering structures, bridges), dynamic load					
tests and experimental modal analysis (building structures, engineering structures, bridges, footbridges), effects of technical seismicity, evaluation of adverse effects of vibration on						
the human body, assessment of the influence of building vibrations on installed machines and devices).						

Name of the block: Compulsory courses in the specialization Minimal number of credits of the block: 32 The role of the block: PS

Code of the group: NK20230101

Name of the group: specializace Inženýrské konstrukce, 1. semestr Requirement credits in the group: In this group you have to gain at least 14 credits Requirement courses in the group: In this group you have to complete at least 3 courses Credits in the group: 14

Note on the group:

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
132DY02	Dynamics of structures 2 Ji í Máca, Karel Pohl Ji í Máca Ji í Máca (Gar.)	Z,ZK	4	2P+1C	Z	PS
133B03K	Concrete Structures 3K Jan Vítek, Lukáš Vráblík Jan Vítek Jan Vítek (Gar.)	Z,ZK	5	2P+2C	Z	PS
134O02K	Steel Structures 2K Martina Eliášová Martina Eliášová Martina Eliášová (Gar.)	Z,ZK	5	2P+2C	Z	PS

Characteristics of the courses of this group of Study Plan: Code=NK20230101 Name=specializace Inženýrské konstrukce, 1. semestr

132DY02	Dynamics of structures 2	Z,ZK	4			
Methods for solving natural and forced vibrations of building structures using the finite element method. Response to wind, earthquake, traffic. Interaction of structure and subsoil						
133B03K	Concrete Structures 3K	Z,ZK	5			
Improvement of knowlege in the area of pretsressed concrete and selected problems of engineering structures						
134O02K	Steel Structures 2K	Z,ZK	5			
Deepening of knowle	dge received from courses 133NNK and 134OK01. Amplifying of theoretical knowledge in the field of steel grade selection, tough	ness, global analy	sis of structures			
buckling of structural systems, joint classification, and high strength steel and demanding composite steel and concrete structures. Complementation of knowledge from fire resistance						
of steel and composite structures and detailed design of industrial buildings and crane girders. Design of masts, towers, chimneys, tanks, silos and pipelines, technological structures,						
pre-stressed steel structures and basis of design from aluminium alloys and stainless steel, and cable and membrane structures.						

Code of the group: NK20230201

Name of the group: specializace Inženýrské konstrukce, 2. semestr Requirement credits in the group: In this group you have to gain at least 18 credits Requirement courses in the group: In this group you have to complete at least 4 courses Credits in the group: 18 Note on the group:

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
133B04K	Concrete Structures 4K Jan Vítek, Lukáš Vráblík Lukáš Vráblík (Gar.)	Z,ZK	4	2P+1C	L	PS
134OCM2	Steel Bridges 2 Pavel Ryjá ek Pavel Ryjá ek Pavel Ryjá ek (Gar.)	Z,ZK	4	2P+1C	L	PS
136S03K	Road construction 3D Michal Uhlík Michal Uhlík (Michal Uhlík (Gar.)	Z,ZK	5	2P+2C	L	PS
137Z02K	Railway structures 2K Leoš Horní ek, Hana Krej i íková Leoš Horní ek Leoš Horní ek (Gar.)	Z,ZK	5	2P+2C	L	PS

Characteristics of the courses of this group of Study Plan: Code=NK20230201 Name=specializace Inženýrské konstrukce, 2. semestr

	ncrete Structures 4K sues of design of prestressing of bridge structures, procedures of their computationa meric optimization.	analysis and the	effects of co		Z,ZK	4 roduction to	
1340CM2 Ste	eel Bridges 2 ed information on steel bridge design in the areas of major bridges, fatigue, reconstru	uction fabrication	and bridge (1	Z,ZK	4	
136S03K Road construction 3D Z,ZK 5							
Introduction to urban engineering, solutions in built-up areas - reconstruction. Parking - solution methods, technical parameters and requirements, garages. Bus stations and bus stops. Public mass transport and its preferences. Pedestrian and bicycle traffic. Traffic signs. Adaptations for the blind and partially sighted, barrier-free adaptations. Utilities.							
1 1	ilway structures 2K es of railway stations, structural elements of railway stations, equipment for passenge	r and freight trans	port, conne	1	Z,ZK European rail	5 way network,	
	on of railway lines, design of tram and metro lines, ecological impacts of rail transport	-					
Name of the block	k: Compulsory elective courses						
	of credits of the block: 6						
The role of the blo	ock: PV						
Code of the group	o: NK20230100_1						
0 1	p: Stavební Inženýrství - konstrukce a dopravní st	avby, PV p	edm	ty, 1. se	emestr		
•	dits in the group: In this group you have to gain at l			3 /			
Requirement cou	rses in the group: In this group you have to comple	ete at least	t 1 cou	rse			
Credits in the gro	•						
Note on the group): povinně voliteln Name of the course / Name of the group of courses	ý předmět			T	1	
Code	(in case of groups of courses the list of codes of their	Completion	Credits	Scope	Semester	Role	
	members) Tutors, authors and guarantors (gar.)	Completion	e. cuite	coope			
102YFPL	Solid State Physics in Civil Engineering Ji í Konfršt Ji í Konfršt Ji í Konfršt (Gar.)	Z	2	1P+1C	Z	PV	
132YDDS	Dynamics of Transport Structures Michal Polák Michal Polák Michal Polák (Gar.)	Z	2	1P+1C	Z	PV	
132YMMO	Modern Methods of Optimization Mat j Lepš, Jan Zeman Mat j Lepš Mat j Lepš (Gar.)	Z	2	1P+1C	Z	PV	
132YSEI	Seismic Engineeering Ji í Máca Ji í Máca Ji í Máca (Gar.)	Z	2	1P+1C	Z	PV	
132YSSK	Reliability of Structures Jaroslav Kruis Jaroslav Kruis (Gar.)	Z	2	1P+1C	Z	PV	
133YBEX	Concrete under Extreme Conditions Radek Štefan, Petr Štemberk, Marek Foglar Radek Štefan Radek Štefan (Gar.)	Z	2	1P+1C	z	PV	
133YBM2	Concrete Bridges 2 Jan Vítek Jan Vítek Jan Vítek (Gar.)	Z	2	1P+1C	Z	PV	
133YPRK	Failures and Rehabilitation of Concrete Structures Petr Štemberk, Jakub Žák Petr Štemberk Petr Štemberk (Gar.)	Z	2	1P+1C	Z	PV	
134YDKM	Timber structures and bridges Anna Kuklíková Anna Kuklíková (Gar.)	Z	2	1P+1C	Z	PV	
134YROK	Extending the Life of Steel and Timber Structures Karel Mikeš Karel Mikeš Karel Mikeš (Gar.)	Z	2	1P+1C	Z	PV	
134YSMK	Stability and modelling of steel structures Josef Machá ek, Michal Jandera Michal Jandera Josef Machá ek (Gar.)	Z	2	1P+1C	Z	PV	
135YGSM	Geotechnical Software for Numerical modelling Jan Ježek, Daniel Turanský, Jan Salák, Alena Zemanová Alena Zemanová Alena Zemanová (Gar.)	z	2	1P+1C	z	PV	
135YZAL	Basics of mining Ji í Barták Ji í Barták	Z	2	1P+1C	Z	PV	
136YEES	Environmental Aspects and Esthetics of Road Structures Ludvík Vébr, Karel Horní ek Michal Uhlík Karel Horní ek (Gar.)	Z	2	1P+1C		PV	
136YLET	Airports Petr Pánek Petr Pánek (Gar.)	Z	2	1P+1C	Z	PV	
137YDKP	Diagnostics of rail transport construction Hana Krej i íková Lenka Lomoz Hana Krej i íková (Gar.)	Z	2	1P+1C	Z	PV	
220YLPG	Geotechnical laboratory Ji í Svoboda, Ji í Šástka, Radek Vaší ek Radek Vaší ek Ji í Svoboda (Gar.)	Z	2	2C	Z	PV	

Characteristics of the courses of this group of Study Plan: Code=NK20230100_1 Name=Stavební Inženýrství - konstrukce a dopravní stavby, PV p edm_ty, 1. semestr

102YFPL	Solid State Physics in Civil Engineering	Z	2			
Solids, crystal structure, atomic shell theory, valence layer chemical bonds, dislocation disturbances, critical crack energy, vibration of masses, systems natural frequency of vibration						
and damped vibration, basics concepts of fracture mechanics, types of fracture, electron microscopes, scanning tunneling microscope, atomic force microscope, diffraction, diffraction						
methods, semiconducto	rs, p-n junction, photovoltaic effect, solar cells, heat and moisture transport.					

132YDDS Dynamics of Transport Structures	Z	2
Understanding of the problems of the Dynamics of transport structures (especially of road bridges, railway bridges and footbridges), explanation	-	-
procedures - the arrangement of an experiment "in situ?, monitored parameters, measuring line, modal analysis, the monitoring systems for ob	-	-
behaviour and of traffic flow characteristics, numerical methods for solving dynamical interaction between building structure and moving load,	modelling of structures,	traffic flow and
pedestrians, dynamical wind effects, practical examples.	7	0
132YMMO Modern Methods of Optimization		2
The course is aimed at an overview of numerical optimization methods applicable not only in the Civil Engineering area. The emphasis is put mor however, practical applications in MATLAB environment are also conducted during exercises.	e on the introduction of a	riving principies,
	Z	2
132YSEI Seismic Engineeering Basic principles of design of earthquake resistant structures. Methods of calculating the response of structures to earthquake loads according	1 1	2
132YSSK Reliability of Structures	Z	2
The course is devoted to the reliability of elements and systems. Element reliability is time dependent while the reliability of systems is of type		
solved by the FORM method. Two simulation methods are introduced: Monte Carlo and LHS.	Strength load. Complica	
133YBEX Concrete under Extreme Conditions	Z	2
The course is focused on concrete and concrete structures under extreme conditions.	-	2
133YBM2 Concrete Bridges 2	Z	2
Extension of the field of concrete bridges. The technologies of bridge construction represent main part of the study. Specifications of individua	1 1	-
133YPRK Failures and Rehabilitation of Concrete Structures	Z	2
The course focuses on the description of failures of concrete structures, explanation of the causes of these failures and the design of remedia	1	_
existing concrete structures are also discussed. Surface repairs, strengthening of contactors, strengthening of structural elements to the effect		
foundation structures are discussed. The course appropriately combines theoretical approaches with common practice.		
134YDKM Timber structures and bridges	Z	2
Timber structures focused to national strategy of sustainable development. New timber-based materials. Structural systeme of houses and bri	dges. Repairing and stre	ngthtening. Fire
design. Production, protection, erection and maintenance. Design and evaluation of bridges, roofs structures in normal temperature and in fire).	
134YROK Extending the Life of Steel and Timber Structures	Z	2
Materials used for bearing structures. Developments in the area of regulations and standardization. Causes of defects, malfunctions, survey of objects		
Possibilities of strengthening, strengthening of steel and timber structures and strengthening of connections. Using of computers in reconstruct	ctions and development of	of numerical
models.		
134YSMK Stability and modelling of steel structures	Z	2
Subject YSMK covers two parts. The first one deals with stability and strength of steel plates, the second one with stability and strengths of ste		
historic collapses of steel structures are analysed including the importance of imperfections for a design of thin plated structures. Presented a		-
and nonlinear theory of buckling of thin plates. The results are applied to the 4th class cross sections in harmony with Eurocode. Buckling due including their combination is applying in a detail. In the and the applied to the 4th class cross sections in harmony with design of paperson wetfference.		-
including their combination is analysed in a detail. In the end the application of the results is shown together with design of necessary stiffeners and structure stability. Possible global analysis methods are presented together with methods for compression and bending interaction for sler		
of lateral torsional buckling are explained including also tapered members.		specific cases
135YGSM Geotechnical Software for Numerical modelling	Z	2
Students get acquainted with the Finite Element Method, the currently dominant tool for numerical modeling in Geotechnics. Emphasis is place		- 1
the Finite Element Method and their subsequent application to selected problems of Geotechnical Engineering. The course summarises the type	•	· · ·
applications, material models suitable for the description of soil deformation, and selected specifics associated with numerical modeling in geote		-
in the modeling of foundation, embedded walls, and stability problems.	· ·	
135YZAL Basics of mining	Z	2
The Fundamentals of Quarrying course introduces students to all the essential aspects of aggregate mining, an important part of the national ec	conomy in a concise and	understandable
	ononity, in a contoice and	
way. Aggregates extracted and processed in various ways are essential raw materials for most construction industries.	contonity, in a contoice and	
way. Aggregates extracted and processed in various ways are essential raw materials for most construction industries. 136YEES Environmental Aspects and Esthetics of Road Structures		2
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136YEES Environmental Aspects and Esthetics of Road Structures	or, the designer and the	public, physical
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted point relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways	or, the designer and the ollutants on characteristic of financing road constr	public, physical c roads in the uction and
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, and	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme	public, physical c roads in the uction and ent of Transport
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transition	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hist	public, physical c roads in the uction and ent of Transport tory of highway
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted point relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hist , relationships between o	public, physical c roads in the uction and ent of Transport tory of highway directional and
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hist , relationships between o	public, physical c roads in the uction and ent of Transport tory of highway directional and
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of the vehicle fleet, the differences between static and dynamic composition in the data.	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, his , relationships between o of determining the dyna	public, physical c roads in the uction and ent of Transport tory of highway directional and mic composition
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hisi , relationships between o of determining the dyna	public, physical c roads in the uction and ent of Transport tory of highway directional and mic composition
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Types of airports, organization, data about airports, legislature, choice notions, movement of aeroplanes, flight and touch - down, assesment for	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hisi , relationships between o of determining the dyna	public, physical c roads in the uction and ent of Transport tory of highway directional and mic composition
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted por relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Types of airports, organization, data about airports, legislature, choice notions, movement of aeroplanes, flight and touch - down, assesment for characteristics , ACN / PCN, protective zone, visual aids, traffic processes at the airport, structureof terminals and aprons, proposal airport.	Z or, the designer and the ollutants on characteristic of financing road constru- officials of the Departme on to hydrogen cells, hist , relationships between o of determining the dynai	public, physical c roads in the uction and ent of Transport tory of highway directional and mic composition 2 code, geometric
136YEES Environmental Aspects and Esthetics of Road Structures Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the invester principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted point relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transitic construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of for-oad road design, landscape profile considerations height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Types of airports, organization, data about airports, legislature, choice notions, movement of aeroplanes, flight and touch - down, assesment lor characteristics , ACN / PCN, protective zone, visual aids, traffic processes at the airport, structureof terminals and aprons, proposal airport. 137YDKP Diagnostics of rail transport construction	Z or, the designer and the ollutants on characteristic of financing road constr officials of the Departme on to hydrogen cells, hist , relationships between o of determining the dyna Z ngitude RWY,aerodrome Z	public, physical c roads in the uction and ent of Transport tory of highway directional and mic composition 2 code, geometric 2
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Code of the group: NK20230200_1

Name of the group: Stavební Inženýrství - konstrukce a dopravní stavby, PV p edm ty, 2. semestr Requirement credits in the group: In this group you have to gain at least 4 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 4 Note on the group: 2

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
101YMCD	Methods of Time Discretization Petr Mayer František Bubeník František Bubeník (Gar.)	z	2	1P+1C	L	PV
101YMST	Mathematical statistics for technicians Daniela Jarušková Jana Nosková Daniela Jarušková (Gar.)	Z	2	1P+1C	L	PV
101YNUM	Numerical Methods Ivana Pultarová, Martin Ladecký, Liya Gaynutdinova Ivana Pultarová Ivana Pultarová (Gar.)	Z	2	1P+1C	L	PV
126YBIM	Building Information Modelling - Fundamentals Petr Mat jka, Robert Bouška Robert Bouška Petr Mat jka (Gar.)	Z	2	2C	L	PV
132YDSK	Diagnostics of Building Structures Michal Polák Michal Polák Michal Polák (Gar.)	Z	2	1P+1C	L	PV
132YMCK	Micromechanics of Cement-Based Composites Vít Šmilauer Vít Šmilauer Vít Šmilauer (Gar.)	Z	2	1P+1C	L	PV
132YNAK	Nonlinear Analysis of Materials and Structures Bo ek Patzák, Petr Kabele, Daniel Rypl Daniel Rypl Daniel Rypl (Gar.)	Z	2	1P+1C	L	PV
132YNA2	Numerical Analysis of Structures 2 Bo ek Patzák Bo ek Patzák Bo ek Patzák (Gar.)	Z,ZK	4	2P+1C	L	PV
132YPM2	Computer Analysis of Structures 2 Ji í Máca, Petr Fajman Ji í Máca Petr Fajman (Gar.)	Z	2	1P+1C	L	PV
132YUPM	General Principles of Mechanics Milan Jirásek Milan Jirásek (Gar.)	Z,ZK	4	2P+1C	L	PV
133YATK	Applied Theory of Structures Lukáš Vráblík, Radek Hájek Lukáš Vráblík Lukáš Vráblík (Gar.)	Z,ZK	4	2P+1C	L	PV
133YPMM	Parametric Bridge Design Vladimír P íbramský Vladimír P íbramský (Gar.)	Z	2	2C	L	PV
133YPNB	Fire desgn og concrete and mnsory structures Radek Štefan, Martin Benýšek Radek Štefan Radek Štefan (Gar.)	Z	2	1P+1C	L	PV
133YRZM	Reconstruction and strengthening of bridges Michal Drahorád Michal Drahorád Michal Drahorád (Gar.)	Z	2	1P+1C	L	PV
133YVHB	Ultrahigh Performance Concretes Josef Fládr Josef Fládr Josef Fládr (Gar.)	Z	2	1P+1C	L	PV
134YHNK	Stainless steel and aluminium structures František Wald, B etislav Židlický František Wald František Wald (Gar.)	Z	2	1P+1C	L	PV
134YNDK	Load-bearing timber roof constructions Karel Mikeš Karel Mikeš Karel Mikeš (Gar.)	Z	2	1P+1C	L	PV
134YNSK	Design of Glass Structures Martina Eliášová Martina Eliášová (Gar.)	Z,ZK	2	1P+1C	L	PV
134YPMK	Design of Membrane Structures Svitlana Kalmykova Svitlana Kalmykova Svitlana Kalmykova (Gar.)	Z	2	1P+1C	L	PV
134YPOD	Fire Resistance of Steel and Timber Structures Zden k Sokol Zden k Sokol Zden k Sokol (Gar.)	Z	2	1P+1C	L	PV
134YSOD	Connections of steel and timber structures František Wald, Robert Jára Robert Jára František Wald (Gar.)	Z	2	1P+1C	L	PV
134YSOK	Special steel structures Jakub Dolejš Jakub Dolejš (Gar.)	Z	2	1P+1C	L	PV
135YGEM	Geotechnical monitoring Jan Záleský Jan Záleský Jan Záleský (Gar.)	Z	2	1P+1C	L	PV
135YMPK	Jan Zalesky Jan Zalesky Jan Zalesky (Gal.) Mechanics of underground structures Jan Pruška, Alexandr Butovi , Ji í Barták Alexandr Butovi Jan Pruška (Gar.)	Z	2	1P+1C	L	PV
135YZKS	Soil structures Ivan Vaní ek, Martin Vaní ek Ivan Vaní ek Ivan Vaní ek (Gar.)	Z	2	1P+1C	L	PV
136YMVZ	Pavement mechanics Ludvík Vébr Ludvík Vébr Ludvík Vébr (Gar.)	Z	2	1P+1C	L	PV
136YPPK	Intersection Highway Design Jaromíra Ježková Jaromíra Ježková (Gar.)	KZ	2	2C	L	PV
137YAZS	Project - Progressive application of substructure Vit Lojda Vit Lojda (Gar.)	KZ	2	2C	L	PV
137YEAD	Ecological Aspects of Transport Petra Vá ová, Lenka Lomoz Lenka Lomoz Lenka Lomoz (Gar.)	Z	2	1P+1C	L	PV

Characteristics of the courses of this group of Study Plan: Code=NK20230200_1 Name=Stavební Inženýrství - konstrukce a dopravní stavby, PV p edm ty, 2. semestr

101YMCD	Methods of Time Discretization	Z	2		
The course is devoted to a universal and very effective method for solving problems involving time, the so-called evolutionary problems, especially for partial differential equations with					
a time variable. This method represents a modern approach to modeling and solving engineering tasks. These problems, both linear and non-linear, model events in many engineering					
fields, such as heat con	fields, such as heat conduction, oscillations, also in rheology and other parts.				
101YMST	Mathematical statistics for technicians	Z	2		
Inferential statistics. Theory of probability. Random variables and its characteristics. Basic methods of mathematical statistics.					
101YNUM	Numerical Methods	Z	2		
Numerical computing in applied mathematics: course for beginners.					

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System of roofs structures. Creation of numerical models for assessment of internal forces and deformations for main different roof systems and structures. Analysis of the static function and behaviour of main individual elements and their design. Historic structures and their reconstruction. Designing typical structural details based on carpentry joints. We will discuss also using modern methods of joining elements of timber structures. 134YNSK Design of Glass Structures Z,ZK 2 The subject is intended for students of the master's program Civil Engineering, deepens the knowledge acquired in the subject 134YNKS. Extension of theoretical knowledge in the field of stability of glass beams, columns and walls. Principles of designing structural elements made of glass according to normative documents, experimental verification of material properties of glass, safety glass, use of software support for designing. Z 2 134YPMK Design of Membrane Structures Z 2 2 134YPOD Fire Resistance of Steel and Timber Structures Z 2 2 134YSOK Connections of steel and timber structures Z 2 2 134YSOK Special steel structures Z 2 2 134YSOK Special steel structures Z 2 2 134YSOK Special steel structures Z 2 2 2 Crane supporting structures - actions, design, detailin				2
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The course is a continuation of the course Underground structures and rock mechanics, which is part of the Bachelor's degree programme. The course deepens the knowledge in the field of underground construction and provides practical experience in the design and implementation of underground structures. The student tries out the application of the knowledge	-		7	2
field of underground construction and provides practical experience in the design and implementation of underground structures. The student tries out the application of the knowledge		5	- 1	
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			11	

135YZKS	Soil structures	Z	2
Principles of soil structu	res design		
136YMVZ	Pavement mechanics	Z	2
Rise and development of	f road pavement mechanics, fundamental data for designing, characteristics of traffic load, thermic and water relation of sub	base,load-bearing	g capacity of
subgrade, road paveme	nt materials, pavement design methods - partition, development and possibilities. Stress and transformation analysis on road	d pavement const	ruction and
subgrade, pavement des	sign specificity for different constructional types, road pavements with special loads.		
136YPPK	Intersection Highway Design	KZ	2
Design of interchange.	Based on capacity assessment, evaluation of the most suitable form of interchange and its design processing. Roundabout d	esign.	
137YAZS	Project - Progressive application of substructure	KZ	2
The content of the subje	ict is focused on the presentation of the latest knowledge and results of research and development in the field of railway und	ercarriage, which	have not yet
entered into common pr	actice or the regulatory base in the Czech Republic. It complements and expands students' knowledge from basic subjects 2	201, Z02 and Z03	
137YEAD	Ecological Aspects of Transport	Z	2
Negative impacts of nois	se and vibration on human. Assessment of varied transport noise Acoustic levels. Noise maps. Noise study. Traffic noise char	racteristics of diffe	erent transport
means. Propagation of r	noise. Ways of environment protection before adverse impacts of transport noise (urban, architectural, traffic-organizing, tech	inical).	

Name of the block: Povinn volitelné p edm ty, doporu ení S4 Minimal number of credits of the block: 4 The role of the block: S4

Code of the group: NK20230200_2

Name of the group: Stavební inženýrství - konstrukce a dopravní stavby, diplomový seminá Requirement credits in the group: In this group you have to gain at least 4 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 4

Note on the group:

xxxDISE Diplomový seminář

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
101DISE	Diploma Seminar Jozef Bobok, Jan Lama , Aleš Nekvinda Jozef Bobok Jozef Bobok (Gar.)	Z	4	4C	L	S4
132DISE	Diploma Seminar Martin Horák, Michal Polák, Tornáš Plachý, Ji í Máca, Mat j Lepš, Jan Zernan, Milan Jirásek, Martin Došká, Jan Vorel, Aleš Jíra	Z	4	4C	L	S4
133DISE	Diploma Seminar Lukáš Vráblík Lukáš Vráblík (Gar.)	Z	4	4C	L	S4
134DISE	Diploma Seminar Michal Jandera Pavel Ryjá ek (Gar.)	Z	4	4C		S4
135DISE	Diploma Seminar Jan Pruška	Z	4	4C	L	S4
136DISE	Diploma Seminar Petr Mondschein, Michal Uhlík, Ludvík Vébr, Petr Pánek, Jaromíra Ježková, Karel Fazekas, Jan Hradil, Jan Valentin, Tomáš Havlí ek Petr Mondschein Jaromíra Ježková (Gar.)	Z	4	4C		S4
137DISE	Diploma Seminar Vít Lojda, Leoš Horní ek, Hana Krej i íková, Michal Petýrek, Lenka Lomoz, Ond ej Bret, Martin Lidmila Lenka Lomoz Leoš Horní ek (Gar.)	Z	4	4C	L	S4
210DISE	Diploma Seminar	Z	4	4C		S4
220DISE	Diploma Seminar Ji í Svoboda, Radek Vaší ek, Jaroslav Pacovský Radek Vaší ek Jaroslav Pacovský (Gar.)	Z	4	4C		S4

Characteristics of the courses of this group of Study Plan: Code=NK20230200_2 Name=Stavební inženýrství - konstrukce a dopravní stavby, diplomový seminá

101DISE	Diploma Seminar	Z	4
Please contact your tea	acher or guarantor of this subject.		
132DISE	Diploma Seminar	Z	4
The course precedes the	, ne thesis and prepares students for writing their future thesis. The assignment of the final thesis is always individual based on	the agreement of	the teacher and
the student. The vast m	ajority of assignments are connected with the scientific and research activities of the respective employee. The output of the	solution may be a	a brief research
study of the given prob	lem, experimental activity, programming and others according to the respective assignment.		
133DISE	Diploma Seminar	Z	4
The topic of the assign	ment is individual, mostly related to the expected topic of the Diploma Thesis.		1
134DISE	Diploma Seminar	Z	4
Semestral project of ma	aster study.		•
135DISE	Diploma Seminar	Z	4
Deepening of knowledg	e in the field according to the choice of the assignment as preparation for the Diploma Thesis, study of specialized literature and	knowledge from i	mplementations,
preparation of theoretic	al research and variant solutions, or preparation for the implementation of an experimental program.		
136DISE	Diploma Seminar	Z	4
Preparation of the basic	c documents for the assignment of a master thesis and their processing. Lectures by experts from the practice (road design, co	onstruction techno	logy, information
about new procedures	and software)		

137DISE	Diploma Seminar	Z	4
After agreement with th	e teacher, a preliminary thesis topic is determined. The student should responsibly prepare for the creation of the work itself by	, studying the doc	uments, creating
research, and obtainin	g background materials (e.g. maps). Furthermore, he should determine the outline of the work and master the work with any i	measuring technic	que, etc.
210DISE	Diploma Seminar	Z	4
Preparatory works on o	liploma thesis elaboration. Literature review, study on problematics to be solved - practical cases in geotechnical laboratory and	the Josef underg	round laboratory
(http://ceg.fsv.cvut.cz).			
220DISE	Diploma Seminar	Z	4
Preparatory works on o	liploma thesis elaboration. Literature review, study on problematics to be solved - practical cases in geotechnical laboratory and	the Josef underg	round laboratory
(https://www.stolajosef	.cz).		

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

Code of the group: NK20230300

Name of the group: Stavební Inženýrství - konstrukce a dopravní stavby, diplomová práce Requirement credits in the group: In this group you have to gain at least 30 credits Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 30

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
101DPM	Diploma Thesis Daniela Jarušková, Michal Beneš, Milan Bo ík, Jakub Šolc, Jana Nosková Michal Beneš Daniela Jarušková (Gar.)	Z	30	24C	z	S1
132DPM	Diploma Thesis Bo ek Patzák, Martin Horák, Michal Polák, Tomáš Plachý, Ji í Máca, Karel Pohl, Mat j Lepš, Jan Zeman, Petr Kabele, Aleš Jíra	Z	30	24C	z	S1
133DPM	Diploma Thesis Martin Tipka	Z	30	24C	Z	S1
134DPM	Diploma Thesis Jakub Dolejš Jakub Dolejš (Gar.)	Z	30	24C	Z	S1
135DPM	Diploma Thesis Jan Pruška, Jan Masopust Jan Pruška Jan Pruška (Gar.)	Z	30	24C	Z	S1
136DPM	Diploma Thesis Petr Mondschein Ludvík Vébr (Gar.)	Z	30	24C	Z	S1
137DPM	Diploma Thesis Leoš Horní ek, Hana Krej i íková Lenka Lomoz Leoš Horní ek (Gar.)	Z	30	24C	Z	S1
210DPM	Diploma Thesis Petr Konvalinka, Michal Mára, Jan Zatloukal, Radoslav Sovják, Jind ich Forn sek, Ji í Litoš, Pavel Reiterman, Karel Kolá, Petr Máca Ji í Litoš Ji í Litoš (Gar.)	Z	30	24C	Z	S1
220DPM	Diploma Thesis Ji í Svoboda, Radek Vaší ek, Jaroslav Pacovský Ji í Svoboda Ji í Svoboda (Gar.)	Z	30	24C	Z	S1

Characteristics of the courses of this group of Study Plan: Code=NK20230300 Name=Stavební Inženýrství - konstrukce a dopravní stavby, diplomová práce

101DPM	Diploma Thesis	Z	30
Please contact your tea	acher or guarantor of this subject.	I	I
132DPM	Diploma Thesis	Z	30
In accordance with the	thesis proposal.		
133DPM	Diploma Thesis	Z	30
In accordance with a th	iesis proposal.		
134DPM	Diploma Thesis	Z	30
Design of steel / timber	load bearing building structure according to external requirements in relation to interaction of load bearing and final complet	on structural elen	nents. A study
focused on research of	load bearing structures may be also the topic of the the project. The project is assigned by a final project superisor individua	lly.	
135DPM	Diploma Thesis	Z	30
In the diploma thesis, t	he student deals with a topic chosen by the department from those regularly announced by the department. It addresses, for	example, problem	is related to the
design and constructio	n of geotechnical structures, civil engineering structures, special foundations for industrial, transport, housing and water mana	gement structure	s, earth and rock
structures in complex of	ases and waste disposal structures. The thesis builds on and develops the findings of the thesis project.		
136DPM	Diploma Thesis	Z	30
The assigned topic of d	iploma theses can be a project, traffic surveys, research of selected issues with application in practice for various technical solu	tions of road struc	tures, laboratory
tests to verify the funct	ionality of various materials for pavements, etc. In terms of design, the most common topics of theses are, for example, the de	esign of a new co	nstruction or
reconstruction of a sele	ected section of a road (bypass, flyover), the design of a road network in a selected area of the city, the design of a new const	ruction or reconst	ruction of
intersections, the desig	n of an airport, heliport, etc. In terms of pavement structures and road construction technologies, the most frequent topics of v	work are, for exam	ple, comparison
of different material solu	utions for asphalt or concrete pavements, including the relevant composite materials or input components (binders, aggregates,	etc.), assessment	of the behaviour
of a particular material	or type of structure by laboratory methods, or carrying out simulations, etc.		

137DPM	Diploma Thesis	Z	30
The diploma thesis is the	e final complex work prepared by students at the end of their university studies. The diploma thesis describes the given issue	in a broader con	text, in which the
student demonstrates t	he ability to work independently and an engineering approach. The diploma thesis takes the form of either a project (reconstru	ction of a section	of a railway line,
study of new railway lin	es), a research (processing of an overview in a certain area) or a laboratory (including the execution and evaluation of specifie	ed laboratory tests	s), or a combined
one.			
210DPM	Diploma Thesis	Z	30
Students will get the op	portunity to organize complex process of experimental work from the beginning of production, experimental investigation to c	of the data. Thesis	are designed to
fit scientific and researc	ch activity of the Experimental Centre		
220DPM	Diploma Thesis	Z	30
Diploma thesis elabora	tion with possible use of geotechnical laboratory and underground facility the Josef underground laboratory (http://ceg.fsv.cvu	it.cz).	

List of courses of this pass:

Code	Name of the course	Completion	Credits
101DISE	Diploma Seminar	Z	4
	Please contact your teacher or guarantor of this subject.		
101DPM	Diploma Thesis	Z	30
	Please contact your teacher or guarantor of this subject.		
101NRDR	Numerical Solution of Differential Equations	Z,ZK	4
-	ools of linear algebra (matrix, determinant, Gaussian elimination) are recalled, iterative methods for solving systems of linear algebra	-	
Then, the finite diff	erence method and the finite element method are presented and their applications to problems based on differential equations are s basic methods for solving initial value problems in ordinary differential equations.	hown. Attention is	also paid to
101YMCD	Methods of Time Discretization	Z	2
	ted to a universal and very effective method for solving problems involving time, the so-called evolutionary problems, especially for pa	-	
a time variable. Thi	s method represents a modern approach to modeling and solving engineering tasks. These problems, both linear and non-linear, mod	lel events in many	engineering
	fields, such as heat conduction, oscillations, also in rheology and other parts.		
101YMST	Mathematical statistics for technicians	Z	2
	Inferential statistics. Theory of probability. Random variables and its characteristics. Basic methods of mathematical statistic	s.	
101YNUM	Numerical Methods	Z	2
	Numerical computing in applied mathematics: course for beginners.	•	
102YFPL	Solid State Physics in Civil Engineering	Z	2
Solids, crystal stru	cture, atomic shell theory, valence layer chemical bonds, dislocation disturbances, critical crack energy, vibration of masses, systems	natural frequency	of vibration
and damped vibrat	ion, basics concepts of fracture mechanics, types of fracture, electron microscopes, scanning tunneling microscope, atomic force mic	roscope, diffraction	n, diffraction
	methods, semiconductors, p-n junction, photovoltaic effect, solar cells, heat and moisture transport.		
126YBIM	Building Information Modelling - Fundamentals	Z	2
	Building Information Modeling (BIM) topic as with the modern tool for management and operation of construction projects. It is orien	•	
software (Autodesk	Revit, Autodesk Navisworks) and especially to understanding meaning of BIM in current construction business and its future and im	portance in specif	ic phases of
	construction projects.	_	
132DISE	Diploma Seminar	Z	4
	es the thesis and prepares students for writing their future thesis. The assignment of the final thesis is always individual based on the	-	
the student. The v	ast majority of assignments are connected with the scientific and research activities of the respective employee. The output of the so study of the given problem, experimental activity, programming and others according to the respective assignment.	ution may be a bin	erresearch
132DPM	Diploma Thesis	Z	30
132DFIVI	In accordance with the thesis proposal.	<u> </u>	- 30
132DY02	Dynamics of structures 2	Z,ZK	4
	ing natural and forced vibrations of building structures using the finite element method. Response to wind, earthquake, traffic. Interactions and forced vibrations of building structures using the finite element method.	· ·	
132EANK	Experimental Analysis and Diagnostics K	KZ	4
	sed on monitoring of the amount of climatic loads on building and engineering structures (wind, snow, temperature loads), diagnostic		
	carried out on physical models of building and engineering structures (model similarity laws, seismic simulations on shake tables, wir	-	
	I tests on physical models), monitoring of building and engineering structures, static load tests (building structures, engineering struc		
tests and experim	ental modal analysis (building structures, engineering structures, bridges, footbridges), effects of technical seismicity, evaluation of a	dverse effects of v	ibration on
	the human body, assessment of the influence of building vibrations on installed machines and devices).		
132NAK	Numerical Analysis of Structures	Z,ZK	5
Variational princ	iples of mechanics. Method of weighted residuals, conditions of convergence (continuity, integrity). Principles of FEM. Isoparametric	elements, area coo	ordinates,
-	erical integration. Application of method to selected 1D and 2D problems (Elasticity, heat transfer, consolidation). Algorithmic aspects	of the method.	
132YDDS	Dynamics of Transport Structures	Z	2
-	ne problems of the Dynamics of transport structures (especially of road bridges, railway bridges and footbridges), explanation of experi		
1.	rangement of an experiment "in situ?, monitored parameters, measuring line, modal analysis, the monitoring systems for observation	•	
behaviour and of t	raffic flow characteristics, numerical methods for solving dynamical interaction between building structure and moving load, modelling	g of structures, traf	fic flow and
	pedestrians, dynamical wind effects, practical examples.	Z	<u> </u>
132YDSK	Diagnostics of Building Structures	· /	2
4000/0400/2			
132YMCK	Micromechanics of Cement-Based Composites	Z	2
Cement composite	s form the basis of today's civilization and construction industry; traditional concrete is now the most produced material in the world w	Z ith an average cor	2 sumption of
Cement composite over 1 m3 / person		Z ith an average cor a, creep, shrinkage	2 sumption of e, resistance

	esolution. The subject is supplemented by a whole range of engineering applications on which these methods have been successfully u re structures (arches with cooling, foundation blocks, guide faces of dams), cement concrete highway covers with extended durability, spra	-	-
of Portland cem	ent with calcium sulphide binders, innovative crack-resistant materials, alkali-activated fly ash. Most of the used numerical models have oftware OOFEM, which you can freely use, for example, for your prediction of temperatures during hydration, stress and crack analysi	/e been implemen	ted in the
	reinforcement and boundary conditions.		
132YMMO The course is aime	Modern Methods of Optimization ed at an overview of numerical optimization methods applicable not only in the Civil Engineering area. The emphasis is put more on the in	Z troduction of drivin	2 g principles,
(00)() (0.0	however, practical applications in MATLAB environment are also conducted during exercises.		
132YNA2 Advanced course	Numerical Analysis of Structures 2 on finite element method. Formulation of plate elements suitable for thin and thick plates, plates on elastic foundation. Introduction to no and material nonlinearity, solution methods, implementation aspects.	Z,ZK onlinear problems:	4 geometrical
132YNAK	Nonlinear Analysis of Materials and Structures	Z	2
	he acquainted with the concepts of linear stability and calculation of elastoplastic load capacity. Linear stability - evaluation of the critic	_	I
	res according to the 2nd order theory - equilibrium conditions on a deformed structure, initial stress matrix. Elastoplastic analysis of str		• •
	ibution of internal forces at the limit state - static incremental method, kinematic method. Solving stability and elastoplasticity problems b		
	finite element program.		
132YPM2	Computer Analysis of Structures 2	Z	2
Limit state of frame	es. Stability analysis of structures. Second order theory. Beams and gridwork girders on elastic foundation. Plate and wall structures.	ynamic analysis o	f structures.
	Verification of results.		
132YSEI	Seismic Engineeering	Z	2
	principles of design of earthquake resistant structures. Methods of calculating the response of structures to earthquake loads according	•	
132YSSK The course is dev	Reliability of Structures voted to the reliability of elements and systems. Element reliability is time dependent while the reliability of systems is of type strength	Z load. Complicated	2 cases are
400\/1101/	solved by the FORM method. Two simulation methods are introduced: Monte Carlo and LHS.	7 71/	A
132YUPM Tensors, differen	General Principles of Mechanics tial operators and their application in mechanics, Gauss and Green theorems. General structure of the basic equations of linear and r	Z,ZK nonlinear statics, e	4 nergy and
duality. Principle	of virtual work (power), variational principles (Lagrange, Castigliano, Hellinger-Reissner, Hu-Washizu) and their application to continu	ous and discrete	models of
	beams, frames, plates, walls and three-dimensional bodies.		
133B03K	Concrete Structures 3K	Z,ZK	5
40000414	Improvement of knowlege in the area of pretsressed concrete and selected problems of engineering structures	7 71/	
133B04K Introduction to the	Concrete Structures 4K e detailed issues of design of prestressing of bridge structures, procedures of their computational analysis and the effects of construct the principles of structural generic optimization.	Z,ZK on technology. Intr	4 roduction to
133DISE	Diploma Seminar	Z	4
133DPM	The topic of the assignment is individual, mostly related to the expected topic of the Diploma Thesis. Diploma Thesis	Z	30
	In accordance with a thesis proposal.		
133YATK Detailed introduction	Applied Theory of Structures on to theoretical approaches to the effects of creep and shrinkage on structures. Principles of time-dependent analysis. Methods for the a structures, stability theory.	Z,ZK Inalysis of thin-wall	4 led concrete
133YBEX	Concrete under Extreme Conditions The course is focused on concrete and concrete structures under extreme conditions.	Z	2
133YBM2	Concrete Bridges 2	Z	2
	on of the field of concrete bridges. The technologies of bridge construction represent main part of the study. Specifications of individua		1
133YPMM	Parametric Bridge Design	Z	2
133YPNB	Fire desgn og concrete and mnsory structures	Z	2
The course is focu	sed on fire resistance of concrete and masonry structures: concrete and concrete structures exposed to fire, design rules, thermal and design methods, material properties of concrete and steel reinforcement at high temperatures, fire design of masonry structu		n principles,
133YPRK	Failures and Rehabilitation of Concrete Structures	Z	2
	es on the description of failures of concrete structures, explanation of the causes of these failures and the design of remedial measures of the design of remedial measures of the design of remedial measures of the design of t		
	foundation structures are discussed. The course appropriately combines theoretical approaches with common practice.		
133YRZM	Reconstruction and strengthening of bridges	Z	2
	urse focuses on the assessment of existing concrete and masonry bridges, determination of carrying capacity, design of rehabilitation		
	Ultrahigh Performance Concretes urse is to present a special type of concrete that achieves great strength and high durability, which enables the realization of very thin a		-
	e concrete are presented and the main differences in composition of ordinary concrete and HPC. A large part of the lectures is devote increte, the composition and the method of manufacturing, which are subsequently accompanied by laboratory exercises, where the s theoretical knowledge in practical use.		-
134DISE	Diploma Seminar	Z	4
	Semestral project of master study.		1
134DPM Design of steel /	Diploma Thesis timber load bearing building structure according to external requirements in relation to interaction of load bearing and final completion	Z structural elemen	30 ts. A study
•	cused on research of load bearing structures may be also the topic of the the project. The project is assigned by a final project superis		
134O02K	Steel Structures 2K	Z,ZK	5
	vledge received from courses 133NNK and 134OK01. Amplifying of theoretical knowledge in the field of steel grade selection, toughness	s, global analysis o	
•	ral systems, joint classification, and high strength steel and demanding composite steel and concrete structures. Complementation of l osite structures and detailed design of industrial buildings and crane girders. Design of masts, towers, chimneys, tanks, silos and pipe	lines, technologica	
40400145	pre-stressed steel structures and basis of design from aluminium alloys and stainless steel, and cable and membrane structu		4
134OCM2 Thi	Steel Bridges 2 s course presents advanced information on steel bridge design in the areas of major bridges, fatigue, reconstruction, fabrication and t	Z,ZK pridge erection.	4

134YDKM	Timber structures and bridges	Z	2
Timber structures	focused to national strategy of sustainable development. New timber-based materials. Structural systeme of houses and bridges. Rep design. Production, protection, erection and maintenance. Design and evaluation of bridges, roofs structures in normal temperature	е е	htening. Fire
134YHNK	Stainless steel and aluminium structures	Z	2
	ers two parts: the first concerns design of structures from aluminium alloys, the second deals with stainless steel structures. Structures o	-	
	esigning of aluminium structures. Structures of stainless steel: Evolution of stainless steel materials/structures and examples of realize		
	ctures are described in a detail, including their properties. Dissimilarities in assessments of members under common loadings with re-	-	
	th ultimate and serviceability limit states. In the end the possibilities concerning connections of stainless steel members, erection and members are described.		1
134YNDK	Load-bearing timber roof constructions	Z	2
	ructures. Creation of numerical models for assessment of internal forces and deformations for main different roof systems and structures main individual elements and their design. Historic structures and their reconstruction. Designing typical structural details based on ca		
	also using modern methods of joining elements of timber structures.	i pentry joints. we	
134YNSK	Design of Glass Structures	Z,ZK	2
	tended for students of the master's program Civil Engineering, deepens the knowledge acquired in the subject 134YNKS. Extension o		1
field of stability of	glass beams, columns and walls. Principles of designing structural elements made of glass according to normative documents, exper	imental verification	n of material
	properties of glass, safety glass, use of software support for designing.		
134YPMK	Design of Membrane Structures	Z	2
134YPOD	Fire Resistance of Steel and Timber Structures	Z	2
	The class gives introduction to fire modeling, fire safety and fire resistance of steel, steel-concrete composite and timber structural		
134YROK	Extending the Life of Steel and Timber Structures	Z	2
	bearing structures. Developments in the area of regulations and standardization. Causes of defects, malfunctions, survey of objects, static		
	trengthening, strengthening of steel and timber structures and strengthening of connections. Using of computers in reconstructions ar models.	a development of	numerical
134YSMK	Stability and modelling of steel structures	Z	2
	vers two parts. The first one deals with stability and strength of steel plates, the second one with stability and strengths of steel frame		
	of steel structures are analysed including the importance of imperfections for a design of thin plated structures. Presented are principl		-
	neory of buckling of thin plates. The results are applied to the 4th class cross sections in harmony with Eurocode. Buckling due to norm nbination is analysed in a detail. In the end the application of the results is shown together with design of necessary stiffeners. The second		-
-	bility. Possible global analysis methods are presented together with methods for compression and bending interaction for slender men		
	of lateral torsional buckling are explained including also tapered members.	isoro: in dotail, ope	
134YSOD	Connections of steel and timber structures	Z	2
	The subject allows insight and ability to apply the knowledge related to structural connections and its application by softwar		-
134YSOK	Special steel structures	Z	2
Crane supporting	g structures - actions, design, detailing. Silos - actions, behaviour, silos with rigid and non-rigid section. Masts - division, detiling, desig calculation.	n. Cable roofs - pr	ocedure of
135DISE	Diploma Seminar	Z	4
	Wedge in the field according to the choice of the assignment as preparation for the Diploma Thesis, study of specialized literature and know		1 -
	preparation of theoretical research and variant solutions, or preparation for the implementation of an experimental program	n.	
135DPM	Diploma Thesis	Z	30
	esis, the student deals with a topic chosen by the department from those regularly announced by the department. It addresses, for example, the student deals with a topic chosen by the department from those regularly announced by the department.		
design and constr	uction of geotechnical structures, civil engineering structures, special foundations for industrial, transport, housing and water manager		rth and rock
405057	structures in complex cases and waste disposal structures. The thesis builds on and develops the findings of the thesis proje		
135GET	Geotechnics	Z,ZK	5
Familianzation wit	th specific issues of building foundation, mastering the basic methods of technology of implementation of individual elements and stru of their static assessment.	stures and the use	ormethous
135YGEM	Geotechnical monitoring	Z	2
	ctures and subsoil as a tool for confirmation of assumptions made at the design stage, selection of input data and reliability assurance		1
	of sensors and gathered data for back analyses and modelling of field performance.		
135YGSM	Geotechnical Software for Numerical modelling	Z	2
	Jainted with the Finite Element Method, the currently dominant tool for numerical modeling in Geotechnics. Emphasis is placed on intr		
	Method and their subsequent application to selected problems of Geotechnical Engineering. The course summarises the types of finite	-	-
applications, mate	rial models suitable for the description of soil deformation, and selected specifics associated with numerical modeling in geotechnics. The	is knowledge is fur	ther applied
	in the modeling of foundation, embedded walls, and stability problems.		
135YMPK	Mechanics of underground structures	Z	2
	portinuation of the course Underground structures and rock mechanics, which is part of the Bachelor's degree programme. The course		-
	nd construction and provides practical experience in the design and implementation of underground structures. The student tries out th gained on a simple tunnel project. An integral part of the course is also an excursion to a completed underground construction in		, mowieuge
135YZAL	Basics of mining	Z	2
	s of Quarrying course introduces students to all the essential aspects of aggregate mining, an important part of the national economy, in	1	1
	way. Aggregates extracted and processed in various ways are essential raw materials for most construction industries.		
135YZKS	Soil structures	Z	2
	Principles of soil structures design	н — — — — — — — — — — — — — — — — — — —	ŗ
136DISE	Diploma Seminar	Z	4
	basic documents for the assignment of a master thesis and their processing. Lectures by experts from the practice (road design, const	ruction technology,	, information
	about new procedures and software)		
136DPM	Diploma Thesis	Z	30
	c of diploma theses can be a project, traffic surveys, research of selected issues with application in practice for various technical solution		
-	e functionality of various materials for pavements, etc. In terms of design, the most common topics of theses are, for example, the design the design of the set of t	-	
	of a selected section of a road (bypass, flyover), the design of a road network in a selected area of the city, the design of a new const		
intersections, the	design of an airport, heliport, etc. In terms of pavement structures and road construction technologies, the most frequent topics of worl	are, for example,	comparison

of different material solutions for asphalt or concrete pavements, including the relevant composite materials or input components (binders, aggregates, etc.), assessment of the behaviour of a particular material or type of structure by laboratory methods, or carrying out simulations, etc.

136S03K Road construction 3D Z,ZK Introduction to urban engineering, solutions in built-up areas - reconstruction. Parking - solution methods, technical parameters and requirements, garages. Bus stations and buy Public mass transport and its preferences. Pedestrian and bioycle traffic. Taffic signs. Adaptations for the bill and parkially sighted, barrier-free adaptations. Utilities. 136YEES Environmental Aspects and Esthetics of Road Structures Z Terminology of evironmental terms, Laws 114/1991 and 100/2000. Detailed description of the EIA process from the point of view of the investor, the designer and the public, pinciples of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic. Instorical development of emitted pollutants on characteristic roads relationship between increasing traffic intensity and decreasing emissions from better-quality whicles, animal migration and its reasons, ways of financing road construction advartages and risks transition to lectric cars, technical, economic and environmental adaptions. To bydrogen cells, history of 1 and Construction, advartages and risks transition to lectric cars, technical, economic and environmental and incomposition in the data. Z 136YLET Time Construction, data about airports, legistature, choice notions, movement of aeroplanes, fight and touch - dwn, assesment longitude RWY.aerodrome code, gr characteristics of ACN / PCN, protective zone, visual alds, traffic processes at the airport, structure of ternials and aprons, proposal airport. 136YLET Natacteristics of indicase transformation and subus for adveement construction advartages and inskesits on cada pavement mecha
Introduction to urban engineering, solutions in built-up areas - reconstruction. Parking - solution methods, technical parameters and requirements, garages. Bus stations and bus Public mass transport and its preferences. Pedestrian and bicycle traffic. Traffic signs. Adaptations for the blind and partially sighted, barrier-free adaptations. Utilities. 136YEES Environmental Aspects and Esthetics of Road Structures Z reminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the ELA process from the point of view of the investor, the designer and the public, principles of acoustics, noise from traffic and anit-noise measures, emissions and immissions from traffic, historical development of emitted pollutants on characteristic road/ relationships between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways of financing road construction maintenance according to categories and risks rasingtion to electric cars, technical, economic and environmental aspects and risks, rasingto to target of the Department of Tradition advantage and risks, fusion of the voltage of environmental aspects and risks, rasington to electric structures of off-road road design, landscape profile considerations, relationships between directio height profile, most common mistakes in proposale, risks of ill-advised acceptance of data from CRNV for transport ex numbers, the principle of determining the dynamic com of the voltage and risk rasingtis (advised acceptance of data from CRNV for transport ex numbers, the principle of determining the dynamic com of the voltage and risk, respirate and explores, proposal airport. 136YLET Airports Z Z Z Z Z Z Z Z
Public mass transport and its preferences. Pedestrian and bicycle traffic. Traffic signs. Adaptations for the blind and partially sighted, barrier-free adaptations. Utilities. 136YEES Environmental Aspects and Esthetics of Road Structures Z principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted pollutants on characteristic roads relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, completence of mayors, councils, councils and officials of the Department of T and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transition to hydrogen cells, history of the onstruction, advantages and risks in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of determining the dynamic comor of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Z
Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the investor, the designer and the public, principles of acoustics, noise from traffic haits and anti-noise measures, emissions and immissions from thetr-quality vehicles, animal migration and its reasons, ways of financing road construction maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and officials of the Department of Tr and Construction in the Czech Republic, basis of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations, relationships between directio height profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of determining the dynamic com of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Z Types of airports, organization, data about airports, legislature, choice notions, movement of aeroplanes, flight and touch - down, assessment longitude RWY, aerodrome code, gr characteristics a, ACN / PCN, protective zone, visual aids, traffic processes at the airport, structureof terminals and aprons, proposal airport. 136YLPK Pavement mechanics Z Rise and development of road pavement mechanics, fundamental data for designing, characteristics of traffic load, thermic and water relation of subbase, load-bearing capa subgrade, road pavement meterials, pavement design specificity for different constructional types, road pavements with special loads. 136YPPK Intersection Highway Design KZ 136YDPK Intersection Highway Design
Terminology of evironmental terms, Laws 114/1991 and 100/2000, Detailed description of the EIA process from the point of view of the investor, the designer and the public, principles of acoustics, noise from traffic and anti-noise measures, emissions from thetr-quality vehicles, animal migration and its reasons, ways of financing road construction maintenance according to categories and owners, functioning of municipal and city authorities, competence of mayors, councils, councils and officials of the Department of Tr and Construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations, relationships between directio construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations, relationships between directio eight profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRWV for transport ex numbers, the principle of determining the dynamic com of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Z
principles of acoustics, noise from traffic and anti-noise measures, emissions and immissions from traffic, historical development of emitted pollutants on characteristic roads relationship between increasing traffic intensity and decreasing emissions from better-quality vehicles, animal migration and its reasons, ways of financing road construction and construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transition to hydrogen cells, history of a construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations, relationships between directio height profile, most common mistakes in proposal, risks of ill-advied acceptance of data from CRWV for transport ex numbers, the principle of determining the dynamic comor of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports Z Types of airports, organization, data about airports, legislature, choice notions, movement of aeroplanes, flight and touch - down, assessment longitude RWY,aerodrome code, go characteristics , ACN / PCN, protective zone, visual aids, traffic processes at the airport, structured terminals and aprons, proposal airport. 136YMVZ Pavement mechanics Z Rise and development of road pavement mechanics, fundamental data for designing, characteristics of traffic load, thermic and water relation of subbase.Joad-bearing caps subgrade, road pavement methad- spariting, development and possibilities. Stress and transformation analysis on road pavement construction subgrade, pavement design specificity for different constructional types, road pavements with special loads. Image: Stressen: Stressen: Stressen: Stressen: Stressen: Stressen: Stressen: Stresse
o urden engineering, soutions in built-up areas - reconstruction. Parking - solution methods, technical parameters and requiremeng, garages. Bus statures of the mass transport and its preferences. Predestrian and block ter files. Tardic signs. Adaptations for the bind and parking signed, barrier free adaptations. Dilling in a soution method is the solution dentilated pollutions on characteristic cost parking is and fast transition to description of the EA process from the point of view of the investor, the designer and the public, according to calcyring and decremany and decremany and the investor in the Department of acoustics, noise and missions from transition, solutions, concluster of entitide pollutions on characteristic cost parkets councils, and fasts at the Department of the calcording to calcyring and a diversity and expects and risks, transition to hydrogen cells, history of innexity and decremany and acceptance of data from CRMV for transport ex numbers, the principe is between directing, experison static and symmetric composition in the data.
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and Construction, advantages and risks transition to electric cars, technical, economic and environmental aspects and risks, issues of transition to hydrogen cells, history of f construction in the Czech Republic, basics of automobile traffic modeling, aesthetics of off-road road design, landscape profile considerations, relationships between directio neight profile, most common mistakes in proposals, risks of ill-advised acceptance of data from CRMV for transport ex numbers, the principle of determining the dynamic com- of the vehicle fleet, the differences between static and dynamic composition in the data. 136YLET Airports, organization, data about airports, legislature, choice notions, movement of acroplanes, flight and touch - down, assesment longitude RWY,aerodrome code, ge characteristics , ACN / PCN, protective zone, visual aids, traffic processes at the airport, structureof terminals and aprons, proposal airport. 136YMVZ Pavement mechanics Rise and development of road pavement mechanics, fundamental data for designing, characteristics of traffic load, thermic and water relation of subbase,load-bearing capa subgrade, road pavement materials, pavement design specificity for different constructional types, road pavements with special loads. 136YPPK Intersection Highway Design KZ After agreement with the teacher, a preliminary thesis topic is determined. The student should responsibly prepare for the creation of the work with any measuring technique, 137DPM Diploma Thesis The diploma thesis is the final complex work prepared by students at the end of their university studies. The diploma thesis describes the give insue in a broader context, in w student demonstrates the ability to work independently and an engineering approach. The diploma thesis describes the give insue in a broader context, in w student demonstrates the ability to work independently and an engineering approach. The diploma thesis describes the give insue in a broader context, in w student demonstrates the ability to wo
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of the vehicle fleet, the differences between static and dynamic composition in the data. Z 136YLET Airports Z Image: Comparization of the presentence of the explanation of the presentence of the explore of the
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