

Study plan

Name of study plan: DS nav.prez.19/20 (pro obor DS)

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Transportation Systems and Technology

Garantor of the study branch: doc. Ing. Jiří arský, Ph.D.

Program of study: Technology in Transportation and Telecommunications

Type of study: Follow-up master full-time

Required credits: 100

Elective courses credits: 20

Sum of credits in the plan: 120

Note on the plan:

Name of the block: Semestrální projekt

Minimal number of credits of the block: 13

The role of the block: ZP

Code of the group: XN1-4 14/15

Name of the group: Projekty nav.prez.1.-4.sem (obory DS, LA, PL+ [BT])

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

Requirement courses in the group: In this group you have to complete 4 courses

Credits in the group: 13

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
11XN1	Master Project 1 Magdalena Hykšová Ivan Nagy	Z	2	0P+2C	Z	ZP
12XN1	Master Project 1 Zuzana arská, Jiří arský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura,	Z	2	0P+2C	Z	ZP
14XN1	Master Project 1 Jana Kaliková, Jan Král, Martin Šrotý, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler Jana Kaliková (Gar.)	Z	2	0P+2C	Z	ZP
15XN1	Master Project 1 Jan Feit, Eva Rezlerová	Z	2	0P+2C	Z	ZP
16XN1	Master Project 1 Adam Orlický, Josef Mík, Dmitry Rozhdestvenskiy, Pěmysl Toman	Z	2	0P+2C	Z	ZP
17XN1	Master Project 1 Václav Baroch, Edvard Bežina, Michal Drábek, Alexandra Dvořáková, Veronika Faifrová, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová,	Z	2	0P+2C	Z	ZP
18XN1	Master Project 1 Petr Zlámal, Petr Koudelka, Tomáš Fíla	Z	2	0P+2C	Z	ZP
20XN1	Master Project 1 Jiří Růžička, Patrik Horažovský, Vladimír Faltus, Petr Bureš, Milan Sliacky, Martin Langr	Z	2	0P+2C	Z	ZP
21XN1	Master Project 1	Z	2	0P+2C	Z	ZP
22XN1	Master Project 1 Michal Frydryn, Karel Kocián, Tomáš Míunek, Luboš Nouzovský, Zdeněk Svatý	Z	2	0P+2C	Z	ZP
23XN1	Master Project 1	Z	2	0P+2C	Z	ZP
11XN2	Master Project 2 Ivan Nagy	Z	2	0P+2C	L	ZP
12XN2	Master Project 2 Zuzana arská, Jiří arský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura,	Z	2	0P+2C	L	ZP
14XN2	Master Project 2 Jana Kaliková, Jan Král, Martin Šrotý, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler	Z	2	0P+2C	L	ZP
15XN2	Master Project 2 Eva Rezlerová	Z	2	0P+2C	L	ZP

16XN2	Master Project 2 <i>Adam Orlický, Josef Mík</i>	Z	2	0P+2C	L	ZP
17XN2	Master Project 2 <i>Václav Baroch, Edvard Bezina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, Denisa Mocková,</i>	Z	2	0P+2C	L	ZP
18XN2	Master Project 2	Z	2	0P+2C	L	ZP
20XN2	Master Project 2	Z	2	0P+2C	L	ZP
21XN2	Master Project 2 <i>Peter Vittek, Lenka Hanáková, Vladimír Socha, Jakub Kraus, Stanislav Pleninger, Jakub Hospodka, Andrej Lališ, Slobodan Stojić, Markéta Šedivá Kalková,</i>	Z	2	0P+2C	L	ZP
22XN2	Master Project 2 <i>Michal Frydryn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý</i>	Z	2	0P+2C	L	ZP
23XN2	Master Project 2	Z	2	0P+2C	L	ZP
11XN3	Master Project 3	Z	1	0P+4C	Z	ZP
12XN3	Master Project 3 <i>Zuzana Arská, Jiří Arský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura,</i>	Z	1	0P+4C	Z	ZP
14XN3	Master Project 3 <i>Jana Kaliková</i>	Z	1	0P+4C	Z	ZP
15XN3	Master Project 3 <i>Jan Feit, Eva Rezlerová</i>	Z	1	0P+4C	Z	ZP
16XN3	Master Project 3 <i>Adam Orlický, Josef Mík</i>	Z	1	0P+4C	Z	ZP
17XN3	Master Project 3 <i>Václav Baroch, Edvard Bezina, Michal Drábek, Alexandra Dvořáková, Veronika Fajfrová, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová,</i>	Z	1	0P+4C	Z	ZP
18XN3	Master Project 3 <i>Daniel Kytý</i>	Z	1	0P+4C	Z	ZP
20XN3	Master Project 3 <i>Milan Sliacky</i>	Z	1	0P+4C	Z	ZP
21XN3	Master Project 3	Z	1	0P+4C	Z	ZP
22XN3	Master Project 3 <i>Michal Frydryn, Karel Kocián, Tomáš Mišuněk, Luboš Nouzovský, Zdeněk Svátý</i>	Z	1	0P+4C	Z	ZP
23XN3	Master Project 3	Z	1	0P+4C	Z	ZP
11XN4	Master Project 4	Z	8	0P+4C	L	ZP
12XN4	Master Project 4 <i>Zuzana Arská, Jiří Arský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura,</i>	Z	8	0P+4C	L	ZP
14XN4	Master Project 4 <i>Jana Kaliková, Jan Král, Martin Šrotý, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler</i>	Z	8	0P+4C	L	ZP
15XN4	Master Project 4 <i>Eva Rezlerová</i>	Z	8	0P+4C	L	ZP
16XN4	Master Project 4 <i>Adam Orlický, Josef Mík, Přemysl Toman, Milan Sliacky</i>	Z	8	0P+4C	L	ZP
17XN4	Master Project 4 <i>Václav Baroch, Edvard Bezina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, Denisa Mocková,</i>	Z	8	0P+4C	L	ZP
18XN4	Master Project 4 <i>Petr Zlámal, Petr Koudelka, Daniel Kytý</i>	Z	8	0P+4C	L	ZP
20XN4	Master Project 4 <i>Jiří Růžička</i>	Z	8	0P+4C	L	ZP
21XN4	Master Project 4 <i>Petr Bureš, Peter Vittek, Lenka Hanáková, Vladimír Socha, Jakub Kraus, Stanislav Pleninger, Jakub Hospodka, Andrej Lališ, Slobodan Stojić,</i>	Z	8	0P+4C	L	ZP
22XN4	Master Project 4 <i>Michal Frydryn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý</i>	Z	8	0P+4C	L	ZP
23XN4	Master Project 4	Z	8	0P+4C	L	ZP

Characteristics of the courses of this group of Study Plan: Code=XN1-4 14/15 Name=Projekty nav.prez.1.-4.sem (obory DS, LA, PL+ [BT])

11XN1	Master Project 1	Z	2
12XN1	Master Project 1	Z	2
14XN1	Master Project 1	Z	2
15XN1	Master Project 1	Z	2
16XN1	Master Project 1	Z	2
17XN1	Master Project 1	Z	2
18XN1	Master Project 1	Z	2
20XN1	Master Project 1	Z	2
21XN1	Master Project 1	Z	2
22XN1	Master Project 1	Z	2
23XN1	Master Project 1	Z	2

11XN2	Master Project 2	Z	2
12XN2	Master Project 2	Z	2
14XN2	Master Project 2	Z	2
15XN2	Master Project 2	Z	2
16XN2	Master Project 2	Z	2
17XN2	Master Project 2	Z	2
18XN2	Master Project 2	Z	2
20XN2	Master Project 2	Z	2
21XN2	Master Project 2	Z	2
22XN2	Master Project 2	Z	2
23XN2	Master Project 2	Z	2
11XN3	Master Project 3	Z	1
12XN3	Master Project 3	Z	1
14XN3	Master Project 3	Z	1
15XN3	Master Project 3	Z	1
16XN3	Master Project 3	Z	1
17XN3	Master Project 3	Z	1
18XN3	Master Project 3	Z	1
20XN3	Master Project 3	Z	1
21XN3	Master Project 3	Z	1
22XN3	Master Project 3	Z	1
23XN3	Master Project 3	Z	1
11XN4	Master Project 4	Z	8
12XN4	Master Project 4	Z	8
14XN4	Master Project 4	Z	8
15XN4	Master Project 4	Z	8
16XN4	Master Project 4	Z	8
17XN4	Master Project 4	Z	8
18XN4	Master Project 4	Z	8
20XN4	Master Project 4	Z	8
21XN4	Master Project 4	Z	8
22XN4	Master Project 4	Z	8
23XN4	Master Project 4	Z	8

Name of the block: Compulsory courses

Minimal number of credits of the block: 73

The role of the block: Z

Code of the group: 1.S.NPDS 19/20

Name of the group: 1.sem.nav.prez.DS od 19/20

Requirement credits in the group: In this group you have to gain 26 credits

Requirement courses in the group: In this group you have to complete 9 courses

Credits in the group: 26

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
12IKOD	Rail Transport Infrastructure <i>Ondřej Trešl, Lukáš Týfa</i>	Z,ZK	5	3P+2C	Z	z
12TKV	The Theory of Pavement Layers in Highway Engineering <i>Otakar Vacín</i>	Z,ZK	3	2P+1C	Z	z
17TZE	Technology of Railway Transport <i>Vít Janoš, Zdeněk Michl</i>	ZK	2	2P+0C	Z	z
18GES	Geomechanics and Foundation Engineering <i>Jan Masopust, Jan Masopust, Taana Holoušová, Jan Masopust (Gar.)</i>	Z,ZK	4	2P+1C	Z	z
18TIK	Theory of Engineering Structures <i>Petr Zlámal, Petr Koudelka, Ondřej Jiroušek, Michaela Neuhäuserová, Michaela Neuhäuserová, Marcel Adorna</i>	Z,ZK	4	2P+1C	Z	z
14GISS	Geographical Information Systems <i>Veronika Vlčková</i>	KZ	2	0P+2C	Z	z
22SKM	Vehicle Kinematic Modelling and Simulation <i>Michal Frydřín, Drahomír Schmidt</i>	KZ	2	0P+2C	Z	z
12DZP	Transport and Environment <i>Kristýna Neubergová</i>	Z	2	2P+0C	Z	z

15J2A1	Language - English 1 <i>Jan Feit, Eva Rezlerová, Klára Lancová, Lenka Monková, Marie Michlová, Jitka He manová, Dana Boušová, Barbora Horáková, Peter Morpuss, Jitka He manová (Gar.)</i>	Z	2	0P+2C+10B	Z	Z
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Characteristics of the courses of this group of Study Plan: Code=1.S.NPDS 19/20 Name=1.sem.nav.prez.DS od 19/20

12IKOD	Rail Transport Infrastructure	Z,ZK	5	Non-compensated lateral acceleration, Parameters education for transition curve and cant transition, curves without straight, track spacing change. Railway, subway and tramway track detailed construction. Continuous welded rail theory. Substructure, slab track. Tram-train. Interoperability. Noise precautions. Railway lines rationalisation, dispositional layout of operating points trackages, passenger buildings and forecourts. Sidings, terminals.
12TKV	The Theory of Pavement Layers in Highway Engineering	Z,ZK	3	Function of transportations in highway engineering - material aspects of roads and highways. The course covers evolution of highway engineering since the beginning of the 20th century with the emphasis of material aspects.
17TZE	Technology of Railway Transport	ZK	2	Track line capacity assesment, model operational situation with a system running time between IPT-nodes, calculation of traction energy savings compared with infrastructure costs for designing of fleeting crossing station, solving of capacity problem and blocking time in relation to train protection system, robustness of timetable, system concept of freight train paths, guidelines for centralised operational traffic control and management.
18GES	Geomechanics and Foundation Engineering	Z,ZK	4	Basic soil behaviour, water flow in the soil, basic of the soil mechanic, mechanic of the soil mass, stress in the soil, landslide and their rehabilitation, mechanics of the rock mass, type of the foundations and their design, abutment walls, breast walls, sheeting structures, improvement of the soil, modern method of the subsoil bearing capacity and slope stability improvement (geotextile, geogrids, anchored prefabricated elements), EN 1997-2.
18TIK	Theory of Engineering Structures	Z,ZK	4	The course builds upon the knowledge gained in basic mechanics courses in bachelor study (especially Statics and Elasticity) in the field of mathematical theory of elasticity. Emphasis is placed on plane and axisymmetric problems, as well as on the calculation of stress and strain in plates and shells. Students are further acquainted with methods of modeling the behavior of subsoil used in the design of line structures.
14GISS	Geographical Information Systems	KZ	2	Construction of saving format of space-oriented information land-survey and cartography minimum basic tasks of spatial operations principles of territorial identification
22SKM	Vehicle Kinematic Modelling and Simulation	KZ	2	Principles and possibilities of simulation tools with regards to vehicle movement analysis and vehicle crash analysis. Kinematic modelling of vehicle / vehicle train movement. View conditions. Proposed road space passage.
12DZP	Transport and Environment	Z	2	This course aims the impact of transport on environment. The accent is put mainly on noise and vibration, emission, barrier effect and energy demands. The noise measury is part and parcel of this course.
15J2A1	Language - English 1	Z	2	Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.

Code of the group: 2.S.NPDS 17/18

Name of the group: 2.sem.nav.prez.DS (od)17/18

Requirement credits in the group: In this group you have to gain 21 credits

Requirement courses in the group: In this group you have to complete 7 courses

Credits in the group: 21

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11THRO	Queuing Theory <i>Šárka Voráková Šárka Voráková Šárka Voráková (Gar.)</i>	ZK	2	2P+0C+8B	L	Z
12NAP	Design and Operation of Traffic Engineering Facilities <i>Otakar Vacin</i>	Z,ZK	6	3P+2C	L	Z
16PDP	Principles of Vehicle Design <i>P emysl Toman, Jaroslav Machan</i>	ZK	2	2P+0C+8B	L	Z
18TAM	Theoretical and Applied Mechanics <i>Ond ej Jiroušek</i>	ZK	2	2P+0C	L	Z
22AMMD	Measuring Methods Applied to Transportation <i>Michal Frydryn, Tomáš Mi unek, Luboš Nouzovský, Zden k Svatý, Drahomír Schmidt</i>	KZ	4	1P+3C	L	Z
14DSIM	Traffic Microsimulation <i>Jan Kr ál</i>	Z	3	0P+2C	L	Z
15JBA2	Language - English 2 <i>Jan Feit, Eva Rezlerová, Lenka Monková, Marie Michlová, Jitka He manová, Dana Boušová, Barbora Horáková, Peter Morpuss, Markéta Olehlová,</i>	Z	2	0P+2C+10B	L	Z

Characteristics of the courses of this group of Study Plan: Code=2.S.NPDS 17/18 Name=2.sem.nav.prez.DS (od)17/18

11THRO	Queuing Theory	ZK	2	Discrete event process, definition, random distribution, and probability. Basic processes, process of revitalisation. Markov process, Markov models, Kendall classification, model M/M/1, models M/M/n. Non-markovian models, model M/C/n, models G/G/n. Models with continuous flow. Service net, examples of Petri net. Computer simulation.
12NAP	Design and Operation of Traffic Engineering Facilities	Z,ZK	6	Past and present of the tunnel construction and design, technological systems at bridges and tunnels and its design, traffic and safety system, risk analysis,bridges and tunnels operation, durability of facilities.

16PDP	Principles of Vehicle Design	ZK	2
Design of transportation vehicle according to its usage and function. Marketing and user demands. Vehicle dynamics. Propulsion systems. Design process, functional design and vehicle structure. Evaluation of variant concepts. Design phases. Reliability, technological aspects etc.			
18TAM	Theoretical and Applied Mechanics	ZK	2
Fundamentals of theory of plasticity. Plasticity conditions. Elastoplastic and plastic state of body. Reliability and durability of structures. The stress and strain state around the notch. Stress intensity factor. Fracture toughness. Energy methods of linear fracture mechanics. Crack driving force. Opening the crack. Fatigue properties of the material. Fatigue process. Dimensioning of fatigue.			
22AMMD	Measuring Methods Applied to Transportation	KZ	4
Geodetic location and technical processing of traffic route with geodetic total station, GPS and photogrammetry, 3D scanning. Transport corridor setting out using geodetic methods. Detection and technical processing of several vehicle dynamic characteristics using high-speed cameras and accelerometers. It is a week course and the terms are usually set in June and September - usually in examination period.			
14DSIM	Traffic Microsimulation	Z	3
Basic overview of traffic microsimulation models. Introduction to the working environment application. Project processing microsimulation model in urban area - creating a transport network, capacity assessment of level intersections, light coordination of level intersections, creating a network of public transport, parking lots, pedestrian and bicycle paths.			
15JBA2	Language - English 2	Z	2
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.			

Code of the group: 2.S.NPDS VÝB R 17/18

Name of the group: 2.sem.nav.prez.DS výb r p edm tu (od) 17/18

Requirement credits in the group: In this group you have to gain 3 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 3

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
12DOUP	Transport and Land - Use Planning Dagmar Koárková, Václav Novotný	Z,ZK	3	1P+2C	L	z
17MGD	Management of Transport Systems Zdeněk íha	Z,ZK	3	2P+1C+8B	L	z

Characteristics of the courses of this group of Study Plan: Code=2.S.NPDS VÝB R 17/18 Name=2.sem.nav.prez.DS výb r p edm tu (od) 17/18

12DOUP	Transport and Land - Use Planning	Z,ZK	3
Explanation of fundamental relation and connection between transport and territory, fundamentals of traffic layout. Land - use planning. Influence of traffic on area and shape of town, solving principles of different transport modes including pedestrian traffic and cycling transport. Traffic calming, parking. Complex transport study.			
17MGD	Management of Transport Systems	Z,ZK	3
Functions, processes and systems of management in transport, organisational structures, strategy, social responsibility, soft skills.			

Code of the group: 3.S.NPDS 19/20

Name of the group: 3.sem.nav.prez.obor DS od 19/20 (N3710)

Requirement credits in the group: In this group you have to gain 23 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 23

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
11STS	Stochastic Systems Šárka Jozová, Ivan Nagy, Pavla Pecherková, Evženie Uglickich	Z,ZK	4	2P+2C+14B	Z	z
12IDOS	Integrated Transport Systems Petr Chmela, Martin Jareš	ZK	3	2P+0C	Z	z
12TEPR	Theory of Road Traffic Operation Zuzana arská, Jiří arský, Vladimír Faltus	Z,ZK	8	4P+2C	Z	z
20DTEL	Road's Traffic Telematics Vladimír Faltus	ZK	4	2P+0C	Z	z
12BA	Road Safety Audit Josef Kocourek, Tomáš Padílek, Karel Kocián	KZ	2	2P+0C	Z	z
15JBA3	Language - English 3 Jan Feit, Eva Režlerová, Klára Lancová, Lenka Monková, Marie Michlová, Jiřka Heřmanová, Dana Bouřová, Barbora Horáková, Peter Morpuss,	Z	2	0P+2C+10B	Z	z

Characteristics of the courses of this group of Study Plan: Code=3.S.NPDS 19/20 Name=3.sem.nav.prez.obor DS od 19/20 (N3710)

11STS	Stochastic Systems	Z,ZK	4
The subject deals with the problems of mathematical modelling of dynamical systems, estimation of these models and their utilization for prediction. The results are illustrated on practical transportation tasks. Mathematical theory roots from probability and mathematical statistics and they use the methods of the Bayesian probabilistic approach.			
12IDOS	Integrated Transport Systems	ZK	3
Reasons for building of integrated transport systems, principle of integration, dividing of integration methods, traffic, infrastructure, technical, organizational methods, integration of tariff, sales systems, information systems, marketing of system, examples of non-integration.			
12TEPR	Theory of Road Traffic Operation	Z,ZK	8
Basic transport parameters and their measurement, traffic sensors. The concept of capacity analysis. Theoretical foundations and application of simulation models, macroscopic and statistical models. Theory of traffic management of intersections, urban areas and highways. Green Wave and priority of public transport. Identification and management of accidents. Principles and methods of evaluation of roads maintenance.			
20DTEL	Road's Traffic Telematics	ZK	4
Traffic management in cities and on highways, information and navigation systems, electronic fee collection, safe and intelligent vehicle and safety systems.			
12BA	Road Safety Audit	KZ	2
Schedules of applications of safety assessments during the process of preparations, and of the particular realization of the road network that should minimize traffic accident risks for all those who take part in road traffic. Road safety survey. Application of European Directive 2008/96/EC on road safety infrastructure management.			
15JBA3	Language - English 3	Z	2
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.			

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 6

The role of the block: PV

Code of the group: Y2-NP 19/20

Name of the group: PVP nav.prez.(obory DS, LA) 19/20

Requirement credits in the group: In this group you have to gain 6 credits

Requirement courses in the group: In this group you have to complete 3 courses

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
17Y2AM	Application of Marketing Tools in Transportation <i>Petra Skolilová</i>	KZ	2	2P+0C	L	PV
12Y2BM	Safety on The Local Roads	KZ	2	2P+0C	Z	PV
23Y2BP	Security Class	KZ	2	2P+0C	Z	PV
21Y2BS	Unmanned aircraft systems 2Bezpilotní systémy 2 <i>Jakub Kraus, Šárka Hulínská, Ladislav Keller, Adam Kleczatský, Stanislav Kušmírek</i>	KZ	2	2P+0C	L	PV
14Y2C1	CATIA I	KZ	2	2P+0C	L	PV
14Y2C2	CATIA II	KZ	2	2P+0C	Z	PV
14Y2CS	Sensitivity of Systems	KZ	2	2P+0C	L	PV
15Y2DN	Transportation Psychology in German Speaking Countries	KZ	2	2P+0C	L	PV
18Y2DC	Dynamics of Transport Routes and Vehicles	KZ	2	2P+0C	Z	PV
17Y2FM	Financing in Urban Mass Transportation	KZ	2	2P+0C	Z	PV
11Y2FX	Functions of Complex Variable	KZ	2	2P+0C	Z	PV
23Y2FB	Physics for Security Branches	KZ	2	2P+0C	Z	PV
18Y2FZ	Physical Basis of Materials' Properties <i>Jaroslav Valach</i>	KZ	2	2P+0C	L	PV
15Y2HS	Road Transport History <i>Zuzana arská</i>	KZ	2	2P+0C	L	PV
16Y2HP	Vehicle Hygiene <i>Jiří First</i>	KZ	2	2P+0C	L	PV
14Y2IS	Intelligent Systems in Postal Services	KZ	2	2P+0C	L	PV
12Y2IS	Urban Networks	KZ	2	2P+0C	Z	PV
14Y2JM	One-Chip Controllers	KZ	2	2P+0C	Z	PV
15Y2JH	Job Hunting in English <i>Jan Feit, Eva Rezlerová, Lenka Monková</i>	KZ	2	2P+0C	Z	PV
14Y2KI	Capital Investment in Transportation and Telecommunications <i>Mária Jánešová</i>	KZ	2	2P+0C	L	PV
16Y2KV	Car Body Design <i>Josef Mík, Jiří First</i>	KZ	2	2P+0C	L	PV

12Y2KS	Rail Transport in Settlements and Regions <i>Miroslav Veliš</i>	KZ	2	2P+0C	Z	PV
12Y2KE	Landscape Ecology <i>Kristýna Neubergová</i>	KZ	2	2P+0C	Z	PV
21Y2LS	Air Traffic Services <i>Jiří Šála, Marek Štumper</i>	KZ	2	2P+0C	L	PV
11Y2LG	Logics of Engineer's Judgement	KZ	2	2P+0C	L	PV
15Y2MS	Sociology for Managers <i>Jan Feit, Eva Rezlerová</i>	KZ	2	2P+0C	Z	PV
18Y2MP	Finite Element Method And Its Application <i>Ondřej Jiroušek</i>	KZ	2	2P+0C	L	PV
16Y2MK	Quality Methods for Vehicles <i>Přemysl Toman, Jaroslav Machan</i>	KZ	2	2P+0C	L	PV
12Y2MD	Methods of Traffic Regulation and Prediction <i>Zuzana arská</i>	KZ	2	2P+0C	L	PV
17Y2MO	International Organisations in Transportation	KZ	2	2P+0C	L	PV
17Y2MS	Microsimulation of Railway Operation	KZ	2	2P+0C	Z	PV
21Y2MS	Aerospace Engineering Simulation and Modelling	KZ	2	2P+0C	Z	PV
12Y2MZ	Modernization of Railway Lines and Stations <i>Miroslav Veliš</i>	KZ	2	2P+0C	L	PV
12Y2MH	Measurement and Modeling of Traffic Noise	KZ	2	2P+0C	L	PV
14Y2OP	Object Oriented Programming in Transport	KZ	2	2P+0C	L	PV
15Y2OZ	Health Protection in Transportation and EU <i>Jan Feit, Eva Rezlerová, Petr Musil</i>	KZ	2	2P+0C	Z	PV
15Y2OF	Specialised French for Transportation and Telecommunications	KZ	2	2P+0C	Z	PV
15Y2PT	Food in Transportation <i>Jan Feit, Eva Rezlerová, Petr Musil</i>	KZ	2	2P+0C	L	PV
16Y2PG	Computer Graphics and Virtual Reality	KZ	2	2P+0C	Z	PV
22Y2PS	Traffic Accidents Computer Simulation and Analysis <i>Michal Frydřín, Tomáš Mišunek</i>	KZ	2	2P+0C	L	PV
15Y2PD	Practical Spanish for Transportation	KZ	2	2P+0C	Z	PV
20Y2PR	Time Series Prediction <i>Emil Pelikán</i>	KZ	2	2P+0C	L	PV
14Y2PI	Process Information Systems in Transportation	KZ	2	2P+0C	Z	PV
14Y2PJ	C++ Programming Language <i>Vít Fábeka</i>	KZ	2	2P+0C	L	PV
14Y2PH	CAD Interface Programming	KZ	2	2P+0C	L	PV
11Y2PM	Programming in MATLAB	KZ	2	2P+0C	L	PV
21Y2PL	Operational Aspects of Aerodromes <i>Viktor Sýkora</i>	KZ	2	2P+0C	Z	PV
21Y2PP	Law and Operation in Air Transport <i>Marie Hauerová</i>	KZ	2	2P+0C	L	PV
15Y2PU	Publications and Their Creation	KZ	2	2P+0C	Z	PV
17Y2PS	Case Studies in Transportation	KZ	2	2P+0C	Z	PV
12Y2RD	Realization of Transport Buildings <i>Martin Höfler</i>	KZ	2	2P+0C	L	PV
21Y2S2	Diploma Thesis Seminar 2	KZ	2	2P+0C	Z	PV
15Y2SP	Seminar on Political Philosophy <i>Jan Feit, Eva Rezlerová, Marek Tomek</i>	KZ	2	2P+0C	Z	PV
16Y2ST	Special Technologies in Transport and Telecommunications <i>Jiří Dunovský</i>	KZ	2	2P+0C	L	PV
18Y2SD	Reliability and Diagnostics, Experimental Methods <i>Daniel Kytý, Stanislav Hraov</i>	KZ	2	2P+0C	Z	PV
15Y2SR	Stylistics and Rhetorics	KZ	2	2P+0C	Z	PV
17Y2SK	Urban and Regional Rail Transport System <i>Jiří Pospíšil</i>	KZ	2	2P+0C	L	PV
17Y2SJ	Network Timetabling on the Railway <i>Vít Janoš</i>	KZ	2	2P+0C	L	PV
15Y2TS	Technician and Contemporary Society <i>Jan Feit, Eva Rezlerová</i>	KZ	2	2P+0C	L	PV
20Y2TE	Technology of Electronic Systems	KZ	2	2P+0C	Z	PV
14Y2TU	Telecommunications Systems and Multimedia	KZ	2	2P+0C	Z	PV
16Y2TT	Transportation and Building Technology and Equipment	KZ	2	2P+0C	Z	PV
12Y2UD	Sustainable Transportation <i>Kristýna Neubergová</i>	KZ	2	2P+0C	L	PV
14Y2UI	Artificial Intelligence	KZ	2	2P+0C	Z	PV

20Y2UA	Artificial Neural Networks, Realization and Applications <i>Mirko Novák</i>	KZ	2	2P+0C	Z	PV
23Y2VZ	Leadership and Human Resource Development	KZ	2	2P+0C	L	PV
23Y2VR	Cope with Risks in Engineering Branches	KZ	2	2P+0C	L	PV
12Y2VT	High Speed Railways <i>Lukáš Týfa</i>	KZ	2	2P+0C	Z	PV
18Y2VC	Computational Mechanics in Transportation <i>Ondřej Jiroušek</i>	KZ	2	2P+0C	L	PV
12Y2ZK	Traffic Calming <i>Zuzana arská</i>	KZ	2	2P+0C	Z	PV
23Y2ZM	Intelligence Means and Methods	KZ	2	2P+0C	Z	PV
18Y2UB	Accident Biomechanics and Safety <i>Jitka Jírová</i>	KZ	2	2P+0C	L	PV
17Y2RZ	Control of Transport Processes <i>Edvard B ezina</i>	KZ	2	2P+0C	Z	PV

Characteristics of the courses of this group of Study Plan: Code=Y2-NP 19/20 Name=PVP nav.prez.(obory DS, LA) 19/20

17Y2AM	Application of Marketing Tools in Transportation Application of marketing principles in transport issues, marketing tools suitable for transport, case studies of the use of marketing in the sphere of public passenger transport.	KZ	2			
12Y2BM	Safety on The Local Roads Classification of road accidents rates, social losses. Collision points, diagrams. Tools and methods for safer road transportation. Crossroads from the point of view of safety. Psychological right of way. Roundabouts. Pedestrian transport, cyclists. Traffic lights coordination. Transport control and regulation.	KZ	2			
23Y2BP	Security Class The most prevalent topics include data management, data and text mining applications, terrorism informatics, deception and intent detection, terrorist and criminal social network analysis, crime analysis, cyber-infrastructure protection, transportation infrastructure security, and information assurance, among others.	KZ	2			
21Y2BS	Unmanned aircraft systems 2/Bezpečnostní systémy 2 Modern trends in unmanned aircraft development. Use of unmanned aircraft. Managerial activities related to the operation of unmanned aircraft. Flights beyond the applicable legislation.	KZ	2			
14Y2C1	CATIA I Fundamentals of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric structure, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.	KZ	2			
14Y2C2	CATIA II Extension of basic course. Modeling compound bodies. Possibility of enumeration, communications with other systems. Surface x solid bodies. Kinematic mechanism. Project making and project cooperation. Outputs of projects.	KZ	2			
14Y2CS	Sensitivity of Systems Design of systems with defined reliability. The impact of changing parameters and subsystems within a system. System sensitivity computing, definition of sensitivity functions and matrices and their usability in system design.	KZ	2			
15Y2DN	Transportation Psychology in German Speaking Countries Introduction to larger view of the traffic problems with regard to the work with texts (physics for drivers, abusing alcohol during driving, exhaustion, getting of driving licence, children in traffic, traffic accident, traffic psychology in the internet etc.).	KZ	2			
18Y2DC	Dynamics of Transport Routes and Vehicles Basic theory and calculations of more mass systems. Analysis of the forces acting between the vehicle and transport route. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of stiffness constants and pliability constants. Fundamentals of vibration of bridges. Criteria for the admissibility of oscillation. Experimental methods in dynamics.	KZ	2			
17Y2FM	Financing in Urban Mass Transportation UMT history and development in Prague and other cities in the world. Building and operation of public tram, bus, and trolleybus networks. Underground building and operation. Other UMT types. UMT development in small towns. Particularities of investment and operation financing of individual UMT types. Historic and present models of UMT financing. Transport inspection and blind passengers. Tourism & UMT. UMT typology & choice of optimum financing.	KZ	2			
11Y2FX	Functions of Complex Variable Derivation of complex function, holomorphic function, complex exponential series, integration, Cauchy theorem. Taylor series, Laurent series of complex variable function. Basics of Laplace and Z-transformation.	KZ	2			
23Y2FB	Physics for Security Branches Grounds of physics of substances and phenomena at extreme conditions. Grounds of rheology. Physics of Earth's interior. Geophysics. Physics of atmosphere. Applications in engineering branches directed to safety.	KZ	2			
18Y2FZ	Physical Basis of Materials' Properties On the basis of internal structure and nature of interaction elastic material behavior and its maximum strength is explained. The model is further developed by considering different types of defects, loads and environment for explanation of failure mechanisms - the level of real strength determined by internal defects, and brittle fracture, fatigue and creep. Failures are discussed as a challenge posed to design of novel materials.	KZ	2			
15Y2HS	Road Transport History Roads and road traffic in the Ancient Age, corridors of main medieval pathways. Development of road traffic in the modern period, acceleration of road transport development during 1st part of 20th century. Development of road layout, geometric and construction layers. Beginning of modern road civil engineering. Development of road travelling in modern period. History of road intercections, bridges and traffic control, development of road signs.	KZ	2			
16Y2HP	Vehicle Hygiene Emissions and ergonomomy of vehicles and the influence on man and nature. National and international law related to the hygiene. Noise and vibrations - sources, creation, propagation, physical values, ways of measuring, prevention, elimination. Exhausts - creation, measurement, reduction, non-regular fuels and drives. Ergonomomy - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredom.	KZ	2			
14Y2IS	Intelligent Systems in Postal Services The use of information systems in the postal services (ITIS, and POST, T + T, PS, KMP, DS), application of information technology in the processing of mail processing nodes in the postal network, optimizing logistics processes in the post. The appreciation of the real implementation of the Czech post in operation both in lectures and in the framework of the practical desk.	KZ	2			
12Y2IS	Urban Networks The importance and the position of UN as public and technical infrastructure / utilities, methodology of the UN master planning, of UN design, UN coordination, UN installation and UN operation (basic technical standards of UN, trenchless technologies for UN).	KZ	2			

14Y2JM	One-Chip Controllers	KZ	2
One-chip controllers architecture, embedded peripherals (counters, timers, converters, ports) and their utilisation. Practical tasks are programmed with the aid of AVR chips.			
15Y2JH	Job Hunting in English	KZ	2
The course provides a practical guide to applying for a job in English. The interview process is mapped out, with the course including skills practise for all the stages of this process, including specifics for job-hunting in English. Students will also be introduced to the English vocabulary and phraseology necessary for a successful interview.			
14Y2KI	Capital Investment in Transportation and Telecommunications	KZ	2
Financial market, investment decision making - long term goals and investment strategies, long term financing			
16Y2KV	Car Body Design	KZ	2
Personal cars body, high-load car body, bus car body, and motorcycle as a construction set. Principles of design, production, testing and operation. Materials used for car body construction. Active and passive safety parts. Ergonomics, HMI, view out of the vehicle, operational extent, view behind the car. Conditioning tools, signaling function. Aerodynamics of the car body. Design and artistic design principles. Practical training.			
12Y2KS	Rail Transport in Settlements and Regions	KZ	2
Modernization and development of railway infrastructure in Czech Republic. Arrangement of railway networks and junctions. Suburban railway services. Network configuration and operation of metro systems. Network configuration and operation of tram systems. Special thematic lectures (rail transport in selected countries / regions).			
12Y2KE	Landscape Ecology	KZ	2
Landscape ecology. Landscape - definition, types, evolution. Landscape systems. Anthropogenic impacts on landscape. Methods using for evaluating landscape. Fractal geometry and its potential applications in landscape ecology. Landscape planning.			
21Y2LS	Air Traffic Services	KZ	2
Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. Procedural and radar control. Incidents caused or partially caused by ATS. History of ATS and czech airspace.			
11Y2LG	Logics of Engineer's Judgement	KZ	2
Logical structure of engineer's judgement, its propositional and predicative logical base. Solutions of logical tasks through the methods of truthfulness and semantic analysis charts. Venn's diagram method. Logical basis for network design for the solution of technical tasks.			
15Y2MS	Sociology for Managers	KZ	2
Sociological approach to a corporation. Corporation and its organization. Corporation and its running - human role and communication. Corporation, its culture and social system. Human's work position in free market economy. Corporate directorship, work groups, adaptation, strife, different roles and positions in corporation.			
18Y2MP	Finite Element Method And Its Application	KZ	2
Basic mathematical formulation of the Finite Element Method. Direct Stiffness Method used in structural mechanics. Evaluation of stiffness matrices for the basic elements using variational principles. Element formulation (bar and beam elements, CST, LST, quadrilateral, tetrahedral and brick elements). Natural coordinates, natural shape functions and isoparametric representation. Numerical integration. Introduction to dynamics. FEM programming.			
16Y2MK	Quality Methods for Vehicles	KZ	2
Quality management methods list, customer data acquisition and analysis of customer requirements, QFD, DFM, DFA, DFS. FMEA (Failure mode effect analysis). Elements of parallel (team) design.			
12Y2MD	Methods of Traffic Regulation and Prediction	KZ	2
Basic ways of traffic prognosis, traffic prognosis for large area (calculation of future traffic volumes, calculation of future traffic volumes between areas (analogical and synthetic methods, modal split, traffic distribution to road network). Shock wave in traffic flow. Service levels and their traffic volumes. Acceleration noise.			
17Y2MO	International Organisations in Transportation	KZ	2
International relations in transport, UN, EEC UN, Intergovernmental organisations, EU Offices and Agencies, Conference of European Ministries of transport, International mode organisations of public transport, Air-Rail, railways, roads, air, waterways, forwarding and postal services.			
17Y2MS	Microsimulation of Railway Operation	KZ	2
Introduction to the characteristics of simulation tools, creation of a simulation model of railway infrastructure, verification of a specific operational concept on the given infrastructure, adaptation of the infrastructure model and modification to the infrastructure to allow the implementation of the proposed operational concept. Stability tests and evaluations. Evaluation of sensitivity of the operational concept to delays.			
21Y2MS	Aerospace Engineering Simulation and Modelling	KZ	2
The course is designed as a set of exemplary tasks and problems based on practical aviation issues. The university degree mathematic skills and software applications usage will be necessary for successful figuring out. Both simple tasks, where students create own model themselves (e.g. in Matlab), and more complicated problems where professional developed tools will be applied.			
12Y2MZ	Modernization of Railway Lines and Stations	KZ	2
Line speed increasing. AGC and AGTC Agreement. AGC and AGTC railway network. Principles of modernization (conceptual papers, definitions of basic concepts, individual principles). Track geometrical characteristics on modernized railway lines. Superstructure and substructure on upgraded lines. Designing of railway stations. Bridges and tunnels. Development and realization of projects. Technical description of the tranzit corridors.			
12Y2MH	Measurement and Modeling of Traffic Noise	KZ	2
Theoretical introduction to noise from traffic. Noise from rail transport. Noise from road traffic. Measurement and calculation of noise from rail traffic. Measurement and calculation of noise from road traffic. Modelling of traffic noise in the CADNA A.			
14Y2OP	Object Oriented Programming in Transport	KZ	2
Classes, objects, encapsulation, inheritance, polymorphism, templates, retying, streams, events, repository, collections, virtual methods and classes. Examples will be derived from microscopic simulation systems, discrete event simulation, cellulár simulations and virtual life simulations.			
15Y2OZ	Health Protection in Transportation and EU	KZ	2
Health protection in transportation in CR in the past and present. Conditions before 1989 and after, current legislature, future prospects. Harmonisation of legislation with other EU members. Fundamental principles of health protection and support in selected EU countries.			
15Y2OF	Specialised French for Transportation and Telecommunications	KZ	2
Basic transportation (public transport, railway, air, road and ship transport) and telecommunications terminology. Special focus on independent speaking and writing skills.			
15Y2PT	Food in Transportation	KZ	2
The nutrition policy. Interaction transportation and foodstuffs. The health risks. Hygienic safeguard. The practical examples from the Czech Republic and from the world. The issues of dining cars, work trains and other railroad equipment. Legislation.			
16Y2PG	Computer Graphics and Virtual Reality	KZ	2
Principles of creation and processing of bitmap and vector 2D graphics, 3D virtual scenes and algorithms used for their computerized processing. Adopting skills of work with professional and freeware tools for creation and processing of 2D, 3D and interactive graphics, and basics of programming language VRML and graphic libraries (OpenGL).			
22Y2PS	Traffic Accidents Computer Simulation and Analysis	KZ	2
Vehicle dynamics simulation, multi body systems and vehicle active safety systems, vehicle slipping, external influence on virtual model, crash tests evaluation, single-track vehicle, vehicle passengers, pedestrian, traffic accident simulation and analysis.			

15Y2PD	Practical Spanish for Transportation	KZ	2
Development of communication skills, training of correct written expression of formal character, basic technical vocabulary, cultural specifics of the Spanish speaking countries. Terminology of transport and commerce.			
20Y2PR	Time Series Prediction	KZ	2
Basic methods of quantitative forecasting, causal models, time series. Model performance evaluation, describing statistics, MAE, MAPE, RMSE, entropy measures, naive models. Basic theory of the linear prediction models, covariance and correlation coefficients, smoothing methods, regression methods, Box-Jenkins methodology, statistical tests, genetics algorithms.			
14Y2PI	Process Information Systems in Transportation	KZ	2
Introduction and detailed usage of transport information systems, e.g. EFC, ePurse and transport check-in systems for public transport with focus on architecture of this system and SOA (Service Oriented Architecture). Information systems implementation and operations description in the Czech Republic (technical and process) included lectures and visits.			
14Y2PJ	C++ Programming Language	KZ	2
Principles of object-oriented programming and C++ programming language. Basic concepts, such as - classes, objects, constructors, destructors, inheritance, virtual methods, exceptions, streams, overloading, ADT.			
14Y2PH	CAD Interface Programming	KZ	2
Introduction to CAD interface programming techniques with the help of LIST and VBA programming languages. Possibilities of proper objects (commands), dialogues, interfaces, and applications creation in CAD systems. Programming of cooperation with other applications (databases, spread-sheets).			
11Y2PM	Programming in MATLAB	KZ	2
To explain the principle of modelling and simulation, description of Matlab environment and its settings, optimization and program code debugging, data fitting and designing GUI in Matlab.			
21Y2PL	Operational Aspects of Aerodromes	KZ	2
Operational aspects of aerodromes. Location of aerodrome and orientation of runways. Requirements for apron. Capacity of airports runways and terminals. Operation under winter conditions. Firefighting units. Protection against unlawful interference. Local transport connection. Environmental protection.			
21Y2PP	Law and Operation in Air Transport	KZ	2
Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods.			
15Y2PU	Publications and Their Creation	KZ	2
Scientific texts types. Footnotes and references. Exploration of facts. Quotations. Formal document layout. Working with information databases. Typographic principles. Typographic editors - MS Word, Tex/LaTeX. Practical creation of simple scientific documents.			
17Y2PS	Case Studies in Transportation	KZ	2
Simulation expert discussions on the topics - the impact of transport on the environment and the economy, energy, construction of transport infrastructure etc. The students will each lesson presented one current and the real issue, which solutions will have to think of each other. Each of them will be represent another role (public authorities, investors, carrier representative interest groups, residents, etc.).			
12Y2RD	Realization of Transport Buildings	KZ	2
In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.			
21Y2S2	Diploma Thesis Seminar 2	KZ	2
Methodology of writing final theses. Definition of materials and methods, approach to obtaining results, presentation and discussion of results, formulation of conclusions. Data collection and presentation, basic statistics, validation of results and proposals. Achieving the objectives of the paper and evaluation of hypotheses tests. Formal and graphic design of the paper - working with LaTeX and Word template.			
15Y2SP	Seminar on Political Philosophy	KZ	2
Interpreting of philosophical texts, view of society, state and their system of government.			
16Y2ST	Special Technologies in Transport and Telecommunications	KZ	2
Micro, nano and special technologies, electric arc and its applications, plasma technologies, dipping, beam technologies, electron beams technology in reduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.			
18Y2SD	Reliability and Diagnostics, Experimental Methods	KZ	2
Reliability theory. Ultimate limit state and serviceability. Diagnosis of components and systems. Defects in materials and products. Experimental observation of the variables and mechanical phenomena. Model similarity. Non-destructive testing of materials and structures. Optical methods. Strain gauges. Experimental determination of residual stresses. Measurement errors. Evaluation experiments.			
15Y2SR	Stylistics and Rhetorics	KZ	2
Basic skills of oral and written expression as a means of human communication. Basic information about speech, articulation, oral and written language. Teaching to speak well-vocal organs, voice training. Language semantics, language syntactic and the pragmatic aspect. Creative thought and its oral and written expression. Practice - cultivating the skills of speech.			
17Y2SK	Urban and Regional Rail Transport System	KZ	2
Factors influencing transport demand, modal-split, traffic flows distribution on public transit network. Line network optimization and configuration. Timetable designing and evaluation accenting integrated periodic timetable. Rolling stock circulation, staff and crew services optimization and their order to rosters. Framework legislation, non-barrier effects and preference of public transport. Marketing.			
17Y2SJ	Network Timetabling on the Railway	KZ	2
Timetable samples. Capacity allocation, technological intervals in railway operation. Rules and regulations of train paths, running times, time adds and supplements. Rolling stock circulation planning. Rules of train-diagramm creating. Timetables for more service-levels on the line. Construction slot conflicts between passenger- and freight transport. Network line relations and waiting times, timetables for lines under construction.			
15Y2TS	Technician and Contemporary Society	KZ	2
Why to take off a hat in a room and open a door for a lady? Are there simple solutions? Science vs belief. Do we need to know or is it enough to turn on a PC? It must be true - it's on the Internet and in newspapers! What are the sights for? Interest in public affairs - a hangover from the past?			
20Y2TE	Technology of Electronic Systems	KZ	2
Principle technologies for an effective operation of electronically controlled systems. Maintaining, measuring, optimization of safety and reliability of complex systems. Semiconductor technologies, printed circuits, assembly operations, interconnection and repairs technologies users and operators.			
14Y2TU	Telecommunications Systems and Multimedia	KZ	2
New trends in telecommunications namely applied in transport solutions, identification and quantification of telecommunications networks and services performance based on redundant architecture, provisioning of guaranteed service quality, two generations of the handover principles.			
16Y2TT	Transportation and Building Technology and Equipment	KZ	2
Transportation and building technology and equipment. Transport of solid and mass material, soil and rock above all. Highway and underground constructions. Transport surface vehicles, description and construction features, delivered mass calculation, economy of operation. Technics and technology of underground constructions. Terrestrial vehicles operation management methodology (ultrasound, laser, GPS, total stations).			

12Y2UD	Sustainable Transportation	KZ	2
Sustainable development, definition, history, legal framework. Sustainable development indicators. Sustainable transportation, definition, history, legal framework. Practical application of sustainable development theory, case study.			
14Y2UI	Artificial Intelligence	KZ	2
History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.			
20Y2UA	Artificial Neural Networks, Realization and Applications	KZ	2
History of neural networks. Basic principles. Comparing the structure of a natural and an artificial neuron. Neural classifiers, predictors, compressors, expanders and other specialised functional blocs and systems. Modelling of neurons. Grossberg's equations. Learning principles. Layered and Hopfield's nets.			
23Y2VZ	Leadership and Human Resource Development	KZ	2
Introduction to the study of human resources, human resources management, corporate goals, strategies, cultural and ethical aspects. Team management, communication in teams, strategy and planning in human resources, ethics and corporate culture, cross-cultural differences. The labor code. Introduction into protocols.			
23Y2VR	Cope with Risks in Engineering Branches	KZ	2
Types of engineering branches directed to risks, procedures used in risk engineering, ensuring the secured systems, ensuring the safe systems, ensuring the safe systems of systems.			
12Y2VT	High Speed Railways	KZ	2
High speed rail (HSR) transport characteristics and position in transportation system. HSR vehicles types and characteristics and control-command and signalling system. HSR system interoperability. Non-adhesion HSR systems. City traffic service by HSR. HSR operating points. HSR worldwide network. HSR routing and traffic conception. Specifics of HSR track construction and geometrical characteristics.			
18Y2VC	Computational Mechanics in Transportation	KZ	2
Principle of virtual work and variational principles in FEM. Bar shaped, planar and three - dimensional structures in FEM. FEM in statics and in dynamics of transportational systems. Elastic, elastoplastic and viscoelastic material. FEM in problems of biomechanics. Numerical analysis of structural parts with programme ANSYS on instances.			
12Y2ZK	Traffic Calming	KZ	2
Principles of traffic calming. Solution of road network organization. Urban road layouts. Psychological and physical obstacles (measures of traffic calming) and their combinations. Traffic calming measures in crossroads. Pedestrian zones. Residential streets and zones.			
23Y2ZM	Intelligence Means and Methods	KZ	2
History and the present of intelligence services and their role in the modern world. How intelligence services handle with information. Methods and procedures of collecting and evaluating information. Means of intelligence services. Internal and external intelligence, military intelligence. The means and methods of state security services. Cooperation among Intelligence services within NATO, EU. The organization of the intelligence services.			
18Y2UB	Accident Biomechanics and Safety	KZ	2
Anatomy of Man. Biomechanics of musculo-skeletal system. Medical diagnostic methods - X-ray, CT, MRI, US. Dynamics and causes of traumatic events. Pedestrian injuries. Injury accidents in road, rail and air traffic. Analysis of physical processes in terms of injury biomechanics. Principles of treatment and rehabilitation. Safety equipment and precautions to reduce the consequences of traffic accidents.			
17Y2RZ	Control of Transport Processes	KZ	2
Theoretical bases, transport system, decomposition, factors influencing control, quality diagnosis, methods of control, systems for decision making support, risk of decision making, telematics.			

Name of the block: Jazyky

Minimal number of credits of the block: 8

The role of the block: J

Code of the group: JZ-N-14/15

Name of the group: Jazyk nav.1.-4.sem.14/15 (pro obory v N3710)

Requirement credits in the group: In this group you have to gain 8 credits

Requirement courses in the group: In this group you have to complete 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
15J2F1	Language - French 1 Jan Feit, Eva Rezlerová, Irena Veselková	Z	2	0P+2C	Z	J
15J2I1	Language - Italian 1	Z	2	0P+2C	Z	J
15J2N1	Language - German 1 Jan Feit, Eva Rezlerová, Jana Štikarová, Alexej Kusák, Petra Mráková Vavroušová	Z	2	0P+2C	Z	J
15J2R1	Language - Russian 1 Jan Feit, Eva Rezlerová, Marie Michlová	Z	2	0P+2C	Z	J
15J2S1	Language - Spanish 1 Jan Feit, Eva Rezlerová, Petra Mráková Vavroušová, Nina Hricsina Puškinová Petra Mráková Vavroušová (Gar.)	Z	2	0P+2C	Z	J
15JBF2	Language - French 2 Jan Feit, Eva Rezlerová, Irena Veselková	Z	2	0P+2C+10B	L	J
15JBI2	Language - Italian 2	Z	2	0P+2C+10B	L	J
15JBN2	Language - German 2 Jan Feit, Eva Rezlerová, Jana Štikarová	Z	2	0P+2C+10B	L	J
15JBR2	Language - Russian 2 Jan Feit, Eva Rezlerová, Marie Michlová	Z	2	0P+2C+10B	L	J
15JBS2	Language - Spanish 2 Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová	Z	2	0P+2C+10B	L	J

15JBF3	Language - French 3 <i>Jan Feit, Eva Rezlerová, Irena Veselková</i>	Z	2	0P+2C	Z	J
15JBI3	Language - Italian 3	Z	2	0P+2C	Z	J
15JBN3	Language - German 3 <i>Jan Feit, Eva Rezlerová, Jana Štikarová, Alexej Kusák, Petra Mraková</i> <i>Vavroušová Alexej Kusák (Gar.)</i>	Z	2	0P+2C	Z	J
15JBR3	Language - Russian 3 <i>Jan Feit, Eva Rezlerová, Marie Michlová</i>	Z	2	0P+2C	Z	J
15JBS3	Language - Spanish 3 <i>Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová</i>	Z	2	0P+2C	Z	J
15JBF4	Language - French 4 <i>Jan Feit, Eva Rezlerová, Irena Veselková</i>	ZK	2	0P+2C+10B	L	J
15JBI4	Language - Italian 4	ZK	2	0P+2C+10B	L	J
15JBN4	Language - German 4 <i>Jan Feit, Eva Rezlerová, Jana Štikarová</i>	ZK	2	0P+2C+10B	L	J
15JBR4	Language - Russian 4 <i>Jan Feit, Eva Rezlerová, Marie Michlová</i>	ZK	2	0P+2C+10B	L	J
15JBS4	Language - Spanish 4 <i>Jan Feit, Eva Rezlerová, Nina Hricsina Puškinová</i>	ZK	2	0P+2C+10B	L	J

Characteristics of the courses of this group of Study Plan: Code=JZ-N-14/15 Name=Jazyk nav.1.-4.sem.14/15 (pro obory v N3710)

15J2F1	Language - French 1	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15J2I1	Language - Italian 1	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15J2N1	Language - German 1	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15J2R1	Language - Russian 1	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15J2S1	Language - Spanish 1	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15JBF2	Language - French 2	Z	2			
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.						
15JBI2	Language - Italian 2	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBN2	Language - German 2	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBR2	Language - Russian 2	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBS2	Language - Spanish 2	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBF3	Language - French 3	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBI3	Language - Italian 3	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						
15JBN3	Language - German 3	Z	2			
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.						

15JBR3	Language - Russian 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBS3	Language - Spanish 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBF4	Language - French 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBI4	Language - Italian 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBN4	Language - German 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBR4	Language - Russian 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBS4	Language - Spanish 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
11STS	Stochastic Systems	Z,ZK	4
The subject deals with the problems of mathematical modelling of dynamical systems, estimation of these models and their utilization for prediction. The results are illustrated on practical transportation tasks. Mathematical theory roots from probability and mathematical statistics and they use the methods of the Bayesian probabilistic approach.			
11THRO	Queuing Theory	ZK	2
Discrete event process, definition, random distribution, and probability. Basic processes, process of revitalisation. Markov process, Markov models, Kendall classification, model M/M/1, models M/M/n. Non-markovian models, model M/C/n, models G/G/n. Models with continuous flow. Service net, examples of Petri net. Computer simulation.			
11XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
11XN3	Master Project 3	Z	1
11XN4	Master Project 4	Z	8
11Y2FX	Functions of Complex Variable	KZ	2
Derivation of complex function, holomorphic function, complex exponential series, integration, Cauchy theorem. Taylor series, Laurent series of complex variable function. Basics of Laplace and Z-transformation.			
11Y2LG	Logics of Engineer's Judgement	KZ	2
Logical structure of engineer's judgement, its propositional and predicative logical base. Solutions of logical tasks through the methods of truthfulness and semantic analysis charts. Venn's diagram method. Logical basis for network design for the solution of technical tasks.			
11Y2PM	Programming in MATLAB	KZ	2
To explain the principle of modelling and simulation, description of Matlab environment and its settings, optimization and program code debugging, data fitting and designing GUI in Matlab.			
12BA	Road Safety Audit	KZ	2
Schedules of applications of safety assessments during the process of preparations, and of the particular realization of the road network that should minimize traffic accident risks for all those who take part in road traffic. Road safety survey. Application of European Directive 2008/96/EC on road safety infrastructure management.			
12DOUP	Transport and Land - Use Planning	Z,ZK	3
Explanation of fundamental relation and connection between transport and territory, fundamentals of traffic layout. Land - use planning. Influence of traffic on area and shape of town, solving principles of different transport modes including pedestrian traffic and cycling transport. Traffic calming, parking. Complex transport study.			
12DZP	Transport and Environment	Z	2
This course aims the impact of transport on environment. The accent is put mainly on noise and vibration, emission, barrier effect and energy demands. The noise measury is part and parcel of this course.			
12IDOS	Integrated Transport Systems	ZK	3
Reasons for building of integrated transport systems, principle of integration, dividing of integration methods, traffic, infrastructure, technical, organizational methods, integration of tariff, sales systems, information systems, marketing of system, examples of non-integration.			

12IKOD	Rail Transport Infrastructure	Z,ZK	5
Non-compensated lateral acceleration, Parameters education for transition curve and cant transition, curves without straight, track spacing change. Railway, subway and tramway track detailed construction. Continuous welded rail theory. Substructure, slab track. Tram-train. Interoperability. Noise precautions. Railway lines rationalisation, dispositional layout of operating points trackage, passenger buildings and forecourts. Sidings, terminals.			
12NAP	Design and Operation of Traffic Engineering Facilities	Z,ZK	6
Past and present of the tunnel construction and design, technological systems at bridges and tunnels and its design, traffic and safety system, risk analysis, bridges and tunnels operation, durability of facilities.			
12TEPR	Theory of Road Traffic Operation	Z,ZK	8
Basic transport parameters and their measurement, traffic sensors. The concept of capacity analysis. Theoretical foundations and application of simulation models, macroscopic and statistical models. Theory of traffic management of intersections, urban areas and highways. Green Wave and priority of public transport. Identification and management of accidents. Principles and methods of evaluation of roads maintenance.			
12TKV	The Theory of Pavement Layers in Highway Engineering	Z,ZK	3
Function of transportations in highway engineering - material aspects of roads and highways. The course covers evolution of highway engineering since the beginning of the 20th century with the emphasis of material aspects.			
12XN1	Master Project 1	Z	2
12XN2	Master Project 2	Z	2
12XN3	Master Project 3	Z	1
12XN4	Master Project 4	Z	8
12Y2BM	Safety on The Local Roads	KZ	2
Classification of road accidents rates, social losses. Collision points, diagrams. Tools and methods for safer road transportation. Crossroads from the point of view of safety. Psychological right of way. Roundabouts. Pedestrian transport, cyclists. Traffic lights coordination. Transport control and regulation.			
12Y2IS	Urban Networks	KZ	2
The importance and the position of UN as public and technical infrastructure / utilities, methodology of the UN master planning, of UN design, UN coordination, UN installation and UN operation (basic technical standards of UN, trenchless technologies for UN).			
12Y2KE	Landscape Ecology	KZ	2
Landscape ecology. Landscape - definition, types, evolution. Landscape systems. Anthropogenic impacts on landscape. Methods using for evaluating landscape. Fractal geometry and its potential applications in landscape ecology. Landscape planning.			
12Y2KS	Rail Transport in Settlements and Regions	KZ	2
Modernization and development of railway infrastructure in Czech Republic. Arrangement of railway networks and junctions. Suburban railway services. Network configuration and operation of metro systems. Network configuration and operation of tram systems. Special thematic lectures (rail transport in selected countries / regions).			
12Y2MD	Methods of Traffic Regulation and Prediction	KZ	2
Basic ways of traffic prognosis, traffic prognosis for large area (calculation of future traffic volumes, calculation of future traffic volumes between areas (analogical and synthetic methods, modal split, traffic distribution to road network). Shock wave in traffic flow. Service levels and their traffic volumes. Acceleration noise.			
12Y2MH	Measurement and Modeling of Traffic Noise	KZ	2
Theoretical introduction to noise from traffic. Noise from rail transport. Noise from road traffic. Measurement and calculation of noise from rail traffic. Measurement and calculation of noise from road traffic. Modelling of traffic noise in the CADNA A.			
12Y2MZ	Modernization of Railway Lines and Stations	KZ	2
Line speed increasing. AGC and AGTC Agreement. AGC and AGTC railway network. Principles of modernization (conceptual papers, definitions of basic concepts, individual principles). Track geometrical characteristics on modernized railway lines. Superstructure and substructure on upgraded lines. Designing of railway stations. Bridges and tunnels. Development and realization of projects. Technical description of the transit corridors.			
12Y2RD	Realization of Transport Buildings	KZ	2
In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.			
12Y2UD	Sustainable Transportation	KZ	2
Sustainable development, definition, history, legal framework. Sustainable development indicators. Sustainable transportation, definition, history, legal framework. Practical application of sustainable development theory, case study.			
12Y2VT	High Speed Railways	KZ	2
High speed rail (HSR) transport characteristics and position in transportation system. HSR vehicles types and characteristics and control-command and signalling system. HSR system interoperability. Non-adhesion HSR systems. City traffic service by HSR. HSR operating points. HSR worldwide network. HSR routing and traffic conception. Specifics of HSR track construction and geometrical characteristics.			
12Y2ZK	Traffic Calming	KZ	2
Principles of traffic calming. Solution of road network organization. Urban road layouts. Psychological and physical obstacles (measures of traffic calming) and their combinations. Traffic calming measures in crossroads. Pedestrian zones. Residential streets and zones.			
14DSIM	Traffic Microsimulation	Z	3
Basic overview of traffic microsimulation models. Introduction to the working environment application. Project processing microsimulation model in urban area - creating a transport network, capacity assessment of level intersections, light coordination of level intersections, creating a network of public transport, parking lots, pedestrian and bicycle paths.			
14GISS	Geographical Information Systems	KZ	2
Construction of saving format of space-oriented information land-survey and cartography minimum basic tasks of spatial operations principles of territorial identification			
14XN1	Master Project 1	Z	2
14XN2	Master Project 2	Z	2
14XN3	Master Project 3	Z	1
14XN4	Master Project 4	Z	8
14Y2C1	CATIA I	KZ	2
Fundamentals of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric structure, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.			
14Y2C2	CATIA II	KZ	2
Extension of basic course. Modeling compound bodies. Possibility of enumeration, communications with other systems. Surface x solid bodies. Kinematic mechanism. Project making and project cooperation. Outputs of projects.			
14Y2CS	Sensitivity of Systems	KZ	2
Design of systems with defined reliability. The impact of changing parameters and subsystems within a system. System sensitivity computing, definition of sensitivity functions and matrices and their usability in system design.			

14Y2IS	Intelligent Systems in Postal Services	KZ	2
The use of information systems in the postal services (ITIS, and POST, T + T, PS, KMP, DS), application of information technology in the processing of mail processing nodes in the postal network, optimizing logistics processes in the post. The appreciation of the real implementation of the Czech post in operation both in lectures and in the framework of the practical desk.			
14Y2JM	One-Chip Controllers	KZ	2
One-chip controllers architecture, embedded peripherals (counters, timers, converters, ports) and their utilisation. Practical tasks are programmed with the aid of AVR chips.			
14Y2KI	Capital Investment in Transportation and Telecommunications	KZ	2
Financial market, investment decision making - long term goals and investment strategies, long term financing			
14Y2OP	Object Oriented Programming in Transport	KZ	2
Classes, objects, encapsulation, inheritance, polymorphism, templates, retyping, streams, events, repository, collections, virtual methods and classes. Examples will be derived from microscopic simulation systems, discrete event simulation, cellular simulations and virtual life simulations.			
14Y2PH	CAD Interface Programming	KZ	2
Introduction to CAD interface programming techniques with the help of LIST and VBA programming languages. Possibilities of proper objects (commands), dialogues, interfaces, and applications creation in CAD systems. Programming of cooperation with other applications (databases, spread-sheets).			
14Y2PI	Process Information Systems in Transportation	KZ	2
Introduction and detailed usage of transport information systems, e.g. EFC, ePurse and transport check-in systems for public transport with focus on architecture of this system and SOA (Service Oriented Architecture). Information systems implementation and operations description in the Czech Republic (technical and process) included lectures and visits.			
14Y2PJ	C++ Programming Language	KZ	2
Principles of object-oriented programming and C++ programming language. Basic concepts, such as - classes, objects, constructors, destructors, inheritance, virtual methods, exceptions, streams, overloading, ADT.			
14Y2TU	Telecommunications Systems and Multimedia	KZ	2
New trends in telecommunications namely applied in transport solutions, identification and quantification of telecommunications networks and services performance based on redundant architecture, provisioning of guaranteed service quality, two generations of the handover principles.			
14Y2UI	Artificial Intelligence	KZ	2
History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.			
15J2A1	Language - English 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.			
15J2F1	Language - French 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15J2I1	Language - Italian 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15J2N1	Language - German 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15J2R1	Language - Russian 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15J2S1	Language - Spanish 1	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15JBA2	Language - English 2	Z	2
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.			
15JBA3	Language - English 3	Z	2
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of English and practical application, formal and technical registers and their use, language of management.			
15JBF2	Language - French 2	Z	2
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Developing perceptive and communicative skills, feedback skills, summarising technical text content, structuring presentations and meeting minutes, elementary rhetorics of foreign language and practical application, formal and technical registers and their use, language of management.			
15JBF3	Language - French 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBF4	Language - French 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			

15JBI2	Language - Italian 2	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBI3	Language - Italian 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBI4	Language - Italian 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBN2	Language - German 2	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBN3	Language - German 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBN4	Language - German 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBR2	Language - Russian 2	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBR3	Language - Russian 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBR4	Language - Russian 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBS2	Language - Spanish 2	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBS3	Language - Spanish 3	Z	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15JBS4	Language - Spanish 4	ZK	2
Grammar and stylistics. Selection of conversation and professional topics based on the language level and study focus at the Faculty. Improvement of language structure knowledge and perceptive and communicative skills, vocabulary development. Basic stylistic forms. Presentation of own knowledge in oral and written form. Work with (professional) text and its features. Practice of oral and written presentation.			
15XN1	Master Project 1	Z	2
15XN2	Master Project 2	Z	2
15XN3	Master Project 3	Z	1
15XN4	Master Project 4	Z	8
15Y2DN	Transportation Psychology in German Speaking Countries	KZ	2
Introduction to larger view of the traffic problems with regard to the work with texts (physics for drivers, abusing alcohol during driving, exhaustion, getting of driving licence, children in traffic, traffic accident, traffic psychology in the internet etc.).			
15Y2HS	Road Transport History	KZ	2
Roads and road traffic in the Ancient Age, corridors of main medieval pathways. Development of road traffic in the modern period, acceleration of road transport development during 1st part of 20th century. Development of road layout, geometric and construction layers. Beginning of modern road civil engineering. Development of road travelling in modern period. History of road intercections, bridges and traffic control, development of road signs.			
15Y2JH	Job Hunting in English	KZ	2
The course provides a practical guide to applying for a job in English. The interview process is mapped out, with the course including skills practise for all the stages of this process, including specifics for job-hunting in English. Students will also be introduced to the English vocabulary and phraseology necessary for a successful interview.			
15Y2MS	Sociology for Managers	KZ	2
Sociological approach to a corporation. Corporation and its organization. Corporation and its running - human role and communication. Corporation, its culture and social system. Human's work position in free market economy. Corporate directorship, work groups, adaptation, strife, different roles and positions in corporation.			
15Y2OF	Specialised French for Transportation and Telecommunications	KZ	2
Basic transportation (public transport, railway, air, road and ship transport) and telecommunications terminology. Special focus on independent speaking and writing skills.			
15Y2OZ	Health Protection in Transportation and EU	KZ	2
Health protection in transportation in CR in the past and present. Conditions before 1989 and after, current legislature, future prospects. Harmonisation of legislation with other EU members. Fundamental principles of health protection and support in selected EU countries.			

15Y2PD	Practical Spanish for Transportation Development of communication skills, training of correct written expression of formal character, basic technical vocabulary, cultural specifics of the Spanish speaking countries. Terminology of transport and commerce.	KZ	2
15Y2PT	Food in Transportation The nutrition policy. Interaction transportation and foodstuffs. The health risks. Hygienic safeguard. The practical examples from the Czech Republic and from the world. The issues of dining cars, work trains and other railroad equipment. Legislation.	KZ	2
15Y2PU	Publications and Their Creation Scientific texts types. Footnotes and references. Exploration of facts. Quotations. Formal document layout. Working with information databases. Typographic principles. Typographic editors - MS Word, Tex/LaTeX. Practical creation of simple scientific documents.	KZ	2
15Y2SP	Seminar on Political Philosophy Interpreting of philosophical texts, view of society, state and their system of government.	KZ	2
15Y2SR	Stylistics and Rhetorics Basic skills of oral and written expression as a means of human communication. Basic information about speech, articulation, oral and written language. Teaching to speak well-vocal organs, voice training. Language semantics, language syntactic and the pragmatic aspect. Creative thought and its oral and written expression. Practice - cultivating the skills of speech.	KZ	2
15Y2TS	Technician and Contemporary Society Why to take off a hat in a room and open a door for a lady? Are there simple solutions? Science vs belief. Do we need to know or is it enough to turn on a PC? It must be true - it's on the Internet and in newspapers! What are the sights for? Interest in public affairs - a hangover from the past?	KZ	2
16PDP	Principles of Vehicle Design Design of transportation vehicle according to its usage and function. Marketing and user demands. Vehicle dynamics. Propulsion systems. Design process, functional design and vehicle structure. Evaluation of variant concepts. Design phases. Reliability, technological aspects etc.	ZK	2
16XN1	Master Project 1	Z	2
16XN2	Master Project 2	Z	2
16XN3	Master Project 3	Z	1
16XN4	Master Project 4	Z	8
16Y2HP	Vehicle Hygiene Emissions and ergonomomy of vehicles and the influence on man and nature. National and international law related to the hygiene. Noise and vibrations - sources, creation, propagation, physical values, ways of measuring, prevention, elimination. Exhausts - creation, measurement, reduction, non-regular fuels and drives. Ergonomomy - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredom.	KZ	2
16Y2KV	Car Body Design Personal cars body, high-load car body, bus car body, and motorcycle as a construction set. Principles of design, production, testing and operation. Materials used for car body construction. Active and passive safety parts. Ergonomics, HMI, view out of the vehicle, operational extent, view behind the car. Conditioning tools, signaling function. Aerodynamics of the car body. Design and artistic design principles. Practical training.	KZ	2
16Y2MK	Quality Methods for Vehicles Quality management methods list, customer data acquisition and analysis of customer requirements, QFD, DFM, DFA, DFS. FMEA (Failure mode effect analysis). Elements of parallel (team) design.	KZ	2
16Y2PG	Computer Graphics and Virtual Reality Principles of creation and processing of bitmap and vector 2D graphics, 3D virtual scenes and algorithms used for their computerized processing. Adopting skills of work with professional and freeware tools for creation and processing of 2D, 3D and interactive graphics, and basics of programming language VRML and graphic libraries (OpenGL).	KZ	2
16Y2ST	Special Technologies in Transport and Telecommunications Micro, nano and special technologies, electric arc and its applications, plasma technologies, dipping, beam technologies, electron beams technology in roduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.	KZ	2
16Y2TT	Transportation and Building Technology and Equipment Transportation and building technology and equipment. Transport of solid and mass material, soil and rock above all. Highway and underground constructions. Transport surface vehicles, description and construction features, delivered mass calculation, economy of operation. Technics and technology of underground constructions. Terrestrial vehicles operation management methodology (ultrasound, laser, GPS, total stations).	KZ	2
17MGD	Management of Transport Systems Functions, processes and systems of management in transport, organisational structures, strategy, social responsibility, soft skills.	Z,ZK	3
17TZE	Technology of Railway Transport Track line capacity assesment, model operational situation with a system running time between IPT-nodes, calculation of traction energy savings compared with infrastructure costs for designing of fleeting crossing station, solving of capacity problem and blocking time in relation to train protection system, robustness of timetable, system concept of freight train paths, guidelines for centralised operational traffic control and management.	ZK	2
17XN1	Master Project 1	Z	2
17XN2	Master Project 2	Z	2
17XN3	Master Project 3	Z	1
17XN4	Master Project 4	Z	8
17Y2AM	Application of Marketing Tools in Transportation Application of marketing principles in transport issues, marketing tools suitable for transport, case studies of the use of marketing in the sphere of public passenger transport.	KZ	2
17Y2FM	Financing in Urban Mass Transportation UMT history and development in Prague and other cities in the world. Building and operation of public tram, bus, and trolleybus networks. Underground building and operation. Other UMT types. UMT development in small towns. Particularities of investment and operation financing of individual UMT types. Historic and present models of UMT financing. Transport inspection and blind passengers. Tourism & UMT. UMT typology & choice of optimum financing.	KZ	2
17Y2MO	International Organisations in Transportation International relations in transport, UN, EEC UN, Intergovernmental organisations, EU Offices and Agencies, Conference of European Ministries of transport, International mode organisations of public transport, Air-Rail, railways, roads, air, waterways, forwarding and postal services.	KZ	2
17Y2MS	Microsimulation of Railway Operation Introduction to the characteristics of simulation tools, creation of a simulation model of railway infrastructure, verification of a specific operational concept on the given infrastructure, adaptation of the infrastructure model and modification to the infrastructure to allow the implementation of the proposed operational concept. Stability tests and evaluations. Evaluation of sensitivity of the operational concept to delays.	KZ	2

17Y2PS	Case Studies in Transportation	KZ	2
Simulation expert discussions on the topics - the impact of transport on the environment and the economy, energy, construction of transport infrastructure etc. The students will each lesson presented one current and the real issue, which solutions will have to think of each other. Each of them will be represent another role (public authorities, investors, carrier representative interest groups, residents, etc.).			
17Y2RZ	Control of Transport Processes	KZ	2
Theoretical bases, transport system, decomposition, factors influencing control, quality diagnosis, methods of control, systems for decision making support, risk of decision making, telematics.			
17Y2SJ	Network Timetabling on the Railway	KZ	2
Timetable samples. Capacity allocation, technological intervals in railway operation. Rules and regulations of train paths, running times, time adds and supplements. Rolling stock circulation planning. Rules of train-diagramm creating. Timetables for more service-levels on the line. Construction slot conflicts between passenger- and freight transport. Network line relations and waiting times, timetables for lines under construction.			
17Y2SK	Urban and Regional Rail Transport System	KZ	2
Factors influencing transport demand, modal-split, traffic flows distribution on public transit network. Line network optimization and configuration. Timetable designing and evaluation accenting integrated periodic timetable. Rolling stock circulation, staff and crew services optimization and their order to rosters. Framework legislation, non-barrier effects and preference of public transport. Marketing.			
18GES	Geomechanics and Foundation Engineering	Z,ZK	4
Basic soil behaviour, water flow in the soil, basic of the soil mechanic, mechanic of the soil mass, stress in the soil, landslide and their rehabilitation, mechanics of the rock mass, type of the foundations and their design, abutment walls, breast walls, sheeting structures, improvement of the soil, modern method of the subsoil bearing capacity and slope stability improvement (geotextile, geogrids, anchored prefabricated elements), EN 1997-2.			
18TAM	Theoretical and Applied Mechanics	ZK	2
Fundamentals of theory of plasticity. Plasticity conditions. Elastoplastic and plastic state of body. Reliability and durability of structures. The stress and strain state around the notch. Stress intensity factor. Fracture toughness. Energy methods of linear fracture mechanics. Crack driving force. Opening the crack. Fatigue properties of the material. Fatigue process. Dimensioning of fatigue.			
18TIK	Theory of Engineering Structures	Z,ZK	4
The course builds upon the knowledge gained in basic mechanics courses in bachelor study (especially Statics and Elasticity) in the field of mathematical theory of elasticity. Emphasis is placed on plane and axisymmetric problems, as well as on the calculation of stress and strain in plates and shells. Students are further acquainted with methods of modeling the behavior of subsoil used in the design of line structures.			
18XN1	Master Project 1	Z	2
18XN2	Master Project 2	Z	2
18XN3	Master Project 3	Z	1
18XN4	Master Project 4	Z	8
18Y2DC	Dynamics of Transport Routes and Vehicles	KZ	2
Basic theory and calculations of more mass systems. Analysis of the forces acting between the vehicle and transport route. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of stiffness constants and pliability constants. Fundamentals of vibration of bridges. Criteria for the admissibility of oscillation. Experimental methods in dynamics.			
18Y2FZ	Physical Basis of Materials' Properties	KZ	2
On the basis of internal structure and nature of intraction elastic material behavior and its maximum strength is explained. The model is further developed by considering different types of defects, loads and environment for explanation of failure mechanisms - the level of real strength determined by internal defects, and brittle fracture, fatigue and creep. Failures are discussed as a challenge posed to design of novel materials.			
18Y2MP	Finite Element Method And Its Application	KZ	2
Basic mathematical formulation of the Finite Element Method. Direct Stiffness Method used in structural mechanics. Evaluation of stiffness matrices for the basic elements using variational principles. Element formulation (bar and beam elements, CST, LST, quadrilateral, tetrahedral and brick elements). Natural coordinates, natural shape functions and isoparametric representation. Numerical integration. Introduction to dynamics. FEM programming.			
18Y2SD	Reliability and Diagnostics, Experimental Methods	KZ	2
Reliability theory. Ultimate limit state and serviceability. Diagnosis of components and systems. Defects in materials and products. Experimental observation of the variables and mechanical phenomena. Model similarity. Non-destructive testing of materials and structures. Optical methods. Strain gauges. Experimental determination of residual stresses. Measurement errors. Evaluation experiments.			
18Y2UB	Accident Biomechanics and Safety	KZ	2
Anatomy of Man. Biomechanics of musculo-skeletal system. Medical diagnostic methods - X-ray, CT, MRI, US. Dynamics and causes of traumatic events. Pedestrian injuries. Injury accidents in road, rail and air traffic. Analysis of physical processes in terms of injury biomechanics. Principles of treatment and rehabilitation. Safety equipment and precautions to reduce the consequences of traffic accidents.			
18Y2VC	Computational Mechanics in Transportation	KZ	2
Principle of virtual work and variational principles in FEM. Bar shaped, planar and three - dimensional structures in FEM. FEM in statics and in dynamics of transportational systems. Elastic, elastoplastic and viscoelastic material. FEM in problems of biomechanics. Numerical analysis of structural parts with programme ANSYS on instances.			
20DTEL	Road's Traffic Telematics	ZK	4
Traffic management in cities and on highways, information and navigation systems, electronic fee collection, safe and intelligent vehicle and safety systems.			
20XN1	Master Project 1	Z	2
20XN2	Master Project 2	Z	2
20XN3	Master Project 3	Z	1
20XN4	Master Project 4	Z	8
20Y2PR	Time Series Prediction	KZ	2
Basic methods of quantitative forecasting, causal models, time series. Model performance evaluation, describing statistics, MAE, MAPE, RMSE, entropy measures, naive models. Basic theory of the linear prediction models, covariance and correlation coefficients, smoothing methods, regression methods, Box-Jenkins methodology, statistical tests, genetics algorithms.			
20Y2TE	Technology of Electronic Systems	KZ	2
Principle technologies for an effective operation of electronically controlled systems. Maintaining, meassuring, optimization of safety and reliability of complex systems. Semiconductor technologies, printed circuits, assembly operations, interconnection and repairs technologiesusers and operators.			
20Y2UA	Artificial Neural Networks, Realization and Applications	KZ	2
History of neural networks. Basic principles. Comparing the structure of a natural and an artificial neuron. Neural classificators, predictors, compresors, expanders and other specialised functional blocs and systems. Modelling of neurons. Grossberg's equations. Learning principles. Layered and Hopfield's nets.			

21XN1	Master Project 1	Z	2
21XN2	Master Project 2	Z	2
21XN3	Master Project 3	Z	1
21XN4	Master Project 4	Z	8
21Y2BS	Unmanned aircraft systems 2Bezpilotní systémy 2	KZ	2
Modern trends in unmanned aircraft development. Use of unmanned aircraft. Managerial activities related to the operation of unmanned aircraft. Flights beyond the applicable legislation.			
21Y2LS	Air Traffic Services	KZ	2
Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. Procedural and radar control. Incidents caused or partially caused by ATS. History of ATS and czech airspace.			
21Y2MS	Aerospace Engineering Simulation and Modelling	KZ	2
The course is designed as a set of exemplary tasks and problems based on practical aviation issues. The university degree mathematic skills and software applications usage will be necessary for successful figuring out. Both simple tasks, where students create own model themselves (e.g. in Matlab), and more complicated problems where professional developed tools will be applied.			
21Y2PL	Operational Aspects of Aerodromes	KZ	2
Operational aspects of aerodromes. Location of aerodrome and orientation of runways. Requirements for apron. Capacity of airports runways and terminals. Operation under winter conditions. Firefighting units. Protection against unlawful interference. Local transport connection. Environmental protection.			
21Y2PP	Law and Operation in Air Transport	KZ	2
Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods.			
21Y2S2	Diploma Thesis Seminar 2	KZ	2
Methodology of writing final theses. Definition of materials and methods, approach to obtaining results, presentation and discussion of results, formulation of conclusions. Data collection and presentation, basic statistics, validation of results and proposals. Achieving the objectives of the paper and evaluation of hypotheses tests. Formal and graphic design of the paper - working with LaTeX and Word template.			
22AMMD	Measuring Methods Applied to Transportation	KZ	4
Geodetic location and technical processing of traffic route with geodetic total station, GPS and photogrammetry, 3D scanning. Transport corridor setting out using geodetic methods. Detection and technical processing of several vehicle dynamic characteristics using high-speed cameras and accelerometers. It is a week course and the terms are usually set in June and September - usually in examination period.			
22SKM	Vehicle Kinematic Modelling and Simulation	KZ	2
Principles and possibilities of simulation tools with regards to vehicle movement analysis and vehicle crash analysis. Kinematic modelling of vehicle / vehicle train movement. View conditions. Proposed road space passage.			
22XN1	Master Project 1	Z	2
22XN2	Master Project 2	Z	2
22XN3	Master Project 3	Z	1
22XN4	Master Project 4	Z	8
22Y2PS	Traffic Accidents Computer Simulation and Analysis	KZ	2
Vehicle dynamics simulation, multi body systems and vehicle active safety systems, vehicle slipping, external influence on virtual model, crash tests evaluation, single-track vehicle, vehicle passengers, pedestrian, traffic accident simulation and analysis.			
23XN1	Master Project 1	Z	2
23XN2	Master Project 2	Z	2
23XN3	Master Project 3	Z	1
23XN4	Master Project 4	Z	8
23Y2BP	Security Class	KZ	2
The most prevalent topics include data management, data and text mining applications, terrorism informatics, deception and intent detection, terrorist and criminal social network analysis, crime analysis, cyber-infrastructure protection, transportation infrastructure security, and information assurance, among others.			
23Y2FB	Physics for Security Branches	KZ	2
Grounds of physics of substances and phenomena at extreme conditions. Grounds of rheology. Physics of Earth's interior. Geophysics. Physics of atmosphere. Applications in engineering branches directed to safety.			
23Y2VR	Cope with Risks in Engineering Branches	KZ	2
Types of engineering branches directed to risks, procedures used in risk engineering, ensuring the secured systems, ensuring the safe systems, ensuring the safe systems of systems.			
23Y2VZ	Leadership and Human Resource Development	KZ	2
Introduction to the study of human resources, human resources management, corporate goals, strategies, cultural and ethical aspects. Team management, communication in teams, strategy and planning in human resources, ethics and corporate culture, cross-cultural differences. The labor code. Introduction into protocols.			
23Y2ZM	Intelligence Means and Methods	KZ	2
History and the present of intelligence services and their role in the modern world. How intelligence services handle with information. Methods and procedures of collecting and evaluating information. Means of intelligence services. Internal and external intelligence, military intelligence. The means and methods of state security services. Cooperation among Intelligence services within NATO, EU. The organization of the intelligence services.			

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