Study plan

Name of study plan: TR nav.prez.15/16

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Technology in Transportation and Telecommunications
Type of study: Follow-up master full-time
Required credits: 50
Elective courses credits: 0
Sum of credits in the plan: 50
Note on the plan:

Name of the block: Semestrální projekt
Minimal number of credits of the block: 4
The role of the block: ZP

Code of the group: XN TR 1.-2. 13/14
Name of the group: Projekt 1.-2.sem TR 13/14
Requirement credits in the group: In this group you have to gain 4 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 4
Note on the group:

Code	**Name of the course / Name of the group of courses** ***(in case of groups of courses the list of codes of their members)*** *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
11XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
12XN1	**Master Project 1** *Zuzana Čarská, Dagmar Kočárková, Iva Šturmová, Kristýna Neubergová, Martin Jacura, Jan Kruntorád, Ondřej Trešl, David Vodák, Tomáš Javořík, ...*	Z	2	0P+2C+4B	Z	ZP
23XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
22XN1	**Master Project 1** *Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý, Jakub Nováček*	Z	2	0P+2C+4B	Z	ZP
21XN1	**Master Project 1** *Jakub Kraus, Andrej Lališ, Slobodan Stojić, Terézia Pilmannová, Jakub Hospodka, Lenka Hanáková, Vladimír Socha, Peter Vittek*	Z	2	0P+2C+4B	Z	ZP
20XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
18XN1	**Master Project 1** *Václav Rada*	Z	2	0P+2C+4B	Z	ZP
17XN1	**Master Project 1** *Václav Baroch, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Eliška Glaserová, Rudolf F. Heidu, Tomáš Horák, Vít Janoš, Milan Kříž, ...*	Z	2	0P+2C+4B	Z	ZP
16XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
15XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
14XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
11XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
22XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
21XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
20XN2	**Master Project 2** ***Vladimír Faltus***	Z	2	0P+2C+8B	L	ZP
18XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
23XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
16XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
15XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
14XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
12XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP

17XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP

Characteristics of the courses of this group of Study Plan: Code=XN TR 1.-2. 13/14 Name=Projekt 1.-2.sem TR 13/14

11XN1	Master Project 1	Z	2
12XN1	Master Project 1	Z	2
23XN1	Master Project 1	Z	2
22XN1	Master Project 1	Z	2
21XN1	Master Project 1	Z	2
20XN1	Master Project 1	Z	2
18XN1	Master Project 1	Z	2
17XN1	Master Project 1	Z	2
16XN1	Master Project 1	Z	2
15XN1	Master Project 1	Z	2
14XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
22XN2	Master Project 2	Z	2
21XN2	Master Project 2	Z	2
20XN2	Master Project 2	Z	2
18XN2	Master Project 2	Z	2
23XN2	Master Project 2	Z	2
16XN2	Master Project 2	Z	2
15XN2	Master Project 2	Z	2
14XN2	Master Project 2	Z	2
12XN2	Master Project 2	Z	2
17XN2	Master Project 2	Z	2

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 42
The role of the block: P

Code of the group: 1.S.NPTR 11/12
Name of the group: 1.sem.nav.prez.TR od 11/12
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 8 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**
12TDP	**Traffic Flow Theory** *Vladimír Faltus*	Z,ZK	3	2P+1C	Z	P
17ILO	**Information Technology in Logistics**	Z,ZK	4	2+2	Z	P
17LGY	**Logistics Systems**	Z,ZK	6	3+2	Z	P
17PJM	**Project Management**	ZK	2	2+0	Z	P
11MME	**Mathematical Models in Economics**	KZ	2	1+1	Z	P
12DZP	**Transport and Environment**	Z	2	2P+0C	Z	P
15J2A1	**Language - English 1** *Barbora Horáčková, Jitka Heřmanová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Marek Tomeček, Markéta Musilová, ...*	Z	2	0P+2C+10B	Z	P
15J2S1	**Language - Spanish 1** *Eva Rezlerová, Nina Hricsina Puškinová*	Z	2	0P+2C+10B	Z	P

Characteristics of the courses of this group of Study Plan: Code=1.S.NPTR 11/12 Name=1.sem.nav.prez.TR od 11/12

12TDP	Traffic Flow Theory	Z,ZK	3
Mobility and associated human problems. Basic traffic parameters and their measurement. Estimation of quality of services. Theoretical fundamentals and applications of mathematical models. Macroscopic, statistical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Relation between traffic models and traffic flow management.			
17ILO	Information Technology in Logistics	Z,ZK	4
Basics of bar code technology. Basics of radiofrequency identification. Product numbering systems for intensive distribution. Packaging hierarchy and identification models in supply chain. Identification of trading partners in the supply chain. Basics of data communication in logistics. National and global multidisciplinary standards for electronic data interchange. ERP Systems used in retail and fast moving consumer goods.			

17LGY	Logistics Systems	Z,ZK	6
Transport in logistics, intermodal transport, electronic toll systems in road transport, supply chain management, logistics partnership and alliances, logistic service of teritory, dangerous goods in logistics, management and marketing in logistics, identification systems in logistics, IT in logistic systems and transportation.			
17PJM	Project Management	ZK	2
Project and planning, project content, management and project task organization. Technical and economical assessment criterions. Criterion function and its components. Organization and management of the project run.			
11MME	Mathematical Models in Economics	KZ	2
Stochastic prosesses and their classification, Poisson process, birth and death process, queueing models and their classification, graph and related terminology, cycles in a graph and their detection, the shortest and longest way through a graph, critical parth through a graph, extreme of a function of many arguments, free and constrained extremum, Lagrange multipliers, numerical methods in optimization, linear programming and its application.			
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
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
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.			

Code of the group: 2.S.NPTR 11/12
Name of the group: 2.sem.nav.prez.TR od 11/12
Requirement credits in the group: In this group you have to gain 19 credits
Requirement courses in the group: In this group you have to complete 6 courses
Credits in the group: 19
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
17INV	**Investments and Financing in Transport**	Z,ZK	4	3+1	L	P
17TTH	**Transport Theory**	Z,ZK	5	2+2	L	P
20STL	**Satellite Technologies and Logistics**	Z,ZK	4	2+2	L	P
16TAJ	**Technological Aspects of Quality**	Z	2	2P+0C	L	P
15JBA2	**Language - English 2**	Z	2	0P+2C+10B	L	P
15JBS2	**Language - Spanish 2**	Z	2	0P+2C+10B	L	P

Characteristics of the courses of this group of Study Plan: Code=2.S.NPTR 11/12 Name=2.sem.nav.prez.TR od 11/12

17INV	Investments and Financing in Transport	Z,ZK	4
Projects and project planning, project financing, financing models, PPP financing, selection procedure, EIA study, project assessment and its criterions, NPV, IRR. Optimal variant selection. Zone planning and decision making.			
17TTH	Transport Theory	Z,ZK	5
Elements of theory of graphs. Minimum spanning tree, trees in graphs. Paths and cycles. Arc routing problems. Vehicle routing problems. Network flows. Location problems. Transportation elements. Transportation flows. Theory of displacement quality. Multicriterial decision making in transport processes.			
20STL	Satellite Technologies and Logistics	Z,ZK	4
Basic topics: GPS and Galileo navigation systems and their use for positioning the rail, air, sea, road and urban transport; GIS technology as a powerful tool for solving problems in logistics, appropriate telecommunication technologies and technologies for the identification and monitoring of goods; life cycle of satellite systems, satellite as the carrier of satellite systems functionalities and its technology.			
16TAJ	Technological Aspects of Quality	Z	2
Certification and accreditation, quality management, standards of quality management and its application, quality system creation, tools and methods of quality improvement, conformity assurance, environmental certification, workplace certification, QMS integration, classification, certification of products and producers.			
15JBA2	Language - English 2	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
15JBS2	Language - Spanish 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.			

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 4
The role of the block: PV

Code of the group: Y2-NPTR 15/16
Name of the group: PVP nav.prez.TR 15/6
Requirement credits in the group: In this group you have to gain 4 credits

Requirement courses in the group: In this group you have to complete at least 2 courses (at most 4)
Credits in the group: 4
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
14Y2C1	**CATIA I**	KZ	2	2P+0C	L	PV
14Y2CS	**Sensitivity of Systems**	KZ	2	2P+0C	L	PV
12Y2DVUP	**Transport and Land - Use Planning**	KZ	2	1+1	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
18Y2D2	**Dynamics of Transport Routes and Vehicles 2**	KZ	2	2+0	L	PV
15Y2HS	**Road Transport History**	KZ	2	2P+0C	L	PV
16Y2HP	**Vehicle Hygiene**	KZ	2	2P+0C	L	PV
17Y2KI	**Capital Investment in Transportation and Telecommunications**	KZ	2	2+0	L	PV
16Y2KV	**Car Body Design**	KZ	2	2P+0C	L	PV
21Y2LS	**Air Traffic Services**	KZ	2	2P+0C+8B	L	PV
11Y2LG	**Logics of Engineer's Judgement**	KZ	2	2P+0C	L	PV
21Y2MK	**Marketing of Air Transport** *Peter Vittek* ***Peter Vittek***	KZ	2	2P+0C+8B	Z	PV
12Y2MH	**Measurement and Modeling of Traffic Noise**	KZ	2	2P+0C	L	PV
18Y2MP	**Finite Element Method And Its Application**	KZ	2	2P+0C	L	PV
16Y2MK	**Quality Methods for Vehicles**	KZ	2	2P+0C	L	PV
12Y2MD	**Methods of Traffic Regulation and Prediction**	KZ	2	2P+0C	L	PV
17Y2MM	**Mobility of Small Towns**	KZ	2	2+0	L	PV
12Y2MZ	**Modernization of Railway Lines and Stations**	KZ	2	2P+0C	L	PV
14Y2OP	**Object Oriented Programming in Transport**	KZ	2	2P+0C	L	PV
22Y2PS	**Traffic Accidents Computer Simulation and Analysis**	KZ	2	2P+0C	L	PV
15Y2PT	**Food in Transportation**	KZ	2	2P+0C	L	PV
21Y2PP	**Law and Operation in Air Transport**	KZ	2	2P+0C+8B	L	PV
20Y2PR	**Prediction of time series**	KZ	2	2P+0C	L	PV
14Y2PJ	**C++ Programming Language**	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
12Y2RD	**Realization of Transport Buildings**	KZ	2	2P+0C	L	PV
17Y2SJ	**Network Timetabling on the Railway**	KZ	2	2P+0C	L	PV
16Y2ST	**Special Technologies in Transport and Telecommunications**	KZ	2	2P+0C	L	PV
17Y2SK	**Urban and Regional Rail Transport System**	KZ	2	2P+0C	L	PV
15Y2TS	**Technician and Contemporary Society**	KZ	2	2P+0C	L	PV
12Y2UD	**Sustainable Transportation**	KZ	2	2P+0C	L	PV
18Y2UB	**Accident Biomechanics and Safety**	KZ	2	2P+0C	L	PV
23Y2VZ	**Leadership and Human Resource Development**	KZ	2	2P+0C	L	PV
18Y2VC	**Computational Mechanics in Transportation**	KZ	2	2P+0C	L	PV
23Y2VR	**Cope with Risks in Engineering Branches** *Danuše Procházková*	KZ	2	2P+0C		PV

Characteristics of the courses of this group of Study Plan: Code=Y2-NPTR 15/16 Name=PVP nav.prez.TR 15/6

14Y2C1	CATIA I	KZ	2
Fundaments of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric stucture, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.			
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.			
12Y2DVUP	Transport and Land - Use Planning	KZ	2
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.			

15Y2DN	Transportation Psychology in German Speaking Countries	KZ	2
Introduction into broader view of 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.)			
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.			
18Y2D2	Dynamics of Transport Routes and Vehicles 2	KZ	2
Analysis of forces in the vehicle and transport routes and their influence on the stress and strain components of the vehicle structure or behavior of traffic routes. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of constant stiffness and constant compliance. Dynamic calculations of structural systems. Criteria for the admissibility of oscillation.			
15Y2HS	Road Transport History	KZ	2
Roads and road traffic in the Ancient Age, corridors of main mediveal 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.			
16Y2HP	Vehicle Hygiene	KZ	2
Emissions and ergonomy 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. Ergonomy - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredom.			
17Y2KI	Capital Investment in Transportation and Telecommunications	KZ	2
Financial market, investment desicion making - long term goals and investment strategies, long temr 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.			
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. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training Systém of Air Traffic Controllers. Future development of ATS.			
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.			
21Y2MK	Marketing of Air Transport	KZ	2
The content of the course "Marketing in air transport" is the management of activities and processes using available marketing tools and processes for analysis, strategy development and implementation of sales of goods and services in the aviation industry. In addition to the theoretical foundations of marketing, the lectures present systems of market, competition and product analysis, creation of marketing strategies and planning.			
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.			
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.			
17Y2MM	Mobility of Small Towns	KZ	2
Basic terms, networks of railway and bus lines, alternative forms of regional transport, influence in regional transport in vicinity of big cities, solutions of passenger and freight transport in regions, activities related to regional transport, passenger transport safety in regions.			
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.			
14Y2OP	Object Oriented Programming in Transport	KZ	2
Class, object, encapsulation, inheritance, polymorphism, templates, retyping, stream, exceptions, repository, collections, virtual methods and classes. Problem cases wil be chosen from microscopic simulation system, discrete event simulation, celular automata simulation and virtual life area.			
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 passangers, pedestrian, traffic accident simulation and analysis.			
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.			
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.			
20Y2PR	Prediction of time series	KZ	2
Introduction to time series prediction, meaning of prediction, basics of quantitative prediction. Methods for predictive quality evaluation, descriptive statistics, MAE, MAPE, RMSE, naive prediction, prediction for general formula of loss function. Calculation and programming environment R. Regression models, basics of linear regression, simple regression. Multiple regression, statistical tests of linear dependence, selection of input variables.			

14Y2PJ	C++ Programming Language	KZ	2
OOP philosophy and basics of C++ programming language. Class, object, constructor, destructor, inheritance, abstract class, virtual methods, exceptions, streams, method and operator overloading, abstract data type implementation in C++.			
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.			
12Y2RD	Realization of Transport Buildings	KZ	2
Transport Buildings Types. Project Documentation Types. Building Code. Land Permission and Building Permission Process. Building Process. Project Economics. Project Management.			
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.			
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 roduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.			
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.			
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?			
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.			
18Y2UB	Accident Biomechanics and Safety	KZ	2
Anatomy of man. Methods of Medical Diagnostics - RTG, CT, MRI, US. Dynamics of traumatic events. Factors influencing the severity of an accident and the extent of a traffic accident. Injuries in road traffic. Pedestrian injuries. Injury in railway and air traffic accidents. Analysis of biomechanical events in accidents and their computational modeling. Principles of treatment and rehabilitation. Protective elements and safety measures in transport.			
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.			
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.			
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.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
11MME	Mathematical Models in Economics	KZ	2
Stochastic prosesses and their classification, Poisson process, birth and death process, queueing models and their classification, graph and related terminology, cycles in a graph and their detection, the shortest and longest way through a graph, critical parth through a graph, extreme of a function of many arguments, free and constrained extremum, Lagrange multipliers, numerical methods in optimization, linear programming and its application.			
11XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
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.			
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.			
12TDP	Traffic Flow Theory	Z,ZK	3
Mobility and associated human problems. Basic traffic parameters and their measurement. Estimation of quality of services. Theoretical fundamentals and applications of mathematical models. Macroscopic, statistical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Relation between traffic models and traffic flow management.			
12XN1	Master Project 1	Z	2
12XN2	Master Project 2	Z	2

12Y2DVUP	Transport and Land - Use Planning	KZ	2
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.			
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 tranzit corridors.			
12Y2RD	Realization of Transport Buildings	KZ	2
Transport Buildings Types. Project Documentation Types. Building Code. Land Permission and Building Permission Process. Building Process. Project Economics. Project Management.			
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.			
14XN1	Master Project 1	Z	2
14XN2	Master Project 2	Z	2
14Y2C1	CATIA I	KZ	2
Fundaments of working with CATIA, making basic parts and bodies. Making 2D sketches, geometric stucture, parametric linking, making adaptive models from 2D sketches. Import and export of made parts and bodies. Making assemble and visualization.			
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.			
14Y2OP	Object Oriented Programming in Transport	KZ	2
Class, object, encapsulation, inheritance, polymorphism, templates, retyping, stream, exceptions, repository, collections, virtual methods and classes. Problem cases wil be chosen from microscopic simulation system, discrete event simulation, celular automata simulation and virtual life area.			
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).			
14Y2PJ	C++ Programming Language	KZ	2
OOP philosophy and basics of C++ programming language. Class, object, constructor, destructor, inheritance, abstract class, virtual methods, exceptions, streams, method and operator overloading, abstract data type implementation in C++.			
15J2A1	Language - English 1	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
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
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
15JBS2	Language - Spanish 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.			
15XN1	Master Project 1	Z	2
15XN2	Master Project 2	Z	2
15Y2DN	Transportation Psychology in German Speaking Countries	KZ	2
Introduction into broader view of 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 mediveal 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.			
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.			
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?			
16TAJ	Technological Aspects of Quality	Z	2
Certification and accreditation, quality management, standards of quality management and its application, quality system creation, tools and methods of quality improvement, conformity assurance, environmental certification, workplace certification, QMS integration, classification, certification of products and producers.			
16XN1	Master Project 1	Z	2
16XN2	Master Project 2	Z	2

16Y2HP	Vehicle Hygiene	KZ	2
Emissions and ergonomy 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. Ergonomy - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredom.			
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.			
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.			
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 roduction and mending of vehicles, laser and laser technologies, soldering, gluing, ultrasound, diffusion, friction and explosion technologies, micro stoves, gas.			
17ILO	Information Technology in Logistics	Z,ZK	4
Basics of bar code technology. Basics of radiofrequency identification. Product numbering systems for intensive distribution. Packaging hierarchy and identification models in supply chain. Identification of trading partners in the supply chain. Basics of data communication in logistics. National and global multidisciplinary standards for electronic data interchange. ERP Systems used in retail and fast moving consumer goods.			
17INV	Investments and Financing in Transport	Z,ZK	4
Projects and project planning, project financing, financing models, PPP financing, selection procedure, EIA study, project assessment and its criterions, NPV, IRR. Optimal variant selection. Zone planning and decision making.			
17LGY	Logistics Systems	Z,ZK	6
Transport in logistics, intermodal transport, electronic toll systems in road transport, supply chain management, logistics partnership and alliances, logistic service of teritory, dangerous goods in logistics, management and marketing in logistics, identification systems in logistics, IT in logistic systems and transportation.			
17PJM	Project Management	ZK	2
Project and planning, project content, management and project task organization. Technical and economical assessment criterions. Criterion function and its components. Organization and management of the project run.			
17TTH	Transport Theory	Z,ZK	5
Elements of theory of graphs. Minimum spanning tree, trees in graphs. Paths and cycles. Arc routing problems. Vehicle routing problems. Network flows. Location problems. Transportation elements. Transportation flows. Theory of displacement quality. Multicriterial decision making in transport processes.			
17XN1	Master Project 1	Z	2
17XN2	Master Project 2	Z	2
17Y2KI	Capital Investment in Transportation and Telecommunications	KZ	2
Financial market, investment desicion making - long term goals and investment strategies, long temr financing.			
17Y2MM	Mobility of Small Towns	KZ	2
Basic terms, networks of railway and bus lines, alternative forms of regional transport, influence in regional transport in vicinity of big cities, solutions of passenger and freight transport in regions, activities related to regional transport, passenger transport safety in regions.			
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.			
18XN1	Master Project 1	Z	2
18XN2	Master Project 2	Z	2
18Y2D2	Dynamics of Transport Routes and Vehicles 2	KZ	2
Analysis of forces in the vehicle and transport routes and their influence on the stress and strain components of the vehicle structure or behavior of traffic routes. Creation of dynamic models of vehicles and transport routes. Vibration of systems with a finite number of degrees of freedom. Methods of constant stiffness and constant compliance. Dynamic calculations of structural systems. Criteria for the admissibility of oscillation.			
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.			
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.			
18Y2UB	Accident Biomechanics and Safety	KZ	2
Anatomy of man. Methods of Medical Diagnostics - RTG, CT, MRI, US. Dynamics of traumatic events. Factors influencing the severity of an accident and the extent of a traffic accident. Injuries in road traffic. Pedestrian injuries. Injury in railway and air traffic accidents. Analysis of biomechanical events in accidents and their computational modeling. Principles of treatment and rehabilitation. Protective elements and safety measures in transport.			
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.			
20STL	Satellite Technologies and Logistics	Z,ZK	4
Basic topics: GPS and Galileo navigation systems and their use for positioning the rail, air, sea, road and urban transport; GIS technology as a powerful tool for solving problems in logistics, appropriate telecommunication technologies and technologies for the identification and monitoring of goods; life cycle of satellite systems, satellite as the carrier of satellite systems functionalities and its technology.			
20XN1	Master Project 1	Z	2

20XN2	Master Project 2	Z	2
20Y2PR	Prediction of time series	KZ	2
Introduction to time series prediction, meaning of prediction, basics of quantitative prediction. Methods for predictive quality evaluation, descriptive statistics, MAE, MAPE, RMSE, naive prediction, prediction for general formula of loss function. Calculation and programming environment R. Regression models, basics of linear regression, simple regression. Multiple regression, statistical tests of linear dependence, selection of input variables.			
21XN1	Master Project 1	Z	2
21XN2	Master Project 2	Z	2
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. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training Systém of Air Traffic Controllers. Future development of ATS.			
21Y2MK	Marketing of Air Transport	KZ	2
The content of the course "Marketing in air transport" is the management of activities and processes using available marketing tools and processes for analysis, strategy development and implementation of sales of goods and services in the aviation industry. In addition to the theoretical foundations of marketing, the lectures present systems of market, competition and product analysis, creation of marketing strategies and planning.			
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.			
22XN1	Master Project 1	Z	2
22XN2	Master Project 2	Z	2
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 passangers, pedestrian, traffic accident simulation and analysis.			
23XN1	Master Project 1	Z	2
23XN2	Master Project 2	Z	2
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.			

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