

# Study plan

## Name of study plan: TR nav.prez.16/17

Faculty/Institute/Others:

Department:

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

Garantor of the study branch: prof. Dr. Ing. Miroslav Svítek, dr. h. c.

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	<b>Master Project 1</b> Magdalena Hykšová	Z	2	0P+2C	Z	ZP
12XN1	<b>Master Project 1</b> Zuzana Čarská, Jiří Čarský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura, .....	Z	2	0P+2C	Z	ZP
23XN1	<b>Master Project 1</b>	Z	2	0P+2C	Z	ZP
22XN1	<b>Master Project 1</b> Michal Frydryn, Karel Kocián, Tomáš Mičunek, Luboš Nouzovský, Zdeněk Svatý	Z	2	0P+2C	Z	ZP
21XN1	<b>Master Project 1</b>	Z	2	0P+2C	Z	ZP
20XN1	<b>Master Project 1</b> Jiří Růžička, Patrik Horažďovský, Vladimír Faltus, Petr Bureš, Milan Sliacky, Martin Langr	Z	2	0P+2C	Z	ZP
18XN1	<b>Master Project 1</b> Petr Zlámal, Petr Koudelka, Tomáš Fíla	Z	2	0P+2C	Z	ZP
17XN1	<b>Master Project 1</b> Václav Baroch, Edvard Březina, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, .....	Z	2	0P+2C	Z	ZP
16XN1	<b>Master Project 1</b> Adam Orlický, Josef Mík, Dmitry Rozhdestvenskiy, Přemysl Toman	Z	2	0P+2C	Z	ZP
15XN1	<b>Master Project 1</b> Jan Feit, Eva Rezlerová	Z	2	0P+2C	Z	ZP
14XN1	<b>Master Project 1</b> Jana Kalíková, Jan Krčál, Martin Šrotýř, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler, Jana Kalíková (Gar.)	Z	2	0P+2C	Z	ZP
11XN2	<b>Master Project 2</b>	Z	2	0P+2C	L	ZP
22XN2	<b>Master Project 2</b> Michal Frydryn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý	Z	2	0P+2C	L	ZP
21XN2	<b>Master Project 2</b> Peter Vittek, Lenka Hanáková, Vladimír Socha, Jakub Kraus, Stanislav Pleninger, Jakub Hospodka, Andrej Lališ, Slobodan Stojić, Markéta Šedivá, Kařková, .....	Z	2	0P+2C	L	ZP
20XN2	<b>Master Project 2</b>	Z	2	0P+2C	L	ZP
18XN2	<b>Master Project 2</b>	Z	2	0P+2C	L	ZP
23XN2	<b>Master Project 2</b>	Z	2	0P+2C	L	ZP

16XN2	<b>Master Project 2</b> <i>Adam Orlický, Josef Mík</i>	Z	2	0P+2C	L	ZP
15XN2	<b>Master Project 2</b> <i>Eva Rezlerová</i>	Z	2	0P+2C	L	ZP
14XN2	<b>Master Project 2</b> <i>Jana Kalíková, Jan Krčál, Martin Šrotýř, Zdeněk Lokaj, Tomáš Zelinka, Ota Hajzler</i>	Z	2	0P+2C	L	ZP
12XN2	<b>Master Project 2</b> <i>Zuzana Čarská, Jiří Čarský, Josef Filip, Jan Gallia, Martin Höfler, Tomáš Honc, Lukáš Hrdina, Petr Chmela, Martin Jacura, .....</i>	Z	2	0P+2C	L	ZP
17XN2	<b>Master Project 2</b> <i>Václav Baroch, Edvard Březina, Michal Drábek, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, Zdeněk Michl, Denisa Mocková, .....</i>	Z	2	0P+2C	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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
12TDP	<b>Traffic Flow Theory</b> <i>Vladimír Faltus</i>	Z,ZK	3	2P+1C	Z	P
17ILO	<b>Information Technology in Logistics</b>	Z,ZK	4	2+2	Z	P
17LGY	<b>Logistics Systems</b>	Z,ZK	6	3+2	Z	P
17PJM	<b>Project Management</b>	ZK	2	2+0	Z	P
11MME	<b>Mathematical Models in Economics</b>	KZ	2	1+1	Z	P
12DZP	<b>Transport and Environment</b> <i>Kristýna Neubergová</i>	Z	2	2P+0C	Z	P
15J2A1	<b>Language - English 1</b> <i>Jan Feit, Eva Rezlerová, Klára Lancová, Lenka Monková, Marie Michlová, Jiřka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Moppuss, .....</i> <i>Jiřka Heřmanová (Gar.)</i>	Z	2	0P+2C+10B	Z	P
15J2S1	<b>Language - Spanish 1</b> <i>Jan Feit, Eva Rezlerová, Petra Mračková Vavroušová, Nina Hricsina Puškinová</i> <i>Petra Mračková Vavroušová (Gar.)</i>	Z	2	0P+2C	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 territory, 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 processes 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 path 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
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.			
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) <i>Tutors, authors and guarantors (gar.)</i>	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 <i>Přemysl Toman, Jaroslav Machan</i>	Z	2	2P+0C	L	P
15JBA2	Language - English 2 <i>Jan Feit, Eva Rezlerová, Lenka Monková, Marie Michlová, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, Peter Morpuss, Markéta Olehlová, ....</i>	Z	2	0P+2C+10B	L	P
15JBS2	Language - Spanish 2 <i>Jan Feit, Eva Rezlerová, Nina Hricina Puškinová</i>	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
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.			

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.			

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 16/17

Name of the group: PVP nav.prez.TR 16/17

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
14Y2C1	<b>CATIA I</b>	KZ	2	2P+0C	L	PV
14Y2CS	<b>Sensitivity of Systems</b>	KZ	2	2P+0C	L	PV
15Y2DN	<b>Transportation Psychology in German Speaking Countries</b>	KZ	2	2P+0C	L	PV
18Y2FZ	<b>Physical Basis of Materials' Properties</b> <i>Jaroslav Valach</i>	KZ	2	2P+0C	L	PV
15Y2HS	<b>Road Transport History</b> <i>Zuzana Čarská</i>	KZ	2	2P+0C	L	PV
16Y2HP	<b>Vehicle Hygiene</b> <i>Jiří First</i>	KZ	2	2P+0C	L	PV
14Y2IS	<b>Intelligent Systems in Postal Services</b>	KZ	2	2P+0C	L	PV
17Y2KI	<b>Capital Investment in Transportation and Telecommunications</b>	KZ	2	2+0	L	PV
16Y2KV	<b>Car Body Design</b> <i>Josef Mik, Jiří First</i>	KZ	2	2P+0C	L	PV
21Y2LS	<b>Air Traffic Services</b> <i>Jiří Šála, Marek Štumper</i>	KZ	2	2P+0C	L	PV
11Y2LG	<b>Logics of Engineer's Judgement</b>	KZ	2	2P+0C	L	PV
21Y2MK	<b>Marketing of Air Transport</b>	KZ	2	2+0	L	PV
18Y2MP	<b>Finite Element Method And Its Application</b> <i>Ondřej Jíroušek</i>	KZ	2	2P+0C	L	PV
16Y2MK	<b>Quality Methods for Vehicles</b> <i>Přemysl Toman, Jaroslav Machan</i>	KZ	2	2P+0C	L	PV
12Y2MD	<b>Methods of Traffic Regulation and Prediction</b> <i>Zuzana Čarská</i>	KZ	2	2P+0C	L	PV
17Y2MM	<b>Mobility of Small Towns</b>	KZ	2	2+0	L	PV
12Y2MZ	<b>Modernization of Railway Lines and Stations</b> <i>Miroslav Veliš</i>	KZ	2	2P+0C	L	PV
12Y2MH	<b>Measurement and Modeling of Traffic Noise</b>	KZ	2	2P+0C	L	PV
14Y2OP	<b>Object Oriented Programming in Transport</b>	KZ	2	2P+0C	L	PV
15Y2PT	<b>Food in Transportation</b> <i>Jan Feit, Eva Režlerová, Petr Musil</i>	KZ	2	2P+0C	L	PV
22Y2PS	<b>Traffic Accidents Computer Simulation and Analysis</b> <i>Michal Frydrýn, Tomáš Mičunek</i>	KZ	2	2P+0C	L	PV
20Y2PR	<b>Time Series Prediction</b> <i>Emil Pelikán</i>	KZ	2	2P+0C	L	PV
14Y2PJ	<b>C++ Programming Language</b> <i>Vít Fábera</i>	KZ	2	2P+0C	L	PV
14Y2PH	<b>CAD Interface Programming</b>	KZ	2	2P+0C	L	PV
11Y2PM	<b>Programming in MATLAB</b>	KZ	2	2P+0C	L	PV
21Y2PP	<b>Law and Operation in Air Transport</b> <i>Marie Hauerová</i>	KZ	2	2P+0C	L	PV
12Y2RD	<b>Realization of Transport Buildings</b> <i>Martin Höfler</i>	KZ	2	2P+0C	L	PV
16Y2ST	<b>Special Technologies in Transport and Telecommunications</b> <i>Jiří Dunovský</i>	KZ	2	2P+0C	L	PV
17Y2SK	<b>Urban and Regional Rail Transport System</b> <i>Jiří Pospíšil</i>	KZ	2	2P+0C	L	PV

17Y2SJ	<b>Network Timetabling on the Railway</b> <i>Vít Janoš</i>	KZ	2	2P+0C	L	PV
15Y2TS	<b>Technician and Contemporary Society</b> <i>Jan Feit, Eva Rezlerová</i>	KZ	2	2P+0C	L	PV
12Y2UD	<b>Sustainable Transportation</b> <i>Kristýna Neubergová</i>	KZ	2	2P+0C	L	PV
23Y2VZ	<b>Leadership and Human Resource Development</b>	KZ	2	2P+0C	L	PV
23Y2VR	<b>Cope with Risks in Engineering Branches</b>	KZ	2	2P+0C	L	PV
18Y2VC	<b>Computational Mechanics in Transportation</b> <i>Ondřej Jiroušek</i>	KZ	2	2P+0C	L	PV
18Y2UB	<b>Accident Biomechanics and Safety</b> <i>Jitka Jírová</i>	KZ	2	2P+0C	L	PV

**Characteristics of the courses of this group of Study Plan: Code=Y2-NPTR 16/17 Name=PVP nav.prez.TR 16/17**

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.						
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.						
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.).						
18Y2FZ	Physical Basis of Materials' Properties	KZ	2			
On the basis of internal structure and nature of in-traction 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.						
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 interconnections, bridges and traffic control, development of road signs.						
16Y2HP	Vehicle Hygiene	KZ	2			
Emissions and ergonomics 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. Ergonomics - sitting, standing, control, operational reach. Condition - heating, ventilation, air-conditioning, filtration, tiredness.						
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.						
17Y2KI	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.						
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.						
21Y2MK	Marketing of Air Transport	KZ	2			
Definition, purpose, evolution, stages and types of marketing. Marketing in air transportation. Marketing research. Market segmentation. Airlines marketing strategies. Airline Products. Yield management and revenues. Air transport market sales.						
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 transit 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, cellular simulations and virtual life simulations.			
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.			
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.			
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.			
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.			
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.			
12Y2RD	Realization of Transport Buildings	KZ	2
In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.			
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.			
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?			
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.			
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.			
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.			
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.			

## List of courses of this pass:

Code	Name of the course	Completion	Credits
11MME	Mathematical Models in Economics Stochastic processes 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 path 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.	KZ	2
11XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
11Y2LG	Logics of Engineer's Judgement 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.	KZ	2
11Y2PM	Programming in MATLAB 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.	KZ	2
12DZP	Transport and Environment 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.	Z	2
12TDP	Traffic Flow Theory 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, queueing theory and special theory of traffic phenomena. Relation between traffic models and traffic flow management.	Z,ZK	3
12XN1	Master Project 1	Z	2
12XN2	Master Project 2	Z	2
12Y2MD	Methods of Traffic Regulation and Prediction 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.	KZ	2
12Y2MH	Measurement and Modeling of Traffic Noise 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.	KZ	2
12Y2MZ	Modernization of Railway Lines and Stations 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.	KZ	2
12Y2RD	Realization of Transport Buildings In the first part acquainting students with preliminary to project. Preliminary to realization. Execution of a project.	KZ	2
12Y2UD	Sustainable Transportation Sustainable development, definition, history, legal framework. Sustainable development indicators. Sustainable transportation, definition, history, legal framework. Practical application of sustainable development theory, case study.	KZ	2
14XN1	Master Project 1	Z	2
14XN2	Master Project 2	Z	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
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
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
14Y2OP	Object Oriented Programming in Transport 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, cellular simulations and virtual life simulations.	KZ	2
14Y2PH	CAD Interface Programming 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).	KZ	2
14Y2PJ	C++ Programming Language Principles of object-oriented programming and C++ programming language. Basic concepts, such as - classes, objects, constructors, destructors, inheritance, virtual methods, exceptions, streams, overloading, ADT.	KZ	2
15J2A1	Language - English 1 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.	Z	2

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.			
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.			
15XN1	Master Project 1	Z	2
15XN2	Master Project 2	Z	2
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.			
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 ergonomoy 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
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.			
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.			
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	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.			
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. Procedural and radar control. Incidents caused or partially caused by ATS. History of ATS and czech airspace.			
21Y2MK	Marketing of Air Transport	KZ	2
Definition, purpose, evolution, stages and types of marketing. Marketing in air transportation. Marketing research. Market segmentation. Airlines marketing strategies. Airline Products. Yield management and revenues. Air transport market sales.			
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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