Study plan

Name of study plan: AUT bak.prez.13/14

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: Bachelor full-time
Required credits: 180
Elective courses credits: 0
Sum of credits in the plan: 180
Note on the plan:

Name of the block: Compulsory courses
Minimal number of credits of the block: 152
The role of the block: Z

Code of the group: 1.S.BP 10/11
Name of the group: 1.sem.bak.prez.10/11
Requirement credits in the group: In this group you have to gain 30 credits
Requirement courses in the group: In this group you have to complete 12 courses
Credits in the group: 30
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
13E	**Economics**	Z,ZK	3	2+1	Z	z
11GIE	**Geometry** *Oldřich Hykš, Pavel Provinský, Šárka Voráčová* ***Oldřich Hykš*** *Oldřich Hykš (Gar.)*	KZ	3	2P+2C+12B	Z	z
14KSP	**Constructing with Computer Aid** *Martin Brumovský, Martin Fiala, Radek Kratochvíl, Lukáš Svoboda, Jan Vogl, Drahomír Schmidt* ***Lukáš Svoboda*** *Drahomír Schmidt (Gar.)*	KZ	2	0P+2C+8B	Z	z
11LA	**Linear Algebra** *Pavel Provinský, Lucie Kárná, Martina Bečvářová* ***Martina Bečvářová*** *Martina Bečvářová (Gar.)*	Z,ZK	3	2P+1C+10B	Z	z
11MTA	**Mathematical Analysis**	Z,ZK	4	2+2	Z	z
18MRI1	**Materials 1**	Z,ZK	3	2+1	Z	z
00TVC1	**Physical Education 1**	Z	1	0+2	Z	z
18TTED	**Creation of Technical Documentation**	KZ	2	2+1	Z	z
22UN	**Traffic Accidents Introduction**	Z	2	2+0	Z	z
12ZADI	**Introduction to Transportation Engineering**	Z,ZK	3	2+1	Z	z
14ZINF	**Fundamentals of Informatics**	KZ	2	0+2	Z	z
21ZLD	**Introduction to Air Transport**	KZ	2	2+1	Z	z

Characteristics of the courses of this group of Study Plan: Code=1.S.BP 10/11 Name=1.sem.bak.prez.10/11

13E	Economics	Z,ZK	3
Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.			
11GIE	Geometry	KZ	3
Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet`s trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilites, AutoCAD environment profiles, drawings with raster foundaments).			

11LA	Linear Algebra	Z,ZK	3
Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.			
11MTA	Mathematical Analysis	Z,ZK	4
Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.			
18MRI1	Materials 1	Z,ZK	3
Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephectostopic testing. Corosion.			
00TVC1	Physical Education 1	Z	1
Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.			
18TTED	Creation of Technical Documentation	KZ	2
Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.			
22UN	Traffic Accidents Introduction	Z	2
Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.			
12ZADI	Introduction to Transportation Engineering	Z,ZK	3
Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.			
14ZINF	Fundamentals of Informatics	KZ	2
Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions.			
21ZLD	Introduction to Air Transport	KZ	2
Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.			

Code of the group: 2.S.BP 10/11
Name of the group: 2.sem.bak.prez.10/11
Requirement credits in the group: In this group you have to gain 30 credits
Requirement courses in the group: In this group you have to complete 12 courses
Credits in the group: 30
Note on the group:

Code	**Name of the course / Name of the group of courses** ***(in case of groups of courses the list of codes of their members)*** *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
13EDOT	**Economy, Transport, Telecommunications**	KZ	2	2+0	L	z
11FY1	**Physics 1**	Z,ZK	4	2P+2C	L	z
11MVP	**Mathematical Analysis of Function of More Variables**	Z,ZK	3	2+2	L	z
18MRI2	**Materials 2**	KZ	2	2+0	L	z
11PT	**Probability**	Z	2	1+1	L	z
12PKD	**Rail Transport Designing**	Z,ZK	3	2+2	L	z
14SIAP	**Networks and Protocols**	KZ	2	1+1	L	z
18ST	**Statics**	Z,ZK	3	2+1	L	z
17TDL	**Transport Technology and Logistics**	Z,ZK	3	2+2	L	z
00TVC2	**Physical Education 2**	Z	1	0+2	L	z
20UIS	**Introduction to ITS**	Z,ZK	3	2+1	L	z
14UPRO	**Introduction to Programming**	KZ	2	0+2	L	z

Characteristics of the courses of this group of Study Plan: Code=2.S.BP 10/11 Name=2.sem.bak.prez.10/11

13EDOT	Economy, Transport, Telecommunications	KZ	2
Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.			
11FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
11MVP	Mathematical Analysis of Function of More Variables	Z,ZK	3
Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R3, application of integral calculus in physics.			
18MRI2	Materials 2	KZ	2
Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.			

11PT	Probability	Z	2
Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.			
12PKD	Rail Transport Designing	Z,ZK	3
Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.			
14SIAP	Networks and Protocols	KZ	2
Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquirement from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.			
18ST	Statics	Z,ZK	3
General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.			
17TDL	Transport Technology and Logistics	Z,ZK	3
Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in pasanger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means.			
00TVC2	Physical Education 2	Z	1
Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.			
20UIS	Introduction to ITS	Z,ZK	3
Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.			
14UPRO	Introduction to Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			

Code of the group: 3.S.BP 11/12
Name of the group: 3.sem.bak.prez.11/12
Requirement credits in the group: In this group you have to gain 27 credits
Requirement courses in the group: In this group you have to complete 10 courses
Credits in the group: 27
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
11DAD	**Differential and Difference Equations**	Z,ZK	3	2+1	Z	z
11FY2	**Physics 2**	Z,ZK	4	2+2	Z	z
12MDE	**Transport Models and Transport Excesses** *Milan Dont, Josef Kocourek*	Z,ZK	3	2P+1C+8B	Z	z
12PPOK	**Designing Roads, Highways and Motorways** *Josef Kocourek, Petr Šatra, Tomáš Padělek, Petr Kumpošt*	KZ	3	1P+2C+10B	Z	z
18PZP	**Elasticity and Strength** *Jan Vyčichl, Jitka Řezníčková, Daniel Kytýř, Jan Šleichrt, Tomáš Doktor, Tomáš Fíla, Nela Krčmářová, Jan Falta, Radim Dvořák, ...*	Z,ZK	3	2P+1C+10B	Z	z
11SIS	**Statistics**	Z,ZK	2	1+1	Z	z
20SSA	**Systems Analysis**	Z,ZK	3	2+1	Z	z
14UATT	**Introduction to Automatization and Telecommunication Systems**	KZ	2	3+0	Z	z
16UDDM	**Introduction to Transportation and Manipulation Technics**	ZK	2	2+0	Z	z
14ZAET	**Fundamentals of Electrotechnics**	KZ	2	2+1	Z	z

Characteristics of the courses of this group of Study Plan: Code=3.S.BP 11/12 Name=3.sem.bak.prez.11/12

11DAD	Differential and Difference Equations	Z,ZK	3
Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function.			
11FY2	Physics 2	Z,ZK	4
Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.			
12MDE	Transport Models and Transport Excesses	Z,ZK	3
Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.			

12PPOK	Designing Roads, Highways and Motorways	KZ	3
Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.			
11SIS	Statistics	Z,ZK	2
Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.			
20SSA	Systems Analysis	Z,ZK	3
Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.			
14UATT	Introduction to Automatization and Telecommunication Systems	KZ	2
Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transpotation, modelling and projecting of transport systems, integrated technological and infromation system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.			
16UDDM	Introduction to Transportation and Manipulation Technics	ZK	2
Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.			
14ZAET	Fundamentals of Electrotechnics	KZ	2
Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementar methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triplangel and principle of superposition in direct current circuits.			

Code of the group: 4.S.BAUT 12/13
Name of the group: 4.sem. AUT bak.prez. 12/13
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 7 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**
14ANM	**Numerical Methods Application**	Z,ZK	3	2+2	L	z
14ELN	**Electronics**	Z,ZK	3	2+1	L	z
18KIAD	**Kinematics and Dynamics**	Z,ZK	2	2+1	L	z
11MDS	**Collection and Processing of Traffic Data**	KZ	2	2P+0C	L	z
11MSP	**Modeling of Systems and Processes** *Lucie Kárná, Bohumil Kovář, Jana Kuklová* ***Jana Kuklová*** *Bohumil Kovář (Gar.)*	Z,ZK	4	2P+2C+12B	L	z
14OJM	**Object Oriented Modelling**	Z,ZK	3	2+1	L	z
20TRS	**Control Theory**	KZ	2	2+0	L	z

Characteristics of the courses of this group of Study Plan: Code=4.S.BAUT 12/13 Name=4.sem. AUT bak.prez. 12/13

14ANM	Numerical Methods Application	Z,ZK	3
Numerical methods and their application, implementation of vectors and matrices in C/C++ using STL library, linear equation system solving, interpolating, approximation, numerical derivative and integration, differential equation solving, stability of methods.			
14ELN	Electronics	Z,ZK	3
Semiconductor diodes and thyristor and their applications. Transistors, their basic connecting and applications. Operational amplifiers, their linear and non-linear applications and frequency characteristics. Passive and active frequency filters. AD and DA converters.			
18KIAD	Kinematics and Dynamics	Z,ZK	2
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Princle of D´Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
11MDS	Collection and Processing of Traffic Data	KZ	2
Basic principles of traffic detection and data collection, specific problems of the field of traffic data. Data preprocessing and analysis for use in additional applications.			
11MSP	Modeling of Systems and Processes	Z,ZK	4
System and subsystem, external and internal system description, continuous and discrete system, mathematics as a tool, examples of formulation of differential and differential equations. Linear and nonlinear system, stationary and non-stationary system, causality. Convolutional integral. Laplace and Z transformations. Transfer function. Stability of LTI systems. Discretization of continuous systems. System interconnection.			
14OJM	Object Oriented Modelling	Z,ZK	3
Fundamentals of object oriented SW development, fundamentals of object oriented approach. Explanation of basic classes, polymorphism, inheriting, complementation. Modelling fundamnetals in UML. Principles and processing use case diagrams, sequention diagrams, classes and states diagrams. Use of CASE tools for complex analysis. Usability of OM and process modelling.			

20TRS	Control Theory	KZ	2

Introduction to theory systems, linear, non-linear and causal systems. Signal theory, regulation circuits and regulators. Stability and criteria of stability. Management, principles of feedback management. Adaptive and expert management.

Code of the group: 4.S. BPAUT VÝBĚR 12/
Name of the group: 4.sem.AUT výběr předmětu 12/13
Requirement credits in the group: In this group you have to gain 2 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 2
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
14CAD1	**CAD 1**	KZ	2	0+2	L	z
14OS1	**Operating Systems 1**	KZ	2	0+2	L	z

Characteristics of the courses of this group of Study Plan: Code=4.S. BPAUT VÝBĚR 12/ Name=4.sem.AUT výběr předmětu 12/13

14CAD1	CAD 1	KZ	2

Modelling principles and techniques in non-parametric modeller (AutoCAD), Boolean operations, planar vs. volumetric objects. Illuminated scenes - light types and illumination methods. Creation and use of materials for 3D objects. Ways of texture mapping. Final models rendering.

14OS1	Operating Systems 1	KZ	2

OS, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronizzation, file systems, architecture of OS Windows and Linux, start of PC and OS, networking, safety in S, terminals in MS Win and Linux, batch files.

Code of the group: 5.S.BAUT 12/13
Name of the group: 5.sem.AUT bak.prez. 12/13
Requirement credits in the group: In this group you have to gain 18 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 18
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
14DB	**Database Systems**	KZ	2	0+2	Z	z
14IFSD	**Information Systems in Transportation**	KZ	2	2+0	Z	z
14SE	**High Voltage Electrical Engineering**	KZ	2	2+0	Z	z
14TSJ	**Communication Technologies**	Z	2	2+0	Z	z
14TC	**Telecommunications**	Z,ZK	3	2+2	Z	z
17TGA	**Graph Theory and its Applications in Transport** *Alena Rybičková, Denisa Mocková, Dušan Teichmann*	Z,ZK	4	2P+2C+12B	Z	z
20ZC	**Base of Digital Technique**	Z,ZK	3	2+1	Z	z

Characteristics of the courses of this group of Study Plan: Code=5.S.BAUT 12/13 Name=5.sem.AUT bak.prez. 12/13

14DB	Database Systems	KZ	2

Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.

14IFSD	Information Systems in Transportation	KZ	2

Transportation demands, IS types for transport area, common IS structures. Continuous and discrete simulation. Visualization, coding and encryption, secured vs. open comminication channel. Optimizing by help of GA. Theory of games, Paret selections. IS´s life cycle. Legal frame of IS at transportation. Governement IS. Development of secure and relevant ISs at transportation. Real time operating IS. IS certification and validation.

14SE	High Voltage Electrical Engineering	KZ	2

Three-phase system, single- and three-phase transformer, automatic transformer, electromagnet (solenoid), direct current generator and overview of types, direct current motor and overview of types, alternate current motors, rotary magnetic field of three-phase winding, synchronous and asynchronous (induction) motor, alternate current generator (alternator).

14TSJ	Communication Technologies	Z	2

Technology of post shipment submission, transport, and delivery in physical and electronic way, virtual post operation. Technology of information transmission via electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solution to e-communication network interfaces, technological principles of end telecommunication devices.

14TC	Telecommunications	Z,ZK	3

Introduction of present stage and new trends in telecommunications systems. Legal conditions for telecommunications services provisioning and applications are introduced. Telecommunications key elements applied in hierarchical architecture are introduces and relations between networks elements parameters and performance of the whole telecommunications systems are explained in context with their typical applications in the transportations systems.

17TGA	Graph Theory and its Applications in Transport	Z,ZK	4

Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines.

20ZC	Base of Digital Technique	Z,ZK	3

Introduction to logical systems. Design of combinational and sequential logic circuits. Computer architecture - von Neumann concept, RISC architecture. Processor, computer arithmetics, controller, memories, instruction set, base cycle of computer. Digital circuits, A/D and D/A converters. One-chip microcontrollers. Programmable logical circuits - FPGA, CPLD. Displays.

Code of the group: 5.S.BAUT VÝBĚR 12/1
Name of the group: 5.sem.AUT výběr předmětu 12/13
Requirement credits in the group: In this group you have to gain 5 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 5
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
14CAD2	**CAD 2**	KZ	2	0+2	Z	z
14CA	**CAx Systems**	KZ	3	1+2	Z	z
14OS2	**Operating Systems 2**	KZ	2	0+2	Z	z
20ZTH	**Railway Interlocking Plants**	KZ	3	2+1	Z	z

Characteristics of the courses of this group of Study Plan: Code=5.S.BAUT VÝBĚR 12/1 Name=5.sem.AUT výběr předmětu 12/13

14CAD2	CAD 2	KZ	2

Introduction to different approaches at parametric and adaptive modelling. Sketch drawing with a help of geometric relations and parametric dimensions. Theory of work in working planes, axes, and points frameworks. Parts and assemblies modelling, possibilities of adaptive modelling. Creation of presentations and drawings.

14CA	CAx Systems	KZ	3

Programming tools for development of CAx applications superstructures and user interfaces, systems openness, use of C/C++, VBA, and LISP languages, possibilities of scripts and cooperation with spreadsheet programs, relation to database systems.

14OS2	Operating Systems 2	KZ	2

Domains and workgroups in MS Windows, users and their rights, configuration of networks (NFS, Samba, Firewall, FTP, http, DHCP, DNS),Windows register, remote deskttop, configuration files, programming - networking, threads.

20ZTH	Railway Interlocking Plants	KZ	3

Characteristics of components and parts of interlocking plants for control and command of railways transport. Rail transport; standards and principles of rail security. I., II. and III. categories of interlocking plants and future technologies. Components for interlocking plants. Compatibility and interoperability. Data security. Situation in the Czech Republic and in the world. Intelocking plants in public transport in cities.

Code of the group: 6.S.BAUT 13/14
Name of the group: 6.sem.AUT bak.prez. 13/14
Requirement credits in the group: In this group you have to gain 17 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 17
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
20BAS	**Safety and Reliability of Systems**	KZ	2	2+0	L	z
14DM	**Datamining**	KZ	2	2+0	L	z
17DAS	**Transportation and Communication Law**	Z	1	2+0	L	z
17ERP	**Company Economy and Management**	Z,ZK	3	2+1	L	z
14ISYS	**Information Systems**	KZ	2	2+0	L	z
14RVD	**Robotics in Transportation**	Z,ZK	3	2+2	L	z
14TLSY	**Telecommunication Systems**	Z,ZK	4	2+2	L	z

Characteristics of the courses of this group of Study Plan: Code=6.S.BAUT 13/14 Name=6.sem.AUT bak.prez. 13/14

20BAS	Safety and Reliability of Systems	KZ	2

Basic concepts of safety and reliability in transport and its application. Basic scheme and the types of diagnostic systems. Acceptability and reliability of prediction. The sensitivity of transport and sensitivity analysis. Neural networks and optimization algorithms. Human factors in transport. Human - system interaction. Testing of the simulator operator and testing in real situations.

14DM	Datamining	KZ	2

Types of data sources and acquired knowledge, data stores and OLAP technology for knowledge acquiring from data, data preprocessing at knowledge acquiring process, datamining systems, classes characteristics mining, mining of asocial rules from data stores and databases, classification (decision-making tree, Bayes classification, use of neuron networks). Prediction. Cluster analysis. Mining in complex structured data, multimedial dbf, www.

17DAS	Transportation and Communication Law	Z	1

Transportation and communication law - railway, road transport, ropeway, water road, air transport, telecommunication, post, patent.

17ERP	Company Economy and Management	Z,ZK	3
Company and its neighbourhood, structure of assets and liabilities, depreciation, costs, revenues and profit, break-even point, costing, inventory, financial management, investment appraisal, basics of management, organizational structures, human resources management, marketing, company strategy, business plan.			
14ISYS	Information Systems	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these toole use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.			
14RVD	Robotics in Transportation	Z,ZK	3
Understanding the following topics: robot and industrial manupulator, classification, mobile robot. Robot kinematics, co-ordinate systems. Special robot sensors. Action members, transmissions. Tactile recognition, woring head. Industrial robots´ control systems. Spatial orientation. Visual information processing. Mobile robots. Particularities of mobile robot control systems. Artificial intelligence in robotics. Reactive systems.			
14TLSY	Telecommunication Systems	Z,ZK	4
Characteristics of metallic and fiber lines, network passive and active elements. Physical layer design tools. Terrestrial and wireless (fixed and mobile) systems - network architecture. Most frequently used protocols, their properties and mutual relations. Protocols application in e-communications systems for data and voice services and support of the ITS systems.			

Code of the group: 6.S.BAUT VÝBĚR 13/14
Name of the group: 6.sem.AUT výběr předmětu 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 at least 1 course (at most 2)
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
23SBIS	**Information Systems Security Standards**	KZ	2	2+0	L	Z
20TZ	**Technology of Control of the Railway Traffic Systems**	ZK	2	2+0	L	Z
14VZ	**3D Vizualization**	Z,ZK	4	2+2	L	Z

Characteristics of the courses of this group of Study Plan: Code=6.S.BAUT VÝBĚR 13/14 Name=6.sem.AUT výběr předmětu 13/14

23SBIS	Information Systems Security Standards	KZ	2
Security, reliability, accessibility and servicebility of information systems. Physical versus information security, open versus closed system. Basic principles of security and threats for information systems. Security of information systems - standards, development of standards, application of standards.			
20TZ	Technology of Control of the Railway Traffic Systems	ZK	2
Legislation in the railway transport. Technological process of rail transport control. Service and technology of control. Regional Railways. Rail communication equipment. Rail information systems. Fundamentals of rail control. Application of train driving automation.			
14VZ	3D Vizualization	Z,ZK	4
Description and principles of 3D modelling. Basic 3D primitiva and basic modification and transformation functions. SW tools for 3D visualization. Creation of 3D scene. Modification and combination of 3D primitiva. Decsription of planes and work with them. Use of material editors and work with textures. Illumination of 3D scenes, setup of luminous and material parameters. Application of cameras for scanning. Rendering and animations creation.			

Name of the block: Semestrální projekt
Minimal number of credits of the block: 6
The role of the block: ZP

Code of the group: XB 4,5,6 13/14
Name of the group: Projekty bak. 4.5.6.sem. (od)13/14 - pro B3710
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 3 courses
Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
11X31	**Project 1**	Z	2	0P+1C	L	ZP
12X31	**Project 1**	Z	2	0P+1C	L	ZP
14X31	**Project 1**	Z	2	0P+1C	L	ZP
15X31	**Project 1**	Z	2	0P+1C	L	ZP
16X31	**Project 1**	Z	2	0P+1C	L	ZP
17X31	**Project 1** *Alena Rybičková, Denisa Mocková, Dušan Teichmann, Roman Štěrba, Milan Kříž, Václav Baroch, Daniel Pilát, Michal Drábek, Alexandra Dvořáčková, ... Václav Baroch (Gar.)*	Z	2	0P+1C	L	ZP

18X31	**Project 1**	Z	2	0P+1C	L	ZP
20X31	**Project 1**	Z	2	0P+1C	L	ZP
21X31	**Project 1** *Jakub Kraus, AndrejAliš, Jakub Hospodka, Slobodan Stojić, Lenka Hanáková, Terézia Pilmannová, Peter Vittek, Natalia Guskova, Kateřina Grötschelová, ...*	Z	2	0P+1C	L	ZP
22X31	**Project 1**	Z	2	0P+1C	L	ZP
23X31	**Project 1**	Z	2	0P+1C	L	ZP
11X32	**Project 2**	Z	2	0P+2C	Z	ZP
12X32	**Project 2**	Z	2	0P+2C	Z	ZP
14X32	**Project 2**	Z	2	0P+2C	Z	ZP
15X32	**Project 2**	Z	2	0P+2C	Z	ZP
16X32	**Project 2** *Petr Bouchner, Tereza Kunclová*	Z	2	0P+2C	Z	ZP
17X32	**Project 2** *Alena Rybičková, Denisa Mocková, Dušan Teichmann, Andrea Hrníčková, Milan Kříž, Václav Baroch, Daniel Pilát, Michal Drábek, Alexandra Dvořáčková, ...*	Z	2	0P+2C	Z	ZP
18X32	**Project 2**	Z	2	0P+2C	Z	ZP
20X32	**Project 2**	Z	2	0P+2C	Z	ZP
21X32	**Project 2** *Jakub Kraus, AndrejAliš, Jakub Hospodka, Slobodan Stojić, Lenka Hanáková, Terézia Pilmannová, Peter Vittek, Natalia Guskova, Lukáš Popek, ...*	Z	2	0P+2C	Z	ZP
22X32	**Project 2**	Z	2	0P+2C	Z	ZP
23X32	**Project 2**	Z	2	0P+2C	Z	ZP
11X33	**Project 3**	Z	2	0P+1C	L	ZP
12X33	**Project 3** *Josef Kocourek, Tomáš Padělek, Dagmar Kočárková*	Z	2	0P+1C	L	ZP
14X33	**Project 3**	Z	2	0P+1C	L	ZP
15X33	**Project 3**	Z	2	0P+1C	L	ZP
16X33	**Project 3**	Z	2	0P+1C	L	ZP
17X33	**Project 3** *Alena Rybičková, Denisa Mocková, Dušan Teichmann, Roman Štěrba, Milan Kříž, Václav Baroch, Daniel Pilát, Michal Drábek, Alexandra Dvořáčková, ... Václav Baroch (Gar.)*	Z	2	0P+1C	L	ZP
18X33	**Project 3**	Z	2	0P+1C	L	ZP
20X33	**Project 3**	Z	2	0P+1C	L	ZP
21X33	**Project 3** *AndrejAliš, Slobodan Stojić, Lenka Hanáková, Terézia Pilmannová, Lukáš Popek, Iveta Kameníková, Milan Kameník, Marek Šudoma, Viktor Valenta, ...*	Z	2	0P+1C	L	ZP
22X33	**Project 3**	Z	2	0P+1C	L	ZP
23X33	**Project 3**	Z	2	0P+1C	L	ZP

Characteristics of the courses of this group of Study Plan: Code=XB 4,5,6 13/14 Name=Projekty bak. 4.5.6.sem. (od)13/14 - pro B3710

11X31	Project 1	Z	2
12X31	Project 1	Z	2
14X31	Project 1	Z	2
15X31	Project 1	Z	2
16X31	Project 1	Z	2
17X31	Project 1	Z	2
18X31	Project 1	Z	2
20X31	Project 1	Z	2
21X31	Project 1	Z	2
22X31	Project 1	Z	2
23X31	Project 1	Z	2
11X32	Project 2	Z	2
12X32	Project 2	Z	2
14X32	Project 2	Z	2
15X32	Project 2	Z	2
16X32	Project 2	Z	2
17X32	Project 2	Z	2
18X32	Project 2	Z	2
20X32	Project 2	Z	2
21X32	Project 2	Z	2
22X32	Project 2	Z	2
23X32	Project 2	Z	2

11X33	Project 3	Z	2
12X33	Project 3	Z	2
14X33	Project 3	Z	2
15X33	Project 3	Z	2
16X33	Project 3	Z	2
17X33	Project 3	Z	2
18X33	Project 3	Z	2
20X33	Project 3	Z	2
21X33	Project 3	Z	2
22X33	Project 3	Z	2
23X33	Project 3	Z	2

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 10
The role of the block: PV

Code of the group: Y1-BAUT 13/14
Name of the group: PVP bak.prez.AUT 13/14
Requirement credits in the group: In this group you have to gain 10 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 10
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
17Y1AF	**Alternative Forms of Transportation Project Financing**	KZ	2	2+0	Z	PV
18Y1AM	**Anatomy, Mobility and Safety of Man** *Jitka Jírová*	KZ	2	2P+0C	Z	PV
14Y1AV	**Animation and Visualization**	KZ	2	2P+0C	L	PV
14Y1AP	**Automatization in Mail**	KZ	2	2+0	Z	PV
14Y1BE	**Barrierless Transport**	KZ	2	2P+0C	L	PV
15Y1BO	**Work Safety and Health Protection in Transportation** *Petr Musil, Eva Rezlerová*	KZ	2	2P+0C	L	PV
15Y1DU	**History of Art and Society**	KZ	2	2+0	Z	PV
15Y1DZ	**History of Railway** *Eva Rezlerová, Martin Jacura*	KZ	2	2P+0C	L	PV
12Y1DS	**Project Documentation in Practice**	KZ	2	2P+0C	Z	PV
17Y1DZ	**Transported Commodities Cognization**	KZ	2	2+0	L	PV
18Y1D1	**Dynamics of Routes and Vehicles 1**	KZ	2	2+0	Z	PV
17Y1EV	**Public Sector Economy** *Veronika Faifrová*	KZ	2	2P+0C	Z	PV
16Y1EN	**Energy Requirements of Vehicles**	KZ	2	2P+0C	L	PV
15Y1EH	**European Integration within Historical Context** *Jan Feit*	KZ	2	2P+0C	Z	PV
18Y1EV	**Experimental Methods and Numerical Modelling**	KZ	2	2+0	L	PV
15Y1FD	**French Area Studies and Transportation**	KZ	2	2P+0C	L	PV
14Y1GD	**GIS and Maps Digitalization**	KZ	2	2+0	Z	PV
14Y1HW	**Computer Hardware**	KZ	2	2P+0C	L	PV
15Y1HL	**History of Civil Aviation** *Eva Rezlerová, Vladimír Plos*	KZ	2	2P+0C	L,Z	PV
15Y1HD	**History of City Mass Transport** *Milan Dont, Eva Rezlerová*	KZ	2	2P+0C	Z	PV
12Y1HD	**Traffic Noise** *Dagmar Kočárková, Libor Ládyš*	KZ	2	2P+0C	L	PV
15Y1HE	**Work Hygiene and Ergonomics in Traffic** *Petr Musil, Eva Rezlerová*	KZ	2	2P+0C	Z	PV
20Y1IC	**Human Machine Interaction**	KZ	2	2+0	L	PV
16Y1KJ	**Railroad Vehicles**	KZ	2	2+0	L	PV
12Y1KN	**Combined Transportation** *Petr Nejedlý*	KZ	2	2P+0C	Z	PV
20Y1K	**Cybernetics**	KZ	2	2+0	Z	PV

21Y1LM	**Aviation Meteorology**	KZ	2	2+0	L	PV
21Y1LR	**Radio Technology in Aviation**	KZ	2	2+0	L	PV
11Y1LP	**Linear Programming**	KZ	2	2+0	L	PV
17Y1LL	**Logistics of Passenger and Freight Air Transport** *Petra Skolilová Petra Skolilová (Gar.)*	KZ	2	2P+0C	L	PV
11Y1MM	**Mathematical Models in Economy**	KZ	2	2P+0C	Z	PV
18Y1MT	**Engineering Materials** *Jaroslav Valach*	KZ	2	2P+0C	L	PV
17Y1ND	**Maritime Transportation**	KZ	2	2+0	Z	PV
14Y1NH	**Databases Design and Programming**	KZ	2	2+0	L	PV
14Y1NP	**Non-parametric 3D Modelling**	KZ	2	2+0	Z	PV
20Y1NS	**Neural Networks**	KZ	2	2+0	Z	PV
20Y1OI	**Fare Collection and Information Systems** *Milan Sliacky, Patrik Horažďovský Milan Sliacky (Gar.)*	KZ	2	2P+0C	L	PV
14Y1OL	**Linux Operating System**	KZ	2	2+0	Z	PV
17Y1OF	**Personal Finance**	KZ	2	2P+0C	Z	PV
15Y1OP	**Turning Points of the Czech Nation**	KZ	2	2+0	L	PV
11Y1PV	**Parametrical and Multicriterial Programming** *Olga Vraštilová*	KZ	2	2P+0C	Z	PV
17Y1PM	**Personnel Management**	KZ	2	2P+0C	L	PV
12Y1PC	**Pedestrian and Cycling Transport** *Denis Liutov*	KZ	2	2P+0C	L	PV
20Y1PO	**Weather, Air Quality and Transportation**	KZ	2	2+0	Z	PV
14Y1PG	**Computer Graphics**	KZ	2	2P+0C	L	PV
11Y1PE	**Computer Controlled Experiments**	KZ	2	2+0	L	PV
14Y1PM	**Advanced Methods of Parametric Programming**	KZ	2	2+0	L	PV
21Y1PU	**Aircraft Maintenance Technology**	KZ	2	2+0	L	PV
12Y1PD	**Assessment of Transport Structures**	KZ	2	2P+0C	Z	PV
14Y1PJ	**C Programming Language**	KZ	2	2P+0C	Z	PV
12Y1C1	**Designing Roads in Civil 3D I** *Tomáš Honc*	KZ	2	2P+0C	L	PV
12Y1C2	**Designing Roads in Civil 3D II** *Tomáš Honc*	KZ	2	2P+0C	Z	PV
16Y1PV	**Operation, Construction and Maintenance of Vehicles**	KZ	2	2P+0C	L	PV
12Y1PU	**Organization Disposition of Railway Stations**	KZ	2	2P+0C	L	PV
12Y1RZ	**Railway Lines Reconstruction**	KZ	2	2+0	Z	PV
16Y1RE	**Control and Electronic Vehicle Systems** *Josef Mík, Přemysl Toman*	KZ	2	2P+0C	Z	PV
17Y1ST	**Titan Simulation**	KZ	2	2P+0C	L	PV
20Y1SC	**Sensors and Actuators**	KZ	2	2P+0C	L	PV
11Y1SI	**Transportation Software Engineering** *Martin Pěnička*	KZ	2	2P+0C	Z	PV
12Y1SU	**Road Management and Maintenance** *Dagmar Kočárková, Otakar Vacín*	KZ	2	2P+0C	L	PV
18Y1SN	**Statically Nondeterminated Structures**	KZ	2	2+0	Z	PV
16Y1TJ	**Technological Quality Aspects**	KZ	2	2+0	Z	PV
20Y1TE	**Technology of Electronic Systems**	KZ	2	2+0	L	PV
20Y1TD	**Telematics Databases**	KZ	2	2+0	Z	PV
11Y1TG	**Graph Theory** *Lucie Kárná* ***Lucie Kárná*** *Lucie Kárná (Gar.)*	KZ	2	2P+0C	L	PV
16Y1TZ	**Transporting Devices**	KZ	2	2+0	L	PV
14Y1TI	**Creating Interactive Internet Applications**	KZ	2	2P+0C	L	PV
18Y1UK	**Introduction of Rail Vehicles** *Jitka Řezníčková, Josef Kolář*	KZ	2	2P+0C	L	PV
14Y1VB	**Visual Basic**	KZ	2	2+0	L	PV
12Y1VC	**Waterways and Shipping**	KZ	2	2P+0C	Z	PV
12Y1VD	**Water Transport and Transportation**	KZ	2	2+0	L	PV
14Y1VM	**Development of Applications for Mobile Devices**	KZ	2	2P+0C	Z	PV
16Y1ZG	**Introduction into Applied Computer Graphics**	KZ	2	2P+0C	L	PV
11Y1ZF	**Introduction to Solid State Physics**	KZ	2	2+0	Z	PV

14Y1ZM	**Fundamentals of parametric and adaptive modeling**	KZ	2	2P+0C	L	PV
11Y1ZM	**Foundation of MATLAB Programming** *Šárka Voráčová* ***Šárka Voráčová*** *Šárka Voráčová (Gar.)*	KZ	2	2P+0C	L	PV
12Y1ZU	**Principles of Urbanism** *Karel Hájek*	KZ	2	2P+0C	Z	PV
16Y1ZL	**Vehicle Testing, Legislation and Construction** *Josef Mík, Zuzana Radová*	KZ	2	2P+0C	Z	PV

Characteristics of the courses of this group of Study Plan: Code=Y1-BAUT 13/14 Name=PVP bak.prez.AUT 13/14

17Y1AF	Alternative Forms of Transportation Project Financing	KZ	2
There will be specifed such forms of financing in transportation, where the public sector body perform the final debtor, i. e. debtor payments come from its budget, but the final debtor is not a direct participant of the transaction and it is not the counterparty of the financial institute which provides the funding. Issue of securities as an alternative source of transportation project.			
18Y1AM	Anatomy, Mobility and Safety of Man	KZ	2
Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations.			
14Y1AV	Animation and Visualization	KZ	2
Advanced modifications and modeling of NURBS, Patch objects, selection of objects (according to filter and properties). 3D Studio MAX systems and Space Warp objects. Atmospheric and other effects, rendering filters, Motion blur, advanced animations, Motion panel. Modeling for morphing and animation, bone formation, animation using Inverse Kinematics.			
14Y1AP	Automatization in Mail	KZ	2
Technology of post shipment submission, transport, and delivery via physic and electronic way, virtual post operation. Technology of information transmission by electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solutions to e-communication network interfaces, technological principles of end telecommunication devices.			
14Y1BE	Barrierless Transport	KZ	2
The issue of barrierless accessible public transportation in terms of architectural barriers and also for transportation-technological point of view. Students will gain theoretical knowledge of barrierless environment roads, railway stations, public transport stops, terminal buildings, vehicles, public transport, information and orientation systems and transportation technology. Theoretical knowledge will be supplemented by practical examples.			
15Y1BO	Work Safety and Health Protection in Transportation	KZ	2
Fundamental legislative, definition of terms, risks and possible health damage, working conditions and health protection with focus on transportation. Health protection programmes, health insurance of home and foreign business trips, statistics, working practice.			
15Y1DU	History of Art and Society	KZ	2
History of art - definitions, terminology, division into periods. Architecture, fine arts, design. Situation in Central Europe, today in the Czech Republic. Stations, bridges, industrial buildings. Design of transport vehicles.			
15Y1DZ	History of Railway	KZ	2
Horse-drawn railways, steam railways, railway network development in the 2nd half of 19th century, regional railways epoch, railways of the "First Republic", electric traction, World War II railways, railway development in the 2nd half of 20th century, high-speed railway origins, railway lines closing, important long-distance train connections, railway lines construction, railway accidents, railway junctions. Excursions and projections.			
12Y1DS	Project Documentation in Practice	KZ	2
Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts.			
17Y1DZ	Transported Commodities Cognization	KZ	2
Useful features. Quality. Testing. Standardization. Features relevant for the transport. Packing. Stress. Protection of goods and damage prevention during the carriage. Optimization of the choice and effective transport means utility.			
18Y1D1	Dynamics of Routes and Vehicles 1	KZ	2
Theory and analysis of vibration of multimass systems. Dynamical model of vehicle and interaction with transport structure. Assessment of structure vibration and allowable criteria. Vibroisolation and absorbers of dynamical effects. Methods of experimental dynamics. FEM in structure dynamics.			
17Y1EV	Public Sector Economy	KZ	2
Economic and financial theory of public sector, public choice theory, externalites, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects a their economic efficiency assessment, way of elaboration of PPP projects, funding from EU funds, program HDM-4.			
16Y1EN	Energy Requirements of Vehicles	KZ	2
Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis.			
15Y1EH	European Integration within Historical Context	KZ	2
Versailles system, formation of new states. Europe and the powers, League of Nations. European policy in the 1920s. Fascism, nacism, communism. Little Entente, its principles and goals. Europe after Hitler's getting to power, system of bilateral agreements. Decline of the LN. Rearrangement of powers during WWII. Cold war and its consequences for Europe. New quality of French-German relationship - a driving power of starting European integration.			
18Y1EV	Experimental Methods and Numerical Modelling	KZ	2
Physical properties measured in structural mechanics and dynamics. Principles of strain gauge measurement. Theory of photoelasticimetry, experimental methods in structural dynamics. Basic principles of numerical methods in structural mechanics and dynamics. Finite element method in statics and dynamics. Geometry development, discretization to elements, types of structural elements. Boundary conditions. Material models. Solution of problems.			
15Y1FD	French Area Studies and Transportation	KZ	2
France - geography and regions, transport infrastructure. Paris and its sights, city public transport. Road traffic, motorways, railway traffic, TGV, air traffic, specialised terminology. French society and culture. Current political system. System of education, studying in France. Selected authors of French literature. French gastronomy.			
14Y1GD	GIS and Maps Digitalization	KZ	2
Work with map sources and their creating. Maps digitalization and creation. Use and creation of other (non-graphic) information with use of databases. Interlinking external references with drawings containing maps.			
14Y1HW	Computer Hardware	KZ	2
Computer architecture, basics of logical circuits design and their realization using FPGA. In detail, description of computer architecture and separate parts designing - controllers, arithmetic and logical units, I/O subsystem.			

15Y1HL	History of Civil Aviation	KZ	2
Beginnings of flying, development of aircrafts lighter than air. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Famous aviators. Helicopters. CSA airplanes. Development of aircrafts in Czechoslovakia between the years 1945-1989. Classic era of aviation. Golden era of civil aviation. Modern era of civil aviation. Airline companies. Supersonic flying.			
15Y1HD	History of City Mass Transport	KZ	2
History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia.			
12Y1HD	Traffic Noise	KZ	2
Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standarts, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol.			
15Y1HE	Work Hygiene and Ergonomics in Traffic	KZ	2
Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature.			
20Y1IC	Human Machine Interaction	KZ	2
Interaction of human-system. Methods and procedures for detecting decrease in attention. Used software and hardware tools. Bio-feedback, EEG measurements.			
16Y1KJ	Railroad Vehicles	KZ	2
21st century mobility. Recent construction of railroad, city and intercity public vehicles, future and present situation, speed as a solution, maglev. From principle to design and construction; some realization in the world. Division and ways of drive, efficient electronics, changers, railroad traction, energetic calculation. Railroad safety signalling systems, railroad vehicle and infrastructure compliance (interference). Testing.			
12Y1KN	Combined Transportation	KZ	2
Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres.			
20Y1K	Cybernetics	KZ	2
Fundamentals of information theory, dynamic systems, the principle of feedback, logical systems. Finite automata as a special case of dynamical systems. Relations between languages and automata.			
21Y1LM	Aviation Meteorology	KZ	2
Structure of atmosphere. Vertical stratification. Pressures QNH, QFE, QFF, QME. Instability. Atmospherical fronts. Atmospherical precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrofical and geocyclostrophical wind. Visibilities in air transport. Dangerous meteorological aspects. Meteorological maps. Climatology. Circulation.Intertropical front. Meteorological information.			
21Y1LR	Radio Technology in Aviation	KZ	2
Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters.			
11Y1LP	Linear Programming	KZ	2
Definition of the optimization problem of linear programming, application of the linear programming on economic and technical problems, normal traffic problems and traffic problems with constrains. Geometrical interpretation of linear programming problems, simplex method, duality principle.			
17Y1LL	Logistics of Passenger and Freight Air Transport	KZ	2
Logistics airline passenger and cargo. Aircraft and airport terminals for passenger and cargo transport. Airlines in terms of logistics systems. Aerial transport process passengers and air cargo. Information systems in air transport. Global distribution systems.			
11Y1MM	Mathematical Models in Economy	KZ	2
The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcom of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization.			
18Y1MT	Engineering Materials	KZ	2
Systematic overview of main classes of materials used in technical design. In addition to main classes of materials, i. e. metals, ceramics, polymers and composites, attention is paid to biological materials and to biomimetics. Integral approach to material selection process is also demonstrated based on so called Ashby's selection charts.			
17Y1ND	Maritime Transportation	KZ	2
History and importance of the maritime transportation, theoretical discipline in maritime transportation, seafaring vessels, maritime ports and their utilization, inland logistic centre and maritime ports, transport corridors and link by maritime, river and rail transport I and II, global maritime corridors, logistics of maritime transportation, maritime transportation and smart containers, ITS in maritime transport.			
14Y1NH	Databases Design and Programming	KZ	2
Students in this course will deepen their knowledge and skills in database design and learn the procedural extension of SQL, PL/SQL, which makes it possible to ensure data integrity on the level of the database engine.			
14Y1NP	Non-parametric 3D Modelling	KZ	2
Work in 3D non-parametricmodeller (AutoCAD) environment, scenes rendering, creation of planar and volumetric objects, user setup creation, object data creation, work with data connected with external database. Basic definition of work with lights, materials and reflexes. Models presentation.			
20Y1NS	Neural Networks	KZ	2
The basic structure and function of human brain and its main functional blocks and building elements - neurons. Models of neurons, modelling their networks and the basic paradigms of artificial neural networks.			
20Y1OI	Fare Collection and Information Systems	KZ	2
Fare collection systems in public transport and their components (on-board units, validators, turnstiles, ...). Information systems and their components for users (timetables, maps, panels ...) and operators (cycles, location or current delay of vehicles, ...). The issue of tariff systems. Other examples of clearance systems (parking).			
14Y1OL	Linux Operating System	KZ	2
Distributions. GNU/Linux system installation. X-window system. Rights - Users and Groups, ACL rights. Filesystems and file attributes. Programs and processes. Boot of OS, runlevels. Basic console commands. Configuration files. Managing SW system. Programs in graphic mode - tools for text, graphics, sound, video, communication. Services management. Principles of OS secure configuration. Remote administration.			
17Y1OF	Personal Finance	KZ	2
Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance).			

15Y1OP	Turning Points of the Czech Nation	KZ	2
Crucial moments of more than a thousand-year long history of Western Slavs in Central Europe. Emphasis on relations to bordering nations and Europe as a whole. The Premyslid state. Lands of the Czech Crown as a part of Habsburgh monarchy. 19th century political programmes. Foundation of Czechoslovakia. Disputes over the sense of Czech history. Changes of power structure in Europe during 20th century and the position of the Czech nation.			
11Y1PV	Parametrical and Multicriterial Programming	KZ	2
Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coeficients of linear constraints. Computation of efficient solution.			
17Y1PM	Personnel Management	KZ	2
Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication.			
12Y1PC	Pedestrian and Cycling Transport	KZ	2
Routes for pedestrians. Pedestrian crossings. Modifications for blind, dim-sighted and disabled people. Design of cycle routes network. Ways of cycle route layout and design parameters for cyclists. Separation of cyclists from other transport modes. Cycle tracks and its design - one way streets, reserved traffic lanes, bus stops, crossings with other transport modes, crossroads. Traffic signs and road marking for cyclists.			
20Y1PO	Weather, Air Quality and Transportation	KZ	2
State of the atmosphere, weather observation network, weather in transportation, road meteorology. Weather forecasting, data assimilation, probabilistic forecasts, forecast evaluation. Air quality, main pollutants and their effects, atmospheric chemistry, traffic emissions. Greenhouse gasses, carbon cycle, a role of energy and transportation in climate change.			
14Y1PG	Computer Graphics	KZ	2
Basic formats of graphic and possibilities of their editing and mutual conversion. Use of individual types according to character of work. Work with editing programs (within the user level scope) using layers, DPI, colors. Basics of digital photography, scanning and computer technology like monitors and graphics cards.			
11Y1PE	Computer Controlled Experiments	KZ	2
Implementation of experiment consisting of designing, measurement method selection according to required results accuracy and available measurement devices, selection of computer-recorded parameters, data acquisition and results calculation. Evaluation of measurement method accuracy and result uncertainty.			
14Y1PM	Advanced Methods of Parametric Programming	KZ	2
Assemblies programming - tools and methodology of working subassemblies and assemblies, sheet metal parts modelling, welded assemblies, pipelines, and distribution lines. Photorealistic output rendering - physical and material properties, lighting sources. MKP - visual example.			
21Y1PU	Aircraft Maintenance Technology	KZ	2
Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.			
12Y1PD	Assessment of Transport Structures	KZ	2
Assessment of transport structures, the EIA process. Multicriteria assessment methods, risk analysis, SWOT analysis. Landscape character, possibilities of its protection and assessment transport structures on the landscape. Rating fragmentation and landscape connectivity in the preparation of linear structures. Practical examples of assessment of traffic buildings on the environment.			
14Y1PJ	C Programming Language	KZ	2
C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointes, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise oprerators.			
12Y1C1	Designing Roads in Civil 3D I	KZ	2
The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession.			
12Y1C2	Designing Roads in Civil 3D II	KZ	2
The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections.			
16Y1PV	Operation, Construction and Maintenance of Vehicles	KZ	2
Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenence and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics.			
12Y1PU	Organization Disposition of Railway Stations	KZ	2
Connecting station. Passenger transport equipment. Freight transport equipment. Branch lines and railway traffic inside industrial company areas. Zone stations. Formation yards. Reserve stations. Technology of work in railway station with regard to its disposition. Railway station documentations in the Czech Republic railway network.			
12Y1RZ	Railway Lines Reconstruction	KZ	2
Principles of track maintainance technology. Track maintainance machinery, superstructure and substructure building machinery and special rail vehicles. Degradation of track geometrical parameters - causes and elimination principles. Track sections and station tracks exclusion planning. Reconstruction timetable design of railway superstructure and substructure.			
16Y1RE	Control and Electronic Vehicle Systems	KZ	2
Elementary concepts of regulation. Tools for analytical solution, linear system description. Basic types of a regulator (PID), properties, advantages, disadvantages, function. Conventional and hybrid drive control. Electric drive. Vehicle communication bus (CAN, LIN, FlexRay, ISObus, KWP2000 protocole etc.). Vehicle electronic control, safety, communication and comfort systems.			
17Y1ST	Titan Simulation	KZ	2
Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions.			
20Y1SC	Sensors and Actuators	KZ	2
Principles of sensors and actuators. Basics of measuring theory and actuating influence. The respective technologies and construction principles. Sensors of mechanical, electro-magnetic, state (temperature, humidity), chemical and particle flow values. Electrical, pneumatic and hydraulic actuators and solid phase elements.			
11Y1SI	Transportation Software Engineering	KZ	2
Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usuage.			
12Y1SU	Road Management and Maintenance	KZ	2
Getting familiar with ownership of roads in the Czech Republic and the administration of the road at the state and county level. It is presented development of road network, short, medium and long-term strategy of the Ministry of Transport. Maintenance of roads winter and summer, its requirements, specifics, possibilities and repair methods are discussed in the classroom as well as investment activity in highway engineering.			
18Y1SN	Statically Nondeterminated Structures	KZ	2
Deformations of the beam element, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler´s foundation. Calculation beam on elastic foundation. Basement of the mathematical elasticity. Calculation of walls. Calculation of plates. Cylindrical shells. Examples of calculations.			

16Y1TJ	Technological Quality Aspects	KZ	2
Certification and acreditation. Quality management. Standards of Quality Management and its application. Quality system creation. Tools and methods of quality improvement. Conformity verification. Environmental certification. Workplace certification. QMS integration. Classification, certification of products and producers.			
20Y1TE	Technology of Electronic Systems	KZ	2
Characteristics of the technological process, the relation of the design, construction and technology. General scheme of technological process. Principles and characteristics of basic electronic elements. Basic technology of integrated circuits. Synthesis of integrated circuits. Higher levels of technology components. Measurement, diagnostics, reliability. Operational aspects of electronic systems.			
20Y1TD	Telematics Databases	KZ	2
Issue of telematics databases, work with OpenStreetMap layer, use of Linux OS and PostgreSQL with PostGIS extension, real traffic data.			
11Y1TG	Graph Theory	KZ	2
Basic concepts and terminology of graph theory, graph representation. Problems of graph theory, problem instance. Graph search algorithms, trees, minimum spanning tree, shortest path problem, Eulerian path, bipartite graph matching, flow networks, circulations, critical path method, traveling salesman problem. Problem of existence and optimization and algorithms for their solving. Computational complexity, dealing with NP-complete problems, heuristic approach.			
16Y1TZ	Transporting Devices	KZ	2
Flow of masses, material transport technology, loose material transport - conveyors with tractive elements, conveyors without tractive elements, transport of piece material - continual transport devices, cyclic transport devices, crane mechanisms, steel constructions. Vertical transport, transport in mines, long-distance conveyor belt transport.			
14Y1TI	Creating Interactive Internet Applications	KZ	2
Possibilities of scripting language PHP. Overview of PHP language syntax, and functions. Analysis of finished scripts and demonstration of solutions. Your own application programmed in PHP language.			
18Y1UK	Introduction of Rail Vehicles	KZ	2
Basic characteristics and parameters rail transport systems - railway and urban transport. Basis driving mechanics rail vehicles - equation of motion train and unit trains. Rolling and track resistance. Total running resistance. Acceleration force. Analyzing driving cycle rail vehicle. Speed-power diagrams and characteristics rail vehicle - hydromechanic, hydrodynamic and electric drive. Design concept rail vehicles and drive of wheel set.			
14Y1VB	Visual Basic	KZ	2
Applications developing for Visual Basic on MS-Windows .NET platform with use of .NET libraries or Visual Studio tools for graphic or console mode. Further, creation of installation utilities for these applications. Work with VBA at superstructures creation for MS-Windows applications supporting VBA.			
12Y1VC	Waterways and Shipping	KZ	2
Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps.			
12Y1VD	Water Transport and Transportation	KZ	2
Technologické možnosti vnitrozemské plavby. Základní rozdělení vnitrozemských plavidel a jejich základní parametry. Základy konstrukce a stavby plavidel. Efektivnost vodní dopravy a finanční náročnost výstavby infrastruktury vodní dopravy. Poptávka po vodní dopravě v České republice. Způsoby financování investičních a provozních nákladů infrastruktury vodní dopravy (vodní cesty, přístavy loděnice apod.). Námořní doprava obecně a v podmínkách ČR.			
14Y1VM	Development of Applications for Mobile Devices	KZ	2
Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI.			
16Y1ZG	Introduction into Applied Computer Graphics	KZ	2
Computer graphics, division and applications with emphasis on transport, including development and research. Colours, colour perception, colour schemes, models, principles of 2D and 3D generation, elementary algorithms for graphic data workout. Visualisation principles and tasks, technics, graphics and visualisation HW basics. Introduction to 2D and 3D graphics software.			
11Y1ZF	Introduction to Solid State Physics	KZ	2
Structure of solids, crystal lattice, Bloch function, Brillouin zones. Bend theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.			
14Y1ZM	Fundamentals of parametric and adaptive modeling	KZ	2
Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation.			
11Y1ZM	Foundation of MATLAB Programming	KZ	2
To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging.			
12Y1ZU	Principles of Urbanism	KZ	2
Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spacial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning.			
16Y1ZL	Vehicle Testing, Legislation and Construction	KZ	2
Vehicle, bus and motorbike costruction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.			

Name of the block: Jazyky
Minimal number of credits of the block: 12
The role of the block: J

Code of the group: JZ-B-3.4 12/13
Name of the group: Jazyk bak. 5.6.sem. od 12/13
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
15JZ3A	**Foreign Language - English 3** *Eva Rezlerová, Jan Feit, Markéta Musilová, Lenka Monková, Marie Michlová, Peter Morpuss, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, ...*	Z	3	0P+4C	Z	J
15JZ4A	**Foreign Language - English 4** *Eva Rezlerová, Jan Feit, Markéta Musilová, Lenka Monková, Marie Michlová, Peter Morpuss, Jitka Heřmanová, Barbora Horáčková, Markéta Vojanová*	Z,ZK	3	0P+4C	L	J
15JZ3F	**Foreign Language - French 3** *Eva Rezlerová, Irena Veselková*	Z	3	0P+4C+10B	Z	J
15JZ4F	**Foreign Language - French 4** *Eva Rezlerová, Irena Veselková*	Z,ZK	3	0P+4C+10B	L	J
15JZ3N	**Foreign Language - German 3** *Eva Rezlerová, Martina Navrátilová, Jana Štikarová*	Z	3	0P+4C+10B	Z	J
15JZ4N	**Foreign Language - German 4** *Eva Rezlerová, Martina Navrátilová, Jana Štikarová*	Z,ZK	3	0P+4C+10B	L	J
15JZ3R	**Foreign Language - Russian 3** *Eva Rezlerová, Marie Michlová*	Z	3	0P+4C+10B	Z	J
15JZ4R	**Foreign Language - Russian 4** *Eva Rezlerová, Marie Michlová*	Z,ZK	3	0P+4C+10B	L	J
15JZ3S	**Foreign Language - Spanish 3** *Eva Rezlerová, Nina Hricsina Puškinová*	Z	3	0P+4C+10B	Z	J
15JZ4S	**Foreign Language - Spanish 4** *Eva Rezlerová, Nina Hricsina Puškinová*	Z,ZK	3	0P+4C+10B	L	J

Characteristics of the courses of this group of Study Plan: Code=JZ-B-3.4 12/13 Name=Jazyk bak. 5.6.sem. od 12/13

15JZ3A	Foreign Language - English 3	Z	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study pilot. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written form. Technical texts and their features; terminology.

15JZ4A	Foreign Language - English 4	Z,ZK	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study - pilot. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written form. Technical texts and their features; terminology.

15JZ3F	Foreign Language - French 3	Z	3

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.

15JZ4F	Foreign Language - French 4	Z,ZK	3

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.

15JZ3N	Foreign Language - German 3	Z	3

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.

15JZ4N	Foreign Language - German 4	Z,ZK	3

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.

15JZ3R	Foreign Language - Russian 3	Z	3

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.

15JZ4R	Foreign Language - Russian 4	Z,ZK	3

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.

15JZ3S	Foreign Language - Spanish 3	Z	3

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.

15JZ4S	Foreign Language - Spanish 4	Z,ZK	3

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.

Code of the group: JZ-B-1,2 11/12
Name of the group: Jazyk bak.3.4.sem.od 11/12
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 6
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
15JZ1A	**Foreign Language - English 1** *Eva Rezlerová, Jan Feit, Markéta Musilová, Lenka Monková, Marie Michlová, Peter Morpuss, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, ...*	Z	3	0P+4C+10B	Z	J
15JZ2A	**Foreign Language - English 2** *Eva Rezlerová, Jan Feit, Markéta Musilová, Lenka Monková, Marie Michlová, Peter Morpuss, Jitka Heřmanová, Dana Boušová, Barbora Horáčková, ...*	Z,ZK	3	0P+4C+10B		J
15JZ1F	**Foreign Language - French 1**	Z	3	0+4	Z	J
15JZ2F	**Foreign Language - French 2**	Z,ZK	3	0+4	L	J
15JZ1N	**Foreign Language - German 1**	Z	3	0+4	Z	J
15JZ2N	**Foreign Language - German 2**	Z,ZK	3	0+4	L	J
15JZ1R	**Foreign Language - Russian 1**	Z	3	0+4	Z	J
15JZ2R	**Foreign Language - Russian 2**	Z,ZK	3	0+4	L	J
15JZ1S	**Foreign Language - Spanish 1**	Z	3	0+4	Z	J
15JZ2S	**Foreign Language - Spanish 2**	Z,ZK	3	0+4	L	J

Characteristics of the courses of this group of Study Plan: Code=JZ-B-1,2 11/12 Name=Jazyk bak.3.4.sem.od 11/12

15JZ1A	Foreign Language - English 1	Z	3

Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.

15JZ2A	Foreign Language - English 2	Z,ZK	3

Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.

15JZ1F	Foreign Language - French 1	Z	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ2F	Foreign Language - French 2	Z,ZK	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ1N	Foreign Language - German 1	Z	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ2N	Foreign Language - German 2	Z,ZK	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ1R	Foreign Language - Russian 1	Z	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ2R	Foreign Language - Russian 2	Z,ZK	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ1S	Foreign Language - Spanish 1	Z	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

15JZ2S	Foreign Language - Spanish 2	Z,ZK	3

Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.

List of courses of this pass:

Code	Name of the course	Completion	Credits
00TVC1	Physical Education 1	Z	1
Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.			
00TVC2	Physical Education 2	Z	1
Practical instruction and training in a wide variety of sports and games: from basic recreational coaching to competitive top level training. Included are: basketball, volleyball, soccer, tennis, squash, floorball, bodybuilding, swimming, canoeing, aerobic.			
11DAD	Differential and Difference Equations	Z,ZK	3
Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function.			
11FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
11FY2	Physics 2	Z,ZK	4
Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.			
11GIE	Geometry	KZ	3
Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet`s trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.			
11LA	Linear Algebra	Z,ZK	3
Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.			
11MDS	Collection and Processing of Traffic Data	KZ	2
Basic principles of traffic detection and data collection, specific problems of the field of traffic data. Data preprocessing and analysis for use in additional applications.			
11MSP	Modeling of Systems and Processes	Z,ZK	4
System and subsystem, external and internal system description, continuous and discrete system, mathematics as a tool, examples of formulation of differential and differential equations. Linear and nonlinear system, stationary and non-stationary system, causality. Convolutional integral. Laplace and Z transformations. Transfer function. Stability of LTI systems. Discretization of continuous systems. System interconnection.			
11MTA	Mathematical Analysis	Z,ZK	4
Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.			
11MVP	Mathematical Analysis of Function of More Variables	Z,ZK	3
Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R3, application of integral calculus in physics.			
11PT	Probability	Z	2
Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.			
11SIS	Statistics	Z,ZK	2
Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.			
11X31	Project 1	Z	2
11X32	Project 2	Z	2
11X33	Project 3	Z	2
11Y1LP	Linear Programming	KZ	2
Definition of the optimization problem of linear programming, application of the linear programming on economic and technical problems, normal traffic problems and traffic problems with constrains. Geometrical interpretation of linear programming problems, simplex method, duality principle.			
11Y1MM	Mathematical Models in Economy	KZ	2
The goal of the course is to teach selected methods of linear programming, with theoretical procedures applicable for individual tasks and their program implementation. The outcom of the course is the ability to implement and solve basic tasks from the queue theory, graph theory and both free and constrained optimization.			
11Y1PE	Computer Controlled Experiments	KZ	2
Implementation of experiment consisting of designing, measurement method selection according to required results accuracy and available measurement devices, selection of computer-recorded parameters, data acquisition and results calculation. Evaluation of measurement method accuracy and result uncertainty.			
11Y1PV	Parametrical and Multicriterial Programming	KZ	2
Solution to the problem of linear programming with a parameter in objective function, on right sides and in the matrix of coeficients of linear constraints. Computation of efficient solution.			
11Y1SI	Transportation Software Engineering	KZ	2
Basic concepts of software engineering, ranging from domain analysis, requirement analysis and software architectures to analyses, design and implementation using formal techniques and practical usuage.			
11Y1TG	Graph Theory	KZ	2
Basic concepts and terminology of graph theory, graph representation. Problems of graph theory, problem instance. Graph search algorithms, trees, minimum spanning tree, shortest path problem, Eulerian path, bipartite graph matching, flow networks, circulations, critical path method, traveling salesman problem. Problem of existence and optimization and algorithms for their solving. Computational complexity, dealing with NP-complete problems, heuristic approach.			

11Y1ZF	Introduction to Solid State Physics	KZ	2
Structure of solids, crystal lattice, Bloch function, Brillouin zones. Bend theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.			
11Y1ZM	Foundation of MATLAB Programming	KZ	2
To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging.			
12MDE	Transport Models and Transport Excesses	Z,ZK	3
Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.			
12PKD	Rail Transport Designing	Z,ZK	3
Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.			
12PPOK	Designing Roads, Highways and Motorways	KZ	3
Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.			
12X31	Project 1	Z	2
12X32	Project 2	Z	2
12X33	Project 3	Z	2
12Y1C1	Designing Roads in Civil 3D I	KZ	2
The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The course also includes a basic explanation of the traffic building design in the real-life profession.			
12Y1C2	Designing Roads in Civil 3D II	KZ	2
The course is devoted to the traffic buildings design field, specifically the design of roads as such, by the means of a 3D software. Students go through the complete design of this particular linear building, from the initial situation, over the longitudinal section, to the model and work sections and the cubic capacity calculation. The previously acquired skills are improved and developed. Students learn to design intersections.			
12Y1DS	Project Documentation in Practice	KZ	2
Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts.			
12Y1HD	Traffic Noise	KZ	2
Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standarts, regulations. Creation acoustic climate in area, principles of urban acoustic, noise transmission, soundproofing. Types of noise sources in area. Determination of acoustic situation in the area of interest. Methodology of computing and measurement of transport noise. Acoustic studies, measuring protocol.			
12Y1KN	Combined Transportation	KZ	2
Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres.			
12Y1PC	Pedestrian and Cycling Transport	KZ	2
Routes for pedestrians. Pedestrian crossings. Modifications for blind, dim-sighted and disabled people. Design of cycle routes network. Ways of cycle route layout and design parameters for cyclists. Separation of cyclists from other transport modes. Cycle tracks and its design - one way streets, reserved traffic lanes, bus stops, crossings with other transport modes, crossroads. Traffic signs and road marking for cyclists.			
12Y1PD	Assessment of Transport Structures	KZ	2
Assessment of transport structures, the EIA process. Multicriteria assessment methods, risk analysis, SWOT analysis. Landscape character, possibilities of its protection and assessment transport structures on the landscape. Rating fragmentation and landscape connectivity in the preparation of linear structures. Practical examples of assessment of traffic buildings on the environment.			
12Y1PU	Organization Disposition of Railway Stations	KZ	2
Connecting station. Passenger transport equipment. Freight transport equipment. Branch lines and railway traffic inside industrial company areas. Zone stations. Formation yards. Reserve stations. Technology of work in railway station with regard to its disposition. Railway station documentations in the Czech Republic railway network.			
12Y1RZ	Railway Lines Reconstruction	KZ	2
Principles of track maintainance technology. Track maintainance machinery, superstructure and substructure building machinery and special rail vehicles. Degradation of track geometrical parameters - causes and elimination principles. Track sections and station tracks exclusion planning. Reconstruction timetable design of railway superstructure and substructure.			
12Y1SU	Road Management and Maintenance	KZ	2
Getting familiar with ownership of roads in the Czech Republic and the administration of the road at the state and county level. It is presented development of road network, short, medium and long-term strategy of the Ministry of Transport. Maintenance of roads winter and summer, its requirements, specifics, possibilities and repair methods are discussed in the classroom as well as investment activity in highway engineering.			
12Y1VC	Waterways and Shipping	KZ	2
Basic modes of transport. The position of water transport in the transport system of the Czech Republic and the EU. Advantages and disadvantages of water transport. Basic systems of waterways in Europe, a network of waterways in the Czech Republic. Construction of the waterway and its equipment. Management of waterways and its operation. The legal regime in inland navigation, navigation rules of operation, navigation maps.			
12Y1VD	Water Transport and Transportation	KZ	2
Technologické možnosti vnitrozemské plavby. Základní rozdělení vnitrozemských plavidel a jejich základní parametry. Základy konstrukce a stavby plavidel. Efektivnost vodní dopravy a finanční náročnost výstavby infrastruktury vodní dopravy. Poptávka po vodní dopravě v České republice. Způsoby financování investičních a provozních nákladů infrastruktury vodní dopravy (vodní cesty, přístavy loděnice apod.). Námořní doprava obecně a v podmínkách ČR.			
12Y1ZU	Principles of Urbanism	KZ	2
Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spacial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning.			
12ZADI	Introduction to Transportation Engineering	Z,ZK	3
Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.			

13E	Economics	Z,ZK	3
Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.			
13EDOT	Economy, Transport, Telecommunications	KZ	2
Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.			
14ANM	Numerical Methods Application	Z,ZK	3
Numerical methods and their application, implementation of vectors and matrices in C/C++ using STL library, linear equation system solving, interpolating, approximation, numerical derivative and integration, differential equation solving, stability of methods.			
14CA	CAx Systems	KZ	3
Programming tools for development of CAx applications superstructures and user interfaces, systems openness, use of C/C++, VBA, and LISP languages, possibilities of scripts and cooperation with spreadsheet programs, relation to database systems.			
14CAD1	CAD 1	KZ	2
Modelling principles and techniques in non-parametric modeller (AutoCAD), Boolean operations, planar vs. volumetric objects. Illuminated scenes - light types and illumination methods. Creation and use of materials for 3D objects. Ways of texture mapping. Final models rendering.			
14CAD2	CAD 2	KZ	2
Introduction to different approaches at parametric and adaptive modelling. Sketch drawing with a help of geometric relations and parametric dimensions. Theory of work in working planes, axes, and points frameworks. Parts and assemblies modelling, possibilities of adaptive modelling. Creation of presentations and drawings.			
14DB	Database Systems	KZ	2
Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.			
14DM	Datamining	KZ	2
Types of data sources and acquired knowledge, data stores and OLAP technology for knowledge acquiring from data, data preprocessing at knowledge acquiring process, datamining systems, classes characteristics mining, mining of asocial rules from data stores and databases, classification (decision-making tree, Bayes classification, use of neuron networks). Prediction. Cluster analysis. Mining in complex structured data, multimedial dbf, www.			
14ELN	Electronics	Z,ZK	3
Semiconductor diodes and thyristor and their applications. Transistors, their basic connecting and applications. Operational amplifiers, their linear and non-linear applications and frequency characteristics. Passive and active frequency filters. AD and DA converters.			
14IFSD	Information Systems in Transportation	KZ	2
Transportation demands, IS types for transport area, common IS structures. Continuous and discrete simulation. Visualization, coding and encryption, secured vs. open comminication channel. Optimizing by help of GA. Theory of games, Paret selections. IS´s life cycle. Legal frame of IS at transportation. Governement IS. Development of secure and relevant ISs at transportation. Real time operating IS. IS certification and validation.			
14ISYS	Information Systems	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these toole use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilites, AutoCAD environment profiles, drawings with raster foundaments).			
14OJM	Object Oriented Modelling	Z,ZK	3
Fundamentals of object oriented SW development, fundamentals of object oriented approach. Explanation of basic classes, polymorphism, inheriting, complementation. Modelling fundamnetals in UML. Principles and processing use case diagrams, sequention diagrams, classes and states diagrams. Use of CASE tools for complex analysis. Usability of OM and process modelling.			
14OS1	Operating Systems 1	KZ	2
OS, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronizzation, file systems, architecture of OS Windows and Linux, start of PC and OS, networking, safety in S, terminals in MS Win and Linux, batch files.			
14OS2	Operating Systems 2	KZ	2
Domains and workgroups in MS Windows, users and their rights, configuration of networks (NFS, Samba, Firewall, FTP, http, DHCP, DNS),Windows register, remote deskttop, configuration files, programming - networking, threads.			
14RVD	Robotics in Transportation	Z,ZK	3
Understanding the following topics: robot and industrial manupulator, classification, mobile robot. Robot kinematics, co-ordinate systems. Special robot sensors. Action members, transmissions. Tactile recognition, woring head. Industrial robots´ control systems. Spatial orientation. Visual information processing. Mobile robots. Particularities of mobile robot control systems. Artificial intelligence in robotics. Reactive systems.			
14SE	High Voltage Electrical Engineering	KZ	2
Three-phase system, single- and three-phase transformer, automatic transformer, electromagnet (solenoid), direct current generator and overview of types, direct current motor and overview of types, alternate current motors, rotary magnetic field of three-phase winding, synchronous and asynchronous (induction) motor, alternate current generator (alternator).			
14SIAP	Networks and Protocols	KZ	2
Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquirement from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.			
14TC	Telecommunications	Z,ZK	3
Introduction of present stage and new trends in telecommunications systems. Legal conditions for telecommunications services provisioning and applications are introduced. Telecommunications key elements applied in hierarchical architecture are introduces and relations between networks elements parameters and performance of the whole telecommunications systems are explained in context with their typical applications in the transportations systems.			
14TLSY	Telecommunication Systems	Z,ZK	4
Characteristics of metallic and fiber lines, network passive and active elements. Physical layer design tools. Terrestrial and wireless (fixed and mobile) systems - network architecture. Most frequently used protocols, their properties and mutual relations. Protocols application in e-communications systems for data and voice services and support of the ITS systems.			
14TSJ	Communication Technologies	Z	2
Technology of post shipment submission, transport, and delivery in physical and electronic way, virtual post operation. Technology of information transmission via electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solution to e-communication network interfaces, technological principles of end telecommunication devices.			

14UATT	Introduction to Automatization and Telecommunication Systems	KZ	2
Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transpotation, modelling and projecting of transport systems, integrated technological and infromation system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.			
14UPRO	Introduction to Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			
14VZ	3D Vizualization	Z,ZK	4
Description and principles of 3D modelling. Basic 3D primitiva and basic modification and transformation functions. SW tools for 3D visualization. Creation of 3D scene. Modification and combination of 3D primitiva. Decsription of planes and work with them. Use of material editors and work with textures. Illumination of 3D scenes, setup of luminous and material parameters. Application of cameras for scanning. Rendering and animations creation.			
14X31	Project 1	Z	2
14X32	Project 2	Z	2
14X33	Project 3	Z	2
14Y1AP	Automatization in Mail	KZ	2
Technology of post shipment submission, transport, and delivery via physic and electronic way, virtual post operation. Technology of information transmission by electronic way, application of new information and communication technologies in an offer of permanent, mobile, and NGN e-communication networks, solutions to e-communication network interfaces, technological principles of end telecommunication devices.			
14Y1AV	Animation and Visualization	KZ	2
Advanced modifications and modeling of NURBS, Patch objects, selection of objects (according to filter and properties). 3D Studio MAX systems and Space Warp objects. Atmospheric and other effects, rendering filters, Motion blur, advanced animations, Motion panel. Modeling for morphing and animation, bone formation, animation using Inverse Kinematics.			
14Y1BE	Barrierless Transport	KZ	2
The issue of barrierless accessible public transportation in terms of architectural barriers and also for transportation-technological point of view. Students will gain theoretical knowledge of barrierless environment roads, railway stations, public transport stops, terminal buildings, vehicles, public transport, information and orientation systems and transportation technology. Theoretical knowledge will be supplemented by practical examples.			
14Y1GD	GIS and Maps Digitalization	KZ	2
Work with map sources and their creating. Maps digitalization and creation. Use and creation of other (non-graphic) information with use of databases. Interlinking external references with drawings containing maps.			
14Y1HW	Computer Hardware	KZ	2
Computer architecture, basics of logical circuits design and their realization using FPGA. In detail, description of computer architecture and separate parts designing - controllers, arithmetic and logical units, I/O subsystem.			
14Y1NH	Databases Design and Programming	KZ	2
Students in this course will deepen their knowledge and skills in database design and learn the procedural extension of SQL, PL/SQL, which makes it possible to ensure data integrity on the level of the database engine.			
14Y1NP	Non-parametric 3D Modelling	KZ	2
Work in 3D non-parametricmodeller (AutoCAD) environment, scenes rendering, creation of planar and volumetric objects, user setup creation, object data creation, work with data connected with external database. Basic definition of work with lights, materials and reflexes. Models presentation.			
14Y1OL	Linux Operating System	KZ	2
Distributions. GNU/Linux system installation. X-window system. Rights - Users and Groups, ACL rights. Filesystems and file attributes. Programs and processes. Boot of OS, runlevels. Basic console commands. Configuration files. Managing SW system. Programs in graphic mode - tools for text, graphics, sound, video, communication. Services management. Principles of OS secure configuration. Remote administration.			
14Y1PG	Computer Graphics	KZ	2
Basic formats of graphic and possibilities of their editing and mutual conversion. Use of individual types according to character of work. Work with editing programs (within the user level scope) using layers, DPI, colors. Basics of digital photography, scanning and computer technology like monitors and graphics cards.			
14Y1PJ	C Programming Language	KZ	2
C programming language. Preprocessor, basics of the C language (data types, syntax, commands), functions, pointes, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise oprerators.			
14Y1PM	Advanced Methods of Parametric Programming	KZ	2
Assemblies programming - tools and methodology of working subassemblies and assemblies, sheet metal parts modelling, welded assemblies, pipelines, and distribution lines. Photorealistic output rendering - physical and material properties, lighting sources. MKP - visual example.			
14Y1TI	Creating Interactive Internet Applications	KZ	2
Possibilities of scripting language PHP. Overview of PHP language syntax, and functions. Analysis of finished scripts and demonstration of solutions. Your own application programmed in PHP language.			
14Y1VB	Visual Basic	KZ	2
Applications developing for Visual Basic on MS-Windows .NET platform with use of .NET libraries or Visual Studio tools for graphic or console mode. Further, creation of installation utilities for these applications. Work with VBA at superstructures creation for MS-Windows applications supporting VBA.			
14Y1VM	Development of Applications for Mobile Devices	KZ	2
Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI.			
14Y1ZM	Fundamentals of parametric and adaptive modeling	KZ	2
Basics of work at products and parts creation. Sketch drawing by help of geometric relations, parametric dimensions, creation of adaptive models from 2D sketches. Import and export from and to another systems. Fundamentals of assemblies creation.			
14ZAET	Fundamentals of Electrotechnics	KZ	2
Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementar methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triplangel and principle of superposition in direct current circuits.			
14ZINF	Fundamentals of Informatics	KZ	2
Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions.			

15JZ1A	Foreign Language - English 1	Z	3
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			
15JZ1F	Foreign Language - French 1	Z	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ1N	Foreign Language - German 1	Z	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ1R	Foreign Language - Russian 1	Z	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ1S	Foreign Language - Spanish 1	Z	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ2A	Foreign Language - English 2	Z,ZK	3
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			
15JZ2F	Foreign Language - French 2	Z,ZK	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ2N	Foreign Language - German 2	Z,ZK	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ2R	Foreign Language - Russian 2	Z,ZK	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ2S	Foreign Language - Spanish 2	Z,ZK	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty´s fields of study. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written forms. Technical texts and their features; practice of oral and written presentation.			
15JZ3A	Foreign Language - English 3	Z	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study pilot. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written form. Technical texts and their features; terminology.			
15JZ3F	Foreign Language - French 3	Z	3
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.			
15JZ3N	Foreign Language - German 3	Z	3
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.			
15JZ3R	Foreign Language - Russian 3	Z	3
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.			
15JZ3S	Foreign Language - Spanish 3	Z	3
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.			
15JZ4A	Foreign Language - English 4	Z,ZK	3
Grammar structure and stylistics. Conversational and specialised topics selected according to the language group level and with regard to the Faculty's fields of study - pilot. Focus on improvement in perceptive and communicative skills; widening the vocabulary. Basic kinds of compositions. Presentations of own findings in both oral and written form. Technical texts and their features; terminology.			
15JZ4F	Foreign Language - French 4	Z,ZK	3
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.			
15JZ4N	Foreign Language - German 4	Z,ZK	3
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.			

15JZ4R	Foreign Language - Russian 4	Z,ZK	3
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.			
15JZ4S	Foreign Language - Spanish 4	Z,ZK	3
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.			
15X31	Project 1	Z	2
15X32	Project 2	Z	2
15X33	Project 3	Z	2
15Y1BO	Work Safety and Health Protection in Transportation	KZ	2
Fundamental legislative, definition of terms, risks and possible health damage, working conditions and health protection with focus on transportation. Health protection programmes, health insurance of home and foreign business trips, statistics, working practice.			
15Y1DU	History of Art and Society	KZ	2
History of art - definitions, terminology, division into periods. Architecture, fine arts, design. Situation in Central Europe, today in the Czech Republic. Stations, bridges, industrial buildings. Design of transport vehicles.			
15Y1DZ	History of Railway	KZ	2
Horse-drawn railways, steam railways, railway network development in the 2nd half of 19th century, regional railways epoch, railways of the "First Republic", electric traction, World War II railways, railway development in the 2nd half of 20th century, high-speed railway origins, railway lines closing, important long-distance train connections, railway lines construction, railway accidents, railway junctions. Excursions and projections.			
15Y1EH	European Integration within Historical Context	KZ	2
Versailles system, formation of new states. Europe and the powers, League of Nations. European policy in the 1920s. Fascism, nacism, communism. Little Entente, its principles and goals. Europe after Hitler's getting to power, system of bilateral agreements. Decline of the LN. Rearrangement of powers during WWII. Cold war and its consequences for Europe. New quality of French-German relationship - a driving power of starting European integration.			
15Y1FD	French Area Studies and Transportation	KZ	2
France - geography and regions, transport infrastructure. Paris and its sights, city public transport. Road traffic, motorways, railway traffic, TGV, air traffic, specialised terminology. French society and culture. Current political system. System of education, studying in France. Selected authors of French literature. French gastronomy.			
15Y1HD	History of City Mass Transport	KZ	2
History of city mass transport in the world, development of tram, bus and trolley-bus systems. History of transport networks in the world, current trends and developments of tariff and clearance systems. History of city transport in Prague and Brno. History of tram, bus and trolley-bus operation systems in the Czech Republic and Slovakia.			
15Y1HE	Work Hygiene and Ergonomics in Traffic	KZ	2
Basic knowledge of occupational hygiene and ergonomics, and their application in transport. Working environment factors, and the influence of these factors on health of workers. Creation and protection of working conditions that do not damage public health. Mutual links: man-machine-environment. Adaptation of technology to possibilities and skills of a man. Practical examples from the field of transportation; relevant legislature.			
15Y1HL	History of Civil Aviation	KZ	2
Beginnings of flying, development of aircrafts lighter than air. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Famous aviators. Helicopters. CSA airplanes. Development of aircrafts in Czechoslovakia between the years 1945-1989. Classic era of aviation. Golden era of civil aviation. Modern era of civil aviation. Airline companies. Supersonic flying.			
15Y1OP	Turning Points of the Czech Nation	KZ	2
Crucial moments of more than a thousand-year long history of Western Slavs in Central Europe. Emphasis on relations to bordering nations and Europe as a whole. The Premyslid state. Lands of the Czech Crown as a part of Habsburgh monarchy. 19th century political programmes. Foundation of Czechoslovakia. Disputes over the sense of Czech history. Changes of power structure in Europe during 20th century and the position of the Czech nation.			
16UDDM	Introduction to Transportation and Manipulation Technics	ZK	2
Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.			
16X31	Project 1	Z	2
16X32	Project 2	Z	2
16X33	Project 3	Z	2
16Y1EN	Energy Requirements of Vehicles	KZ	2
Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis.			
16Y1KJ	Railroad Vehicles	KZ	2
21st century mobility. Recent construction of railroad, city and intercity public vehicles, future and present situation, speed as a solution, maglev. From principle to design and construction; some realization in the world. Division and ways of drive, efficient electronics, changers, railroad traction, energetic calculation. Railroad safety signalling systems, railroad vehicle and infrastructure compliance (interference). Testing.			
16Y1PV	Operation, Construction and Maintenance of Vehicles	KZ	2
Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenence and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics.			
16Y1RE	Control and Electronic Vehicle Systems	KZ	2
Elementary concepts of regulation. Tools for analytical solution, linear system description. Basic types of a regulator (PID), properties, advantages, disadvantages, function. Conventional and hybrid drive control. Electric drive. Vehicle communication bus (CAN, LIN, FlexRay, ISObus, KWP2000 protocole etc.). Vehicle electronic control, safety, communication and comfort systems.			
16Y1TJ	Technological Quality Aspects	KZ	2
Certification and acreditation. Quality management. Standards of Quality Management and its application. Quality system creation. Tools and methods of quality improvement. Conformity verification. Environmental certification. Workplace certification. QMS integration. Classification, certification of products and producers.			
16Y1TZ	Transporting Devices	KZ	2
Flow of masses, material transport technology, loose material transport - conveyors with tractive elements, conveyors without tractive elements, transport of piece material - continual transport devices, cyclic transport devices, crane mechanisms, steel constructions. Vertical transport, transport in mines, long-distance conveyor belt transport.			

16Y1ZG	Introduction into Applied Computer Graphics	KZ	2
Computer graphics, division and applications with emphasis on transport, including development and research. Colours, colour perception, colour schemes, models, principles of 2D and 3D generation, elementary algorithms for graphic data workout. Visualisation principles and tasks, technics, graphics and visualisation HW basics. Introduction to 2D and 3D graphics software.			
16Y1ZL	Vehicle Testing, Legislation and Construction	KZ	2
Vehicle, bus and motorbike costruction, aggregate computing, driving resistance, build and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, technical legislation creation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.			
17DAS	Transportation and Communication Law	Z	1
Transportation and communication law - railway, road transport, ropeway, water road, air transport, telecommunication, post, patent.			
17ERP	Company Economy and Management	Z,ZK	3
Company and its neighbourhood, structure of assets and liabilities, depreciation, costs, revenues and profit, break-even point, costing, inventory, financial management, investment appraisal, basics of management, organizational structures, human resources management, marketing, company strategy, business plan.			
17TDL	Transport Technology and Logistics	Z,ZK	3
Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in pasanger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means.			
17TGA	Graph Theory and its Applications in Transport	Z,ZK	4
Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines.			
17X31	Project 1	Z	2
17X32	Project 2	Z	2
17X33	Project 3	Z	2
17Y1AF	Alternative Forms of Transportation Project Financing	KZ	2
There will be specifed such forms of financing in transportation, where the public sector body perform the final debtor, i. e. debtor payments come from its budget, but the final debtor is not a direct participant of the transaction and it is not the counterparty of the financial institute which provides the funding. Issue of securities as an alternative source of transportation project.			
17Y1DZ	Transported Commodities Cognization	KZ	2
Useful features. Quality. Testing. Standardization. Features relevant for the transport. Packing. Stress. Protection of goods and damage prevention during the carriage. Optimization of the choice and effective transport means utility.			
17Y1EV	Public Sector Economy	KZ	2
Economic and financial theory of public sector, public choice theory, externalites, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects a their economic efficiency assessment, way of elaboration of PPP projects, funding from EU funds, program HDM-4.			
17Y1LL	Logistics of Passenger and Freight Air Transport	KZ	2
Logistics airline passenger and cargo. Aircraft and airport terminals for passenger and cargo transport. Airlines in terms of logistics systems. Aerial transport process passengers and air cargo. Information systems in air transport. Global distribution systems.			
17Y1ND	Maritime Transportation	KZ	2
History and importance of the maritime transportation, theoretical discipline in maritime transportation, seafaring vessels, maritime ports and their utilization, inland logistic centre and maritime ports, transport corridors and link by maritime, river and rail transport I and II, global maritime corridors, logistics of maritime transportation, maritime transportation and smart containers, ITS in maritime transport.			
17Y1OF	Personal Finance	KZ	2
Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance).			
17Y1PM	Personnel Management	KZ	2
Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication.			
17Y1ST	Titan Simulation	KZ	2
Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions.			
18KIAD	Kinematics and Dynamics	Z,ZK	2
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Princle of D´Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
18MRI1	Materials 1	Z,ZK	3
Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephectostopic testing. Corosion.			
18MRI2	Materials 2	KZ	2
Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.			
18ST	Statics	Z,ZK	3
General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.			
18TTED	Creation of Technical Documentation	KZ	2
Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.			
18X31	Project 1	Z	2
18X32	Project 2	Z	2
18X33	Project 3	Z	2

18Y1AM	Anatomy, Mobility and Safety of Man	KZ	2
Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations.			
18Y1D1	Dynamics of Routes and Vehicles 1	KZ	2
Theory and analysis of vibration of multimass systems. Dynamical model of vehicle and interaction with transport structure. Assessment of structure vibration and allowable criteria. Vibroisolation and absorbers of dynamical effects. Methods of experimental dynamics. FEM in structure dynamics.			
18Y1EV	Experimental Methods and Numerical Modelling	KZ	2
Physical properties measured in structural mechanics and dynamics. Principles of strain gauge measurement. Theory of photoelasticimetry, experimental methods in structural dynamics. Basic principles of numerical methods in structural mechanics and dynamics. Finite element method in statics and dynamics. Geometry development, discretization to elements, types of structural elements. Boundary conditions. Material models. Solution of problems.			
18Y1MT	Engineering Materials	KZ	2
Systematic overview of main classes of materials used in technical design. In addition to main classes of materials, i. e. metals, ceramics, polymers and composites, attention is paid to biological materials and to biomimetics. Integral approach to material selection process is also demonstrated based on so called Ashby's selection charts.			
18Y1SN	Statically Nondeterminated Structures	KZ	2
Deformations of the beam element, virtual work. Strength method. Frame analysis by strength method. Deformation method. Frame analysis by deformation method. Simple planar grid. Beam on elastic Winkler´s foundation. Calculation beam on elastic foundation. Basement of the mathematical elasticity. Calculation of walls. Calculation of plates. Cylindrical shells. Examples of calculations.			
18Y1UK	Introduction of Rail Vehicles	KZ	2
Basic characteristics and parameters rail transport systems - railway and urban transport. Basis driving mechanics rail vehicles - equation of motion train and unit trains. Rolling and track resistance. Total running resistance. Acceleration force. Analyzing driving cycle rail vehicle. Speed-power diagrams and characteristics rail vehicle - hydromechanic, hydrodynamic and electric drive. Design concept rail vehicles and drive of wheel set.			
20BAS	Safety and Reliability of Systems	KZ	2
Basic concepts of safety and reliability in transport and its application. Basic scheme and the types of diagnostic systems. Acceptability and reliability of prediction. The sensitivity of transport and sensitivity analysis. Neural networks and optimization algorithms. Human factors in transport. Human - system interaction. Testing of the simulator operator and testing in real situations.			
20SSA	Systems Analysis	Z,ZK	3
Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.			
20TRS	Control Theory	KZ	2
Introduction to theory systems, linear, non-linear and causal systems. Signal theory, regulation circuits and regulators. Stability and criteria of stability. Management, principles of feedback management. Adaptive and expert management.			
20TZ	Technology of Control of the Railway Traffic Systems	ZK	2
Legislation in the railway transport. Technological process of rail transport control. Service and technology of control. Regional Railways. Rail communication equipment. Rail information systems. Fundamentals of rail control. Application of train driving automation.			
20UIS	Introduction to ITS	Z,ZK	3
Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.			
20X31	Project 1	Z	2
20X32	Project 2	Z	2
20X33	Project 3	Z	2
20Y1IC	Human Machine Interaction	KZ	2
Interaction of human-system. Methods and procedures for detecting decrease in attention. Used software and hardware tools. Bio-feedback, EEG measurements.			
20Y1K	Cybernetics	KZ	2
Fundamentals of information theory, dynamic systems, the principle of feedback, logical systems. Finite automata as a special case of dynamical systems. Relations between languages and automata.			
20Y1NS	Neural Networks	KZ	2
The basic structure and function of human brain and its main functional blocks and building elements - neurons. Models of neurons, modelling their networks and the basic paradigms of artificial neural networks.			
20Y1OI	Fare Collection and Information Systems	KZ	2
Fare collection systems in public transport and their components (on-board units, validators, turnstiles, ...). Information systems and their components for users (timetables, maps, panels ...) and operators (cycles, location or current delay of vehicles, ...). The issue of tariff systems. Other examples of clearance systems (parking).			
20Y1PO	Weather, Air Quality and Transportation	KZ	2
State of the atmosphere, weather observation network, weather in transportation, road meteorology. Weather forecasting, data assimilation, probabilistic forecasts, forecast evaluation. Air quality, main pollutants and their effects, atmospheric chemistry, traffic emissions. Greenhouse gasses, carbon cycle, a role of energy and transportation in climate change.			
20Y1SC	Sensors and Actuators	KZ	2
Principles of sensors and actuators. Basics of measuring theory and actuating influence. The respective technologies and construction principles. Sensors of mechanical, electro-magnetic, state (temperature, humidity), chemical and particle flow values. Electrical, pneumatic and hydraulic actuators and solid phase elements.			
20Y1TD	Telematics Databases	KZ	2
Issue of telematics databases, work with OpenStreetMap layer, use of Linux OS and PostgreSQL with PostGIS extension, real traffic data.			
20Y1TE	Technology of Electronic Systems	KZ	2
Characteristics of the technological process, the relation of the design, construction and technology. General scheme of technological process. Principles and characteristics of basic electronic elements. Basic technology of integrated circuits. Synthesis of integrated circuits. Higher levels of technology components. Measurement, diagnostics, reliability. Operational aspects of electronic systems.			
20ZC	Base of Digital Technique	Z,ZK	3
Introduction to logical systems. Design of combinational and sequential logic circuits. Computer architecture - von Neumann concept, RISC architecture. Processor, computer arithmetics, controller, memories, instruction set, base cycle of computer. Digital circuits, A/D and D/A converters. One-chip microcontrollers. Programmable logical circuits - FPGA, CPLD. Displays.			
20ZTH	Railway Interlocking Plants	KZ	3
Characteristics of components and parts of interlocking plants for control and command of railways transport. Rail transport; standards and principles of rail security. I., II. and III. categories of interlocking plants and future technologies. Components for interlocking plants. Compatibility and interoperability. Data security. Situation in the Czech Republic and in the world. Intelocking plants in public transport in cities.			

21X31	Project 1	Z	2
21X32	Project 2	Z	2
21X33	Project 3	Z	2
21Y1LM	Aviation Meteorology	KZ	2
Structure of atmosphere. Vertical stratification. Pressures QNH, QFE, QFF, QME. Instability. Atmospherical fronts. Atmospherical precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrofical and geocyclostrophical wind. Visibilities in air transport. Dangerous meteorological aspects. Meteorological maps. Climatology. Circulation.Intertropical front. Meteorological information.			
21Y1LR	Radio Technology in Aviation	KZ	2
Electric signals and the wave spectrum. Analog and digital modulations. Noises. Filters. Resonance circuits. Electromagnetic field. Electromagnetic wave propagation. Wave ranges in aviation, radiation and reception of electromagnetic field. Antennas in aviation, receivers and transmitters.			
21Y1PU	Aircraft Maintenance Technology	KZ	2
Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.			
21ZLD	Introduction to Air Transport	KZ	2
Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.			
22UN	Traffic Accidents Introduction	Z	2
Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.			
22X31	Project 1	Z	2
22X32	Project 2	Z	2
22X33	Project 3	Z	2
23SBIS	Information Systems Security Standards	KZ	2
Security, reliability, accessibility and servicebility of information systems. Physical versus information security, open versus closed system. Basic principles of security and threats for information systems. Security of information systems - standards, development of standards, application of standards.			
23X31	Project 1	Z	2
23X32	Project 2	Z	2
23X33	Project 3	Z	2

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