

# Study plan

**Name of study plan: ITS bak.prez.11/12**

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Intelligent Transport Systems

Garantor of the study branch: doc. Ing. Pavel Hrubeš, Ph.D.

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: 135

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	<b>Economics</b>	Z,ZK	3	2+1	Z	z
11GIE	<b>Geometry</b> <i>Oldřich Hykš, Šárka Voráková, Pavel Provinský, Šárka Voráková (Gar.)</i>	KZ	3	2P+2C+12B	Z	z
14KSP	<b>Constructing with Computer Aid</b> <i>Vladimír Douda, Martin Brumovský, Lukáš Kozel, Radek Kratochvíl, Filip Müller, Lukáš Svoboda, Drahomír Schmidt, Lukáš Svoboda (Gar.)</i>	KZ	2	0P+2C+8B	Z	z
11LA	<b>Linear Algebra</b> <i>Pavel Provinský, Lucie Kárná, Jan Píkrýl, Martina Beváková, Martina Beváková (Gar.)</i>	Z,ZK	3	2P+1C+10B	Z	z
11MTA	<b>Mathematical Analysis</b>	Z,ZK	4	2+2	Z	z
18MRI1	<b>Materials 1</b>	Z,ZK	3	2+1	Z	z
00TVC1	<b>Physical Education 1</b>	Z	1	0+2	Z	z
18TTED	<b>Creation of Technical Documentation</b>	KZ	2	2+1	Z	z
22UN	<b>Traffic Accidents Introduction</b>	Z	2	2+0	Z	z
12ZADI	<b>Introduction to Transportation Engineering</b>	Z,ZK	3	2+1	Z	z
14ZINF	<b>Fundamentals of Informatics</b>	KZ	2	0+2	Z	z
21ZLD	<b>Introduction to Air Transport</b>	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	Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, 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 possibilities, AutoCAD environment profiles, drawings with raster foundations).
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. Dephctostopic 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	<b>Economy, Transport, Telecommunications</b>	KZ	2	2+0	L	z
11FY1	<b>Physics 1</b>	Z,ZK	4	2P+2C	L	z
11MVP	<b>Mathematical Analysis of Function of More Variables</b>	Z,ZK	3	2+2	L	z
18MRI2	<b>Materials 2</b>	KZ	2	2+0	L	z
11PT	<b>Probability</b>	Z	2	1+1	L	z
12PKD	<b>Rail Transport Designing</b>	Z,ZK	3	2+2	L	z
14SIAP	<b>Networks and Protocols</b>	KZ	2	1+1	L	z
18ST	<b>Statics</b>	Z,ZK	3	2+1	L	z
17TDL	<b>Transport Technology and Logistics</b>	Z,ZK	3	2+2	L	z
00TVC2	<b>Physical Education 2</b>	Z	1	0+2	L	z
20UIS	<b>Introduction to ITS</b>	Z,ZK	3	2+1	L	z
14UPRO	<b>Introduction to Programming</b>	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 passenger 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 <i>Milan Dont, Josef Kocourek</i>	Z,ZK	3	2P+1C+8B	Z	z
12PPOK	Designing Roads, Highways and Motorways <i>Petr Šatra, Jiří Šarský, Jan Gallia, Tomáš Padělek, Petr Kumpošt</i>	KZ	3	1P+2C+10B	Z	z
18PZP	Elasticity and Strength <i>Petr Zlámal, Jan Vyšichl, Josef Jíra, Petr Koudelka, Tomáš Doktor, Daniel Kytý, Tomáš Fíla, Jan Šleichrt, Ondřej Jiroušek</i>	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 during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.			
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 transportation, modelling and projecting of transport systems, integrated technological and information system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedia 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. Legislation.			
14ZAET	Fundamentals of Electrotechnics	KZ	2
Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assigning of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementary methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triangular and principle of superposition in direct current circuits.			

Code of the group: 5.S.BITS 12/13

Name of the group: 5.sem.ITS bak.prez. 12/13

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 6 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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
14DB	Database Systems	KZ	2	0+2	Z	z
14PRG2	Programming 2	KZ	2	1+1	Z	z
14TC	Telecommunications	Z,ZK	3	2+2	Z	z
17TGA	Graph Theory and its Applications in Transport <i>Alena Rybi ková, Denisa Mocková, Dušan Teichmann Alena Rybi ková (Gar.)</i>	Z,ZK	4	<del>2+2</del> 12B	Z	z
20ZC	Base of Digital Technique	Z,ZK	3	2+1	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.BITS 12/13 Name=5.sem.ITS 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.			
14PRG2	Programming 2	KZ	2
Introduction to differences between C and C++. Special C++ features like: polymorphism, references, memory allocation, new data types, objects - classes. Furthermore inheritance, generic programming, operator overloading, STL library, abstract classes, exceptions, etc. Course contains examples of new techniques for practical exercises. Students, as a part of final exam, will develop advanced C++ program.			
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 introduced 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.			
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. Interlocking plants in public transport in cities.			

Code of the group: 5.S.BITS VÝB R 1 12/

Name of the group: 5.sem.ITS výb r p edm tu 1 12/13

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

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

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
16PBV	<b>Passive Vehicle Safety</b>	Z,ZK	3	2+1	Z	z
20RU	<b>Control of Traffic Node and Line</b>	Z,ZK	3	2+1	Z	z

**Characteristics of the courses of this group of Study Plan: Code=5.S.BITS VÝB R 1 12/ Name=5.sem.ITS výb r p edm tu 1 12/13**

16PBV	Passive Vehicle Safety	Z,ZK	3	Legislation and testing processes. Barrier tests. Car body properties. Injury mechanism. Critical limits for evaluation of injury seriousness. Retaining systems. Airbags. Risk of collision of various vehicle types. Safety of traffic participants. Mathematic modeling. E-call.		
20RU	Control of Traffic Node and Line	Z,ZK	3	Basic concepts, terms, principles and requirements for documentation. Criteria of design light signaling equipment. Hardware and software of transport node. Traffic detectors. Proposal for construction works, horizontal and vertical markings. Calculation of intersection design and its wider relations. Line management. Proposal for traffic management and current trends in transport management.		

Code of the group: 5.S.BITS VÝB R 2 12/

Name of the group: 5.sem.ITS výb r p edm tu 2 12/13

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

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

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
16DOPY	<b>Vehicle Technology</b>	KZ	3	3+0	Z	z
17PDO	<b>Designing of Public Transport Services</b>	KZ	3	2+1	Z	z

**Characteristics of the courses of this group of Study Plan: Code=5.S.BITS VÝB R 2 12/ Name=5.sem.ITS výb r p edm tu 2 12/13**

16DOPY	Vehicle Technology	KZ	3	Terminology in transportation technology. Vehicle in the terms of legislation. Construction, operation, environmental influence. Vehicles and ecology. Traction engines characteristics. Combustion and electrical engines. Power train construction. Power transmission. Conducting properties of railroad vehicles. Resistance to derailling. Transportation technology in water transport. Transportation technology in aviation.		
17PDO	Designing of Public Transport Services	KZ	3	Transport planning, demand elasticity. Strategy and hierarchical planning of public transport system. Line network planning, concept of offer. Integrated periodic timetable. Planning process of long-distance and regional transport. Optimised number of rolling-stock, circulation plan of rolling-stock, rolling-stock strategy. Public service liability for various segments. Harmony of particular long-term plans. Controlled competition. Case studies.		

Code of the group: 6.S.BITS 12/13

Name of the group: 6.sem. ITS bak.prez. 12/13

Requirement credits in the group: In this group you have to gain 16 credits

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

Credits in the group: 16

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, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
20BOZ	<b>Occupational Health and Safety</b>	KZ	2	2+1	L	z
20BAS	<b>Safety and Reliability of Systems</b>	KZ	2	2+0	L	z
17DAS	<b>Transportation and Communication Law</b>	Z	1	2+0	L	z
14ISYS	<b>Information Systems</b>	KZ	2	2+0	L	z
14TLSY	<b>Telecommunication Systems</b>	Z,ZK	4	2+2	L	z
11THOS	<b>Queueing Theory</b>	Z,ZK	3	2+1	L	z
20TRS	<b>Control Theory</b>	KZ	2	2+0	L	z

**Characteristics of the courses of this group of Study Plan: Code=6.S.BITS 12/13 Name=6.sem. ITS bak.prez. 12/13**

20BOZ	Occupational Health and Safety	KZ	2	The base of legal regulations. Common principles by the locking of occupational health and safety (OHS). The base requirements by the locking of OHS. Safety of technical equipments. Obligations of employers. Obligations and rights of workers. Obligations by accession to work. Work safety with electrical equipments. Work safety with computers. Industrial accidents and its documentation. First aid by electrical accidents. Important telephones.		
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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.			
17DAS	Transportation and Communication Law	Z	1
Transportation and communication law - railway, road transport, ropeway, water road, air transport, telecommunication, post, patent.			
14ISYS	Information Systems	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these tools use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.			
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.			
11THOS	Queueing Theory	Z,ZK	3
Markov processes, Kendall classification. Models M/M/a, stability condition, characteristics of a system. Nonmarkovian models, model M/G/a, system with generally distributed service. Serve process, introduction. Equilibrium in queueing model. Petri net. Computer simulation.			
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: 6.S.BITS VÝB R 1 12/

Name of the group: 6.sem. ITS výb r p edm tu 1 12/13

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

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

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
16DYJ	<b>Vehicle Dynamics</b> Adam Orlický, P emysl Toman, Josef Mík	Z,ZK	3	2P+1C	Z	z
20RM	<b>Urban Concentration and Motorway Control</b>	Z,ZK	3	2+1	L	z

Characteristics of the courses of this group of Study Plan: Code=6.S.BITS VÝB R 1 12/ Name=6.sem. ITS výb r p edm tu 1 12/13

16DYJ	Vehicle Dynamics	Z,ZK	3
Application of mechanics. Wheel and axle suspension mechanism. Wheel to road positioning characteristics. Wheel - road contact. Skid and its characteristics. Longitudinal dynamics, acceleration and deceleration. Vertical dynamics, spring suspension, driving characteristics. Directional dynamics, gyroscopical characteristics. Driving stability conditions. Aerodynamic forces. Driving and feedback. ABS, ESP.			
20RM	Urban Concentration and Motorway Control	Z,ZK	3
City transport management. Overall transport management. Stationary transport. Information panels, variable traffic signs. Transport system control including city public transport. Road tunnels and their technological equipment, control and safety systems. Emergency situations in transport and their solutions.			

Code of the group: 6.S.BITS VÝB R 2 12/

Name of the group: 6.sem. ITS výb r p edm tu 2 12/13

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

Requirement courses in the group: In this group you have to complete at least 1 course ( at most 2)

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
16PUM	<b>Production, Operation and Service of Vehicles</b>	Z,ZK	3	2+1	L	z
20TZ	<b>Technology of Control of the Railway Traffic Systems</b>	ZK	2	2+0	L	z
20TZC	<b>Technology of Control of the Railway Traffic Systems - Practice</b>	Z	1	0+1	L	z

Characteristics of the courses of this group of Study Plan: Code=6.S.BITS VÝB R 2 12/ Name=6.sem. ITS výb r p edm tu 2 12/13

16PUM	Production, Operation and Service of Vehicles	Z,ZK	3
Methods of production and servicing of vehicles, control methods, plans for servicing, engine service, emissions, gear-box, diagnostic systems.			
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.			
20TZC	Technology of Control of the Railway Traffic Systems - Practice	Z	1
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.			

Code of the group: 6.S.BITS VÝB R 3 12/

Name of the group: 6.sem. ITS výb r p edm tu 3 12/13

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

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

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
16KI	Intelligent Vehicle Design	KZ	3	2+1	L	z
17RKM	Project Management and Crisis Management	KZ	3	3+0	L	z

Characteristics of the courses of this group of Study Plan: Code=6.S.BITS VÝB R 3 12/ Name=6.sem. ITS výb r p edm tu 3 12/13

16KI	Intelligent Vehicle Design	KZ	3	Content of the subject is the basic principles of design projection of vehicles and motorcycles, legislation and special projection targets and numerical methods during design proposal etc. It also includes design rules and legislation, car body design and deformation influence during traffic accidents, restraint systems, injury biomechanics and serious injuries.		
17RKM	Project Management and Crisis Management	KZ	3	Project cycle and principles of project management. Basic methods of project assessment, criteria of optimal scenario, and principles for economical and financial analysis. Project risks and uncertainties. Crisis management.		

Name of the block: Semestrální projekt

Minimal number of credits of the block: 6

The role of the block: ZP

Code of the group: XP4,5,6 11/12

Name of the group: Projekty prez.4.5.6.sem.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 3 courses

Credits in the group: 6

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
15X31	Project 1 <i>Eva Rezlerová</i>	Z	2	0P+1C	L	ZP
14X31	Project 1 <i>Jana Kaliková, Marek Kalika, Ota Hajzler</i>	Z	2	0P+1C	L	ZP
13X31	Project 1	Z	2	0+1		ZP
12X31	Project 1 <i>Josef Kocourek, Karolína Moudrá, Jiří arský, Tomáš Padlek, Petr Kumpošt, Zuzana arská, Dagmar Koárková, Libor Ládyš, Kristýna Neubergerová, .....</i>	Z	2	0P+1C	L	ZP
11X31	Project 1 <i>Ondřej Píbyl</i>	Z	2	0P+1C	L	ZP
23X31	Project 1	Z	2	0P+1C	L	ZP
17X31	Project 1 <i>Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová, Rudolf Vávra, Petr Fridrišek, Stanislav Metelka, Václav Baroch, Edvard Bežina, .....</i>	Z	2	0P+1C	L	ZP
18X31	Project 1 <i>Jaroslav Valach</i>	Z	2	0P+1C	L	ZP
20X31	Project 1 <i>Petr Bureš</i>	Z	2	0P+1C	L	ZP
21X31	Project 1	Z	2	0P+1C	L	ZP
22X31	Project 1 <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý</i>	Z	2	0P+1C	L	ZP
16X31	Project 1 <i>Adam Orlický, Josef Mík, Dmitry Rozhdestvenskiy</i>	Z	2	0P+1C	L	ZP
15X32	Project 2 <i>Eva Rezlerová</i>	Z	2	0P+2C	Z	ZP
14X32	Project 2 <i>Jana Kaliková, Ota Hajzler, Jan Král, Tomáš Zelinka, Zdeněk Lokaj, Martin Šrotý, Vít Fábeka</i>	Z	2	0P+2C	Z	ZP
13X32	Project 2	Z	2	0+2		ZP

12X32	<b>Project 2</b> <i>Josef Kocourek, Roman Dostál, Karolína Moudrá, Jiří arský, Jan Gallia, Tomáš Padlelek, Petr Kumpošt, Zuzana arská, Dagmar Koárková, .....</i>	Z	2	0P+2C	Z	ZP
11X32	<b>Project 2</b>	Z	2	0P+2C	Z	ZP
16X32	<b>Project 2</b> <i>Adam Orlický, Josef Mík, Dmitry Rozhdestvenský, Petr Bouchner, Milan Sliacky</i>	Z	2	0P+2C	Z	ZP
23X32	<b>Project 2</b>	Z	2	0P+2C	Z	ZP
22X32	<b>Project 2</b> <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý, Tomáš Míunek</i>	Z	2	0P+2C	Z	ZP
21X32	<b>Project 2</b> <i>Terézia Pilmannová</i>	Z	2	0P+2C	Z	ZP
20X32	<b>Project 2</b> <i>Petr Bureš, Jiří Ržika, Patrik Horažovský, Pavel Hrubeš, Martin Leso, Zuzana Purkrábková</i>	Z	2	0P+2C	Z	ZP
18X32	<b>Project 2</b> <i>Jaroslav Valach</i>	Z	2	0P+2C	Z	ZP
17X32	<b>Project 2</b> <i>Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová, Petr Fridrišek, Stanislav Metelka, Václav Baroch, Edvard Bezina, Michal Drábek, .....</i>	Z	2	0P+2C	Z	ZP
11X33	<b>Project 3</b> <i>Ondřej Píbyl</i>	Z	2	0P+1C	L	ZP
12X33	<b>Project 3</b> <i>Josef Kocourek, Karolína Moudrá, Jiří arský, Tomáš Padlelek, Petr Kumpošt, Zuzana arská, Dagmar Koárková, Libor Ládyš, Kristýna Neubergová, .....</i>	Z	2	0P+1C	L	ZP
13X33	<b>Project 3</b>	Z	2	0+1		ZP
14X33	<b>Project 3</b> <i>Jana Kaliková, Jan Král, Tomáš Zelinka, Zdeněk Lokaj, Martin Šrotý</i>	Z	2	0P+1C	L	ZP
15X33	<b>Project 3</b> <i>Eva Rezlerová</i>	Z	2	0P+1C	L	ZP
23X33	<b>Project 3</b>	Z	2	0P+1C	L	ZP
21X33	<b>Project 3</b>	Z	2	0P+1C	L	ZP
20X33	<b>Project 3</b> <i>Petr Bureš</i>	Z	2	0P+1C	L	ZP
18X33	<b>Project 3</b>	Z	2	0P+1C	L	ZP
17X33	<b>Project 3</b> <i>Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová, Rudolf Vávra, Petr Fridrišek, Stanislav Metelka, Václav Baroch, Edvard Bezina, .....</i>	Z	2	0P+1C	L	ZP
16X33	<b>Project 3</b> <i>Josef Mík, Dmitry Rozhdestvenský</i>	Z	2	0P+1C	L	ZP
22X33	<b>Project 3</b> <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý</i>	Z	2	0P+1C	L	ZP

**Characteristics of the courses of this group of Study Plan: Code=XP4,5,6 11/12 Name=Projekty prez.4.5.6.sem.11/12**

15X31	Project 1	Z	2
14X31	Project 1	Z	2
13X31	Project 1	Z	2
12X31	Project 1	Z	2
11X31	Project 1	Z	2
23X31	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
16X31	Project 1	Z	2
15X32	Project 2	Z	2
14X32	Project 2	Z	2
13X32	Project 2	Z	2
12X32	Project 2	Z	2
11X32	Project 2	Z	2
16X32	Project 2	Z	2
23X32	Project 2	Z	2
22X32	Project 2	Z	2
21X32	Project 2	Z	2
20X32	Project 2	Z	2
18X32	Project 2	Z	2
17X32	Project 2	Z	2
11X33	Project 3	Z	2
12X33	Project 3	Z	2



13X33	Project 3	Z	2
14X33	Project 3	Z	2
15X33	Project 3	Z	2
23X33	Project 3	Z	2
21X33	Project 3	Z	2
20X33	Project 3	Z	2
18X33	Project 3	Z	2
17X33	Project 3	Z	2
16X33	Project 3	Z	2
22X33	Project 3	Z	2

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 23

The role of the block: P

Code of the group: 4.S.BITS 11/12

Name of the group: 4.sem.ITS bak.prez.11/12

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

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

Credits in the group: 23

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11AKX	<b>Functions of Complex Variable</b>	Z,ZK	3	2+1	L	P
12DPZ	<b>Traffic Surveys</b>	KZ	2	2+0	L	P
11MDS	<b>Collection and Processing of Traffic Data</b> <i>Ond ej P ibyl Ond ej P ibyl Ond ej P ibyl (Gar.)</i>	KZ	2	2P+0C	L	P
11MSP	<b>Modeling of Systems and Processes</b> <i>Lucie Kárná, Jan P ikryl, Bohumil Ková , Marek Honc Bohumil Ková Jan P ikryl (Gar.)</i>	Z,ZK	4	2P+2C+1B	L	P
20NSD	<b>Power Systems in Railway Transport</b>	Z,ZK	2	2+1	L	P
11ORVD	<b>Optimization and Decision in Transportation</b>	Z,ZK	4	2+2	L	P
14PRG1	<b>Programming 1</b>	Z	2	1+1	L	P
12USIM	<b>Introduction to Traffic Simulation</b>	Z	2	0+2	L	P
20ZE	<b>Base of Electronics</b>	Z,ZK	2	2+1	L	P

**Characteristics of the courses of this group of Study Plan: Code=4.S.BITS 11/12 Name=4.sem.ITS bak.prez.11/12**

11AKX	Functions of Complex Variable Differential calculus of the complex function of one variable, Cauchy-Riemann conditions, power series, integral calculus of the complex function of one variable. Cauchy theorem, meromorphic functions, residue and residue theorem, basic ideas of Laplace and z-transformations.	Z,ZK	3
12DPZ	Traffic Surveys Fundamental means of traffic surveys, project of skills of counting vehicles at all types of road junction, car park surveys to determine accumulation and length of stay of each vehicle, statistical analysis, simulation models, etc.	KZ	2
11MDS	Collection and Processing of Traffic Data 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.	KZ	2
11MSP	Modeling of Systems and Processes Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).	Z,ZK	4
20NSD	Power Systems in Railway Transport In this course, the students are introduced to the heavy current and traction systems, introduced to safety and EMC/EMI of power traction systems, basic norms and regulations. The courses are focused on the special transport systems (metro, trolley bus, etc.) too.	Z,ZK	2
11ORVD	Optimization and Decision in Transportation Linear programming. Traffic and assignment problem. Dynamic of transportation processes. Application of dynamical programming in transportation problems. Decision processes in transportation. Basic concepts of theory of decision, rational procedure of solution of decision problems in organizations. Multicriterial decision.	Z,ZK	4
14PRG1	Programming 1 Introduction to differences between C and C++. Special C++ features like: polymorphism, references, memory allocation, new data types, objects - classes. Furthermore inheritance, generic programming, operator overloading, STL library, abstract classes, exceptions, etc. Course contains examples of new techniques for practical exercises. Students, as a part of final exam, will develop advanced C++ program.	Z	2
12USIM	Introduction to Traffic Simulation Basic terminology in the field, evaluation of the entire simulation process on a real example.	Z	2

20ZE	Base of Electronics	Z,ZK	2
Materials for the production of semiconductors, semiconductor and implementation of electronic components, electronic components without PN junction, PN junction, semiconductor diodes, thyristors, rectifiers, zener diode, stabilization, bipolar transistors (amplifiers, switching element), unipolar transistors. Operating point. Operational amplifiers and their connections (signal amplifiers, comparators, ideal diode). Wien oscillator.			

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 4

The role of the block: PV

Code of the group: Y1-BITS 11/12

Name of the group: PVP bak.prez. ITS od 11/12

Requirement credits in the group: In this group you have to gain 4 credits

Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 4

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
17Y1AF	<b>Alternative Forms of Transportation Project Financing</b>	KZ	2	2+0	Z	PV
18Y1AM	<b>Anatomy, Mobility and Safety of Man</b> <i>Jitka Jírová</i>	KZ	2	2P+0C	Z	PV
14Y1AV	<b>Animation and Visualization</b>	KZ	2	2P+0C	L	PV
14Y1AP	<b>Automatization in Mail</b>	KZ	2	2+0	Z	PV
17Y1BB	<b>Banks and Banking</b>	KZ	2	2+0	Z	PV
14Y1BE	<b>Barrierless Transport</b> <i>Jan Král</i>	KZ	2	2P+0C	L	PV
15Y1BO	<b>Work Safety and Health Protection in Transportation</b> <i>Eva Rezlerová, Jan Feit, Petr Musil</i>	KZ	2	2P+0C	L	PV
15Y1DU	<b>History of Art and Society</b>	KZ	2	2+0	Z	PV
15Y1DZ	<b>History of Railway</b> <i>Eva Rezlerová, Martin Jacura, Jan Feit</i>	KZ	2	2P+0C	L	PV
17Y1DZ	<b>Transported Commodities Cognization</b>	KZ	2	2+0	L	PV
18Y1D1	<b>Dynamics of Routes and Vehicles 1</b>	KZ	2	2+0	Z	PV
13Y1EA	<b>Economic - Energetic Analysis of Land Transport</b>	KZ	2	2+0	Z	PV
13Y1EV	<b>Public Sector Economy</b>	KZ	2	2+0	Z	PV
17Y1EV	<b>Public Sector Economy</b> <i>Zdeněk Iňa</i>	KZ	2	2P+0C	Z	PV
15Y1EH	<b>European Integration within Historical Context</b> <i>Eva Rezlerová, Jan Feit</i>	KZ	2	2P+0C	Z	PV
18Y1EV	<b>Experimental Methods and Numerical Modelling</b>	KZ	2	2+0	L	PV
15Y1FD	<b>French Area Studies and Transportation</b> <i>Eva Rezlerová, Jan Feit, Irena Veselková</i>	KZ	2	2P+0C	L	PV
20Y1GI	<b>Geographical Information Systems</b>	KZ	2	2+0	L	PV
14Y1GD	<b>GIS and Maps Digitalization</b>	KZ	2	2+0	Z	PV
14Y1HW	<b>Computer Hardware</b> <i>Vít Fábera</i>	KZ	2	2P+0C	L	PV
15Y1HL	<b>(History of Civil Aviation)</b> <i>Eva Rezlerová, Jakub Kraus, Vladimír Plos, Jan Feit</i>	KZ	2	2P+0C	L	PV
15Y1HD	<b>History of City Mass Transport</b> <i>Milan Dont, Eva Rezlerová</i>	KZ	2	2P+0C	Z	PV
12Y1HD	<b>Traffic Noise</b> <i>Libor Ládyš</i>	KZ	2	2P+0C	L	PV
15Y1HE	<b>Work Hygiene and Ergonomics in Traffic</b> <i>Eva Rezlerová, Petr Musil</i>	KZ	2	2P+0C	Z	PV
20Y1IC	<b>Human Machine Interaction</b>	KZ	2	2+0	L	PV
16Y1KJ	<b>Railroad Vehicles</b>	KZ	2	2+0	L	PV
12Y1KN	<b>Combined Transportation</b>	KZ	2	2P+0C	Z	PV
20Y1K	<b>Cybernetics</b>	KZ	2	2+0	Z	PV
21Y1LM	<b>Aviation Meteorology</b>	KZ	2	2+0	L	PV
21Y1LR	<b>Radio Technology in Aviation</b>	KZ	2	2+0	L	PV
21Y1L	<b>Airports - Design and Operation</b>	KZ	2	2+0	L	PV

21Y1LC	<b>Human Factor</b>	KZ	2	2+0	Z	PV
11Y1LP	<b>Linear Programming</b>	KZ	2	2+0	L	PV
17Y1LL	<b>Logistics of Passenger and Freight Air Transport</b> <i>Petra Skolilová</i>	KZ	2	2P+0C	L	PV
11Y1MM	<b>Mathematical Models in Economy</b>	KZ	2	2P+0C	Z	PV
18Y1MT	<b>Engineering Materials</b> <i>Jaroslav Valach</i>	KZ	2	2P+0C	L	PV
17Y1ND	<b>Maritime Transportation</b>	KZ	2	2+0	Z	PV
14Y1NH	<b>Databases Design and Programming</b>	KZ	2	2+0	L	PV
14Y1NB	<b>Databases Design and Programming</b>	KZ	2	2+0	L	PV
14Y1NP	<b>Non-parametric 3D Modelling</b>	KZ	2	2+0	Z	PV
20Y1NS	<b>Neural Networks</b>	KZ	2	2+0	Z	PV
20Y1OI	<b>Fare Collection and Information Systems</b> <i>Milan Sliacky</i>	KZ	2	2P+0C	L	PV
14Y1OL	<b>Linux Operating System</b>	KZ	2	2+0	Z	PV
14Y1OS	<b>Operating Systems</b>	KZ	2	2+0	Z	PV
15Y1OP	<b>Turning Points of the Czech Nation</b>	KZ	2	2+0	L	PV
11Y1PV	<b>Parametrical and Multicriterial Programming</b> <i>Olga Vraštilová</i>	KZ	2	2P+0C	Z	PV
13Y1PM	<b>Personal Management</b>	KZ	2	2+0	L	PV
12Y1PC	<b>Pedestrian and Cycling Transport</b>	KZ	2	2P+0C	L	PV
20Y1PO	<b>Weather, Air Quality and Transportation</b>	KZ	2	2+0	Z	PV
14Y1PG	<b>Computer Graphics</b>	KZ	2	2P+0C	L	PV
11Y1PE	<b>Computer Controlled Experiments</b>	KZ	2	2+0	L	PV
13Y1PD	<b>The Participation of Transport in Tourist Trade Management</b>	KZ	2	2+0	L	PV
14Y1PM	<b>Advanced Methods of Parametric Programming</b>	KZ	2	2+0	L	PV
21Y1PU	<b>Aircraft Maintenance Technology</b>	KZ	2	2+0	L	PV
12Y1PD	<b>Assessment of Transport Structures</b> <i>Kristýna Neubergová</i>	KZ	2	2P+0C	Z	PV
14Y1PJ	<b>C Programming Language</b> <i>Vít Fábeka</i>	KZ	2	2P+0C	Z	PV
12Y1C1	<b>Designing Roads in Civil 3D I</b> <i>Tomáš Honc</i>	KZ	2	2P+0C	L	PV
12Y1C2	<b>Designing Roads in Civil 3D II</b> <i>Tomáš Honc</i>	KZ	2	2P+0C	Z	PV
18Y1P1	<b>Design of Structures 1</b>	KZ	2	2+0	L	PV
16Y1PV	<b>Operation, Construction and Maintenance of Vehicles</b>	KZ	2	2P+0C	L	PV
12Y1PU	<b>Organization Disposition of Railway Stations</b>	KZ	2	2P+0C	L	PV
12Y1RZ	<b>Railway Lines Reconstruction</b>	KZ	2	2+0	Z	PV
16Y1RE	<b>Control and Electronic Vehicle Systems</b> <i>P emysl Toman, Josef Mík, Ji í First</i>	KZ	2	2P+0C	Z	PV
16Y1RV	<b>Railroad Vehicles Driving</b>	KZ	2	2+0	L	PV
21Y1RL	<b>Air Traffic Control</b>	KZ	2	2+0	L	PV
13Y1SM	<b>MESE Simulation</b>	KZ	2	2+0	Z	PV
20Y1SC	<b>Sensors and Actuators</b> <i>Pavel Hrubeš</i>	KZ	2	2P+0C	L	PV
11Y1SI	<b>Transportation Software Engineering</b>	KZ	2	2P+0C	Z	PV
12Y1SU	<b>Road Management and Maintenance</b> <i>Martin Höfler, Otakar Vacín</i>	KZ	2	2P+0C	L	PV
18Y1SN	<b>Statically Nondeterminated Structures</b>	KZ	2	2+0	Z	PV
16Y1TJ	<b>Technological Quality Aspects</b>	KZ	2	2+0	Z	PV
20Y1TE	<b>Technology of Electronic Systems</b>	KZ	2	2+0	L	PV
20Y1TD	<b>Telematics Databases</b>	KZ	2	2+0	Z	PV
11Y1TG	<b>Graph Theory</b> <i>Lucie Kárná</i>	KZ	2	2P+0C	L	PV
16Y1TR	<b>Theory of Railroad Vehicle Driving</b>	KZ	2	2+0	Z	PV
16Y1TZ	<b>Transporting Devices</b>	KZ	2	2+0	L	PV
14Y1TI	<b>Creating Interactive Internet Applications</b>	KZ	2	2P+0C	L	PV
18Y1UK	<b>Introduction of Rail Vehicles</b> <i>Josef Kolá , Josef Kolá</i>	KZ	2	2P+0C	L	PV
14Y1VB	<b>Visual Basic</b>	KZ	2	2+0	L	PV

12Y1VC	<b>Waterways and Shipping</b>	KZ	2	2P+0C	Z	PV
14Y1VM	<b>Development of Applications for Mobile Devices</b>	KZ	2	2P+0C	Z	PV
21Y1ZT	<b>ATM Systems</b>	KZ	2	2+0	Z	PV
16Y1ZG	<b>Introduction into Applied Computer Graphics</b> <i>Adam Orlický, Stanislav Novotný</i>	KZ	2	2P+0C	L	PV
18Y1ZD	<b>Basics of Two-Dimensional Design</b>	KZ	2	2+0	Z	PV
11Y1ZF	<b>Introduction to Solid State Physics</b>	KZ	2	2+0	Z	PV
14Y1ZM	<b>Fundamentals of Parametric and Adaptive Programming</b>	KZ	2	2P+0C	L	PV
18Y1ZT	<b>Basics of Three-Dimensional Design</b>	KZ	2	2+0	L	PV
12Y1ZU	<b>Principles of Urbanism</b> <i>Karel Hájek</i>	KZ	2	2P+0C	Z	PV
16Y1ZL	<b>Vehicle Testing, Legislation and Construction</b> <i>Josef Mík</i>	KZ	2	2P+0C	Z	PV

**Characteristics of the courses of this group of Study Plan: Code=Y1-BITS 11/12 Name=PVP bak.prez. ITS od 11/12**

17Y1AF	<b>Alternative Forms of Transportation Project Financing</b>	KZ	2			
There will be specified 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	<b>Anatomy, Mobility and Safety of Man</b>	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	<b>Animation and Visualization</b>	KZ	2			
Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation.						
14Y1AP	<b>Automatization in Mail</b>	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.						
17Y1BB	<b>Banks and Banking</b>	KZ	2			
Banks and banking system. Balance sheet, income statement, bank's capital and its functions. Banking risks. Banking products. Interest types, pay-off and loan securing, financial loan products. Banking deposit products. Banking payment-clearing products. Financial intermediation, open-end and closed-end funds, collective investment schemes. Central bank and its role. Bank regulation and supervision. International banking.						
14Y1BE	<b>Barrierless Transport</b>	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	<b>Work Safety and Health Protection in Transportation</b>	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	<b>History of Art and Society</b>	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	<b>History of Railway</b>	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.						
17Y1DZ	<b>Transported Commodities Cognization</b>	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	<b>Dynamics of Routes and Vehicles 1</b>	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.						
13Y1EA	<b>Economic - Energetic Analysis of Land Transport</b>	KZ	2			
Vehicle traction systems, traction-energetic properties, laws of vehicle motion, assessment of energy demands, traction-energetic conceptions, technical, economical and social aspects.						
13Y1EV	<b>Public Sector Economy</b>	KZ	2			
Summary of basic economic findings, public goods - definition, public sector domains, state budget, taxes, public goods and externalities, externalities in transportation and their treatment, methods of assessment of public projects, transport projects and their funding, benefits of transport projects, the assessment of transport projects by the CBA method, HDM-4, CSHS.						
17Y1EV	<b>Public Sector Economy</b>	KZ	2			
Economic and financial theory of public sector, public choice theory, externalities, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CE), 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.						
15Y1EH	<b>European Integration within Historical Context</b>	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 photoelasticity, 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.			
20Y1GI	Geographical Information Systems	KZ	2
Introduction to geographical information systems, creating real-world model, data models, storage of geographical data, methods of data entry, digitization, geographical coordinate systems, map projections, raster and vector representation, spatial algorithms and operations, and general transport roles in GIS.			
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
Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB).			
15Y1HL	(History of Civil Aviation)	KZ	2
Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world.			
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, standards, 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. Atmospheric fronts. Atmospheric precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrophical 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.			
21Y1L	Airports - Design and Operation	KZ	2
Introductory conditions for development of planning of runway systems and terminal facilities. Road construction, approximate analysis of RWY distance. Investment planning - operator activities. Certification of international airports - standard checking. Unexpected events and their handling.			
21Y1LC	Human Factor	KZ	2
Human performance & limitations, ability & competence, accident statistics, flight safety, basics of flight physiology, individuals & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, biorhythms & sleep, stress, fatigue, working methods.			
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 outcome 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.			
14Y1NB	Databases Design and Programming	KZ	2
Every student will design his own application - that means design database, programme basic graphical interface and requested application behaviour.			
14Y1NP	Non-parametric 3D Modelling	KZ	2
Work in 3D non-parametric modeller (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.			
14Y1OS	Operating Systems	KZ	2
Operating systems, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronization, file systems, architecture of operating systems Win and Linux, start of PC and operating systems, networking, safety in OS, terminals in MS Win and Linux, batch files. Domains and workgroups in MS Win, users and their rights, configuration of networks, Windows registry, remote desktop.			
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 coefficients of linear constraints. Computation of efficient solution.			
13Y1PM	Personal Management	KZ	2
Basic overview of leadership issue from the viewpoint of an employee as well as a manager. The accent at the experience of basic situations through a simulation game. Systemic approach to the personal management, the assessment as a process, SWOT analysis, basic principles of personal management, theory and practice of motivation, managerial leadership styles.			
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.			
13Y1PD	The Participation of Transport in Tourist Trade Management	KZ	2
Tourist trade, transport, typology, market, marketing mix, transport service providers, contract cooperation, reservation systems, transport valuables, standard air carriers, low cost air carriers, IATA, ICAO, road, water, rail transport.			
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, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators.			
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.			
18Y1P1	Design of Structures 1	KZ	2
Deformations of beam elements, 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 of beam on elastic foundation. Basics of the mathematical elasticity. Wall as a structural element. Plate as a structural member. Statical function of shells. Examples of calculations.			

16Y1PV	Operation, Construction and Maintenance of Vehicles	KZ	2
Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance 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 maintenance technology. Track maintenance 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 protocols etc.). Vehicle electronic control, safety, communication and comfort systems.			
16Y1RV	Railroad Vehicles Driving	KZ	2
Electric circuits in railroad vehicles. Railroad vehicle parameters regulation. Servicing and operation of the railroad vehicles. Rail traction technology. Solution of emergency situations. Searching and solving faults.			
21Y1RL	Air Traffic Control	KZ	2
Air traffic services and their distribution. Organization of air traffic, flow and capacity management. Airspace management. System support for aircraft flying through space. Flight plan, form, content. Separation of aircraft. Reports of air traffic services, form, content. Harmonization and integration of ATC. CFMU and its subsystems. Flexible use of airspace - FUA. RVSM, RNP. New trends in the area of ATC.			
13Y1SM	MESE Simulation	KZ	2
Management game simulating corporate decision making. Groups of students produce the same product, give the volume of available production capacity, plan budgets for marketing, research and development.			
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 usage.			
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 Nondetermined 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 accreditation. 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
Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach.			
16Y1TR	Theory of Railroad Vehicle Driving	KZ	2
Legislation in railroad transportation. Technical condition of railroad vehicles and responsibility for their condition. Railroad traffic regulations. Railroad traffic safety. Signal systems. Radiocommunication system. Powering system. Power distribution.			
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.			
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.			

21Y1ZT	ATM Systems	KZ	2
The course introduces classical and modern facilities, systems and technologies designed for ATS. Student obtains knowledge of technical principles and solutions of communication, navigation and surveillance systems used in aviation.			
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.			
18Y1ZD	Basics of Two-Dimensional Design	KZ	2
The comprehensive teaching method includes primary creative principles and the introduction to the logic of free shapes in the plane. The "step-by-step" procedure passing from simple relationships to more complex ones. The topics are closed by two-dimensional variations on basic conceptual elements and other tasks of the creative character.			
11Y1ZF	Introduction to Solid State Physics	KZ	2
Structure of solids, crystal lattice, Bloch function, Brillouin zones. Band theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.			
14Y1ZM	Fundamentals of Parametric and Adaptive Programming	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.			
18Y1ZT	Basics of Three-Dimensional Design	KZ	2
The design tasks focus first on the three-dimensional design in defined space. The next step is the synthesis of the internal space with three-dimensional elements and correct shape modelling.			
12Y1ZU	Principles of Urbanism	KZ	2
Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial 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 construction, 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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
15JZ3A	Foreign Language - English 3	Z	3	0+4	Z	J
15JZ4A	Foreign Language - English 4	Z,ZK	3	0+4	L	J
15JZ3F	Foreign Language - French 3 <i>Eva Rezlerová, Irena Veselková</i>	Z	3	0P+4C	Z	J
15JZ4F	Foreign Language - French 4 <i>Eva Rezlerová, Jan Feit, Irena Veselková</i>	Z,ZK	3	0P+4C+10B	L	J
15JZ3N	Foreign Language - German 3 <i>Eva Rezlerová, Jana Štikarová</i>	Z	3	0P+4C	Z	J
15JZ4N	Foreign Language - German 4 <i>Eva Rezlerová, Jan Feit, Jana Štikarová</i>	Z,ZK	3	0P+4C+10B	L	J
15JZ3R	Foreign Language - Russian 3 <i>Eva Rezlerová, Marie Michlová</i>	Z	3	0P+4C	Z	J
15JZ4R	Foreign Language - Russian 4 <i>Eva Rezlerová, Jan Feit, Marie Michlová</i>	Z,ZK	3	0P+4C+10B	L	J
15JZ3S	Foreign Language - Spanish 3 <i>Eva Rezlerová, Nina Hricsina Puškinová</i>	Z	3	0P+4C	Z	J
15JZ4S	Foreign Language - Spanish 4 <i>Eva Rezlerová, Jan Feit, Nina Hricsina Puškinová</i>	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. 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.			
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. 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.			



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	<b>Foreign Language - English 1</b> Eva Rezlírová, Marie Michlová, Dana Boušová, Jitka He manová, Barbora Horá ková, Lenka Monková, Markéta Olehlová, Markéta Vojanová, Peter Morpuss, .....	Z	3	0P+4C+10B	Z	J
15JZ2A	<b>Foreign Language - English 2</b> Eva Rezlírová, Jan Feit, Dana Boušová, Jitka He manová, Barbora Horá ková, Lenka Monková, Markéta Vojanová, Peter Morpuss, Marek Tome ek	Z,ZK	3	0P+4C+10B	L	J
15JZ1F	<b>Foreign Language - French 1</b>	Z	3	0+4	Z	J
15JZ2F	<b>Foreign Language - French 2</b>	Z,ZK	3	0+4	L	J
15JZ1N	<b>Foreign Language - German 1</b>	Z	3	0+4	Z	J
15JZ2N	<b>Foreign Language - German 2</b>	Z,ZK	3	0+4	L	J
15JZ1R	<b>Foreign Language - Russian 1</b>	Z	3	0+4	Z	J
15JZ2R	<b>Foreign Language - Russian 2</b>	Z,ZK	3	0+4	L	J
15JZ1S	<b>Foreign Language - Spanish 1</b>	Z	3	0+4	Z	J
15JZ2S	<b>Foreign Language - Spanish 2</b>	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.			
11AKX	Functions of Complex Variable	Z,ZK	3
Differential calculus of the complex function of one variable, Cauchy-Riemann conditions, power series, integral calculus of the complex function of one variable. Cauchy theorem, meromorphic functions, red'sidue and residue theorem, basic ideas of Laplace and z-transformations.			
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
Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, 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
Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).			

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 R <sup>3</sup> , application of integral calculus in physics.			
11ORVD	Optimization and Decision in Transportation	Z,ZK	4
Linear programming. Traffic and assignment problem. Dynamic of transportation processes. Application of dynamical programming in transportation problems. Decision processes in transportation. Basic concepts of theory of decision, rational procedure of solution of decision problems in organizations. Multicriterial decision.			
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.			
11THOS	Queueing Theory	Z,ZK	3
Markov processes, Kendall classification. Models M/M/a, stability condition, characteristics of a system. Nonmarkovian models, model M/G/a, system with generally distributed service. Serve process, introduction. Equilibrium in queueing model. Petri net. Computer simulation.			
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 outcome 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 coefficients 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 usage.			
11Y1TG	Graph Theory	KZ	2
Directed and undirected graphs, weighted graphs, matrices describing graphs, minimal spanning tree, minimal path, Eulerian paths, graph traversing, matching in bipartite graphs, flow networks. Algorithms for problems of existence and optimization. Solving of NP-hard problems, heuristic approach.			
11Y1ZF	Introduction to Solid State Physics	KZ	2
Structure of solids, crystal lattice, Bloch function, Brillouin zones. Band theory of solids. Dynamics of 1D lattice. Phonons. Thermodynamic properties of solids. Semiconductors. Magnetism.			
12DPZ	Traffic Surveys	KZ	2
Fundamental means of traffic surveys, project of skills of counting vehicles at all types of road junction, car park surveys to determine accumulation and length of stay of each vehicle, statistical analysis, simulation models, etc.			
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.			
12USIM	Introduction to Traffic Simulation	Z	2
Basic terminology in the field, evaluation of the entire simulation process on a real example.			
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.			

12Y1HD	<b>Traffic Noise</b>	KZ	2
Acoustic introduction, basic terms, quantities. Basics of physiological acoustic, noise impacts on human body. Acoustic legislation, standards, 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	<b>Combined Transportation</b>	KZ	2
Combined transport strategy and legislation. Load units. Means of transport in combined transport. Combined transport systems. Transshipping areas. Multimodal logistic centres.			
12Y1PC	<b>Pedestrian and Cycling Transport</b>	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	<b>Assessment of Transport Structures</b>	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	<b>Organization Disposition of Railway Stations</b>	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	<b>Railway Lines Reconstruction</b>	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	<b>Road Management and Maintenance</b>	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	<b>Waterways and Shipping</b>	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.			
12Y1ZU	<b>Principles of Urbanism</b>	KZ	2
Survey on history of city and settlement building. Functional components and their mutual relations (working, living, recreation, transportation). Spatial arrangement of settlements. Types of towns or cities with a certain prevailing function, forms of their development. Brief overview of land-use planning.			
12ZADI	<b>Introduction to Transportation Engineering</b>	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	<b>Economics</b>	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	<b>Economy, Transport, Telecommunications</b>	KZ	2
Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.			
13X31	<b>Project 1</b>	Z	2
13X32	<b>Project 2</b>	Z	2
13X33	<b>Project 3</b>	Z	2
13Y1EA	<b>Economic - Energetic Analysis of Land Transport</b>	KZ	2
Vehicle traction systems, traction-energetic properties, laws of vehicle motion, assessment of energy demands, traction-energetic conceptions, technical, economical and social aspects.			
13Y1EV	<b>Public Sector Economy</b>	KZ	2
Summary of basic economic findings, public goods - definition, public sector domains, state budget, taxes, public goods and externalities, externalities in transportation and their treatment, methods of assessment of public projects, transport projects and their funding, benefits of transport projects, the assessment of transport projects by the CBA method, HDM-4, CSHS.			
13Y1PD	<b>The Participation of Transport in Tourist Trade Management</b>	KZ	2
Tourist trade, transport, typology, market, marketing mix, transport service providers, contract cooperation, reservation systems, transport valuables, standard air carriers, low cost air carriers, IATA, ICAO, road, water, rail transport.			
13Y1PM	<b>Personal Management</b>	KZ	2
Basic overview of leadership issue from the viewpoint of an employee as well as a manager. The accent at the experience of basic situations through a simulation game. Systemic approach to the personal management, the assessment as a process, SWOT analysis, basic principles of personal management, theory and practice of motivation, managerial leadership styles.			
13Y1SM	<b>MESE Simulation</b>	KZ	2
Management game simulating corporate decision making. Groups of students produce the same product, give the volume of available production capacity, plan budgets for marketing, research and development.			
14DB	<b>Database Systems</b>	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.			
14ISYS	<b>Information Systems</b>	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these tools 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	<b>Constructing with Computer Aid</b>	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 possibilities, AutoCAD environment profiles, drawings with raster foundations).			

14PRG1	Programming 1	Z	2
Introduction to differences between C and C++. Special C++ features like: polymorphism, references, memory allocation, new data types, objects - classes. Furthermore inheritance, generic programming, operator overloading, STL library, abstract classes, exceptions, etc. Course contains examples of new techniques for practical exercises. Students, as a part of final exam, will develop advanced C++ program.			
14PRG2	Programming 2	KZ	2
Introduction to differences between C and C++. Special C++ features like: polymorphism, references, memory allocation, new data types, objects - classes. Furthermore inheritance, generic programming, operator overloading, STL library, abstract classes, exceptions, etc. Course contains examples of new techniques for practical exercises. Students, as a part of final exam, will develop advanced C++ program.			
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 introduced 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.			
14UATT	Introduction to Automatization and Telecommunication Systems	KZ	2
Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transportation, modelling and projecting of transport systems, integrated technological and information system in port, 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.			
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
Introducing and basic 3D primitives and their basic modifications and transformations. Creating 3D scenes. Transformations of 3D primitives, connection / interaction / combination of 3D primitives, creating 3D bodies as non-primitives. Using of surfaces. Working with materials and material editors. Lightnings. Setting of light and material parameters. Scene capturing. Camera settings, moving in the scene. Rendering and making animation.			
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
Design combinational and sequential logical circuits and their implementation on FPGA, VHDL language. Computer architecture, structures of computer components - controller, ALU, memories, I/O subsystem, typical interfaces and buses (PCI Express, I2C, SPI, USB).			
14Y1NB	Databases Design and Programming	KZ	2
Every student will design his own application - that means design database, programme basic graphical interface and requested application behaviour.			
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-parametric modeller (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.			
14Y1OS	Operating Systems	KZ	2
Operating systems, their function and architecture, process and memory management, virtual memory, threads, interprocess communication, synchronization, file systems, architecture of operating systems Win and Linux, start of PC and operating systems, networking, safety in OS, terminals in MS Win and Linux, batch files. Domains and workgroups in MS Win, users and their rights, configuration of networks, Windows registry, remote desktop.			
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, pointers, dynamical memory allocation, string, files, structures and unions. Implementations of abstract data types (FIFO, LIFO, list), programming techniques (sorting, searching, recursion), using bitwise operators.			

14Y1PM	<b>Advanced Methods of Parametric Programming</b> 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.	KZ	2
14Y1TI	<b>Creating Interactive Internet Applications</b> 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.	KZ	2
14Y1VB	<b>Visual Basic</b> 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.	KZ	2
14Y1VM	<b>Development of Applications for Mobile Devices</b> Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI.	KZ	2
14Y1ZM	<b>Fundamentals of Parametric and Adaptive Programming</b> 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.	KZ	2
14ZAET	<b>Fundamentals of Electrotechnics</b> 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-triangel and principle of superposition in direct current circuits.	KZ	2
14ZINF	<b>Fundamentals of Informatics</b> 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.	KZ	2
15JZ1A	<b>Foreign Language - English 1</b> 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.	Z	3
15JZ1F	<b>Foreign Language - French 1</b> 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.	Z	3
15JZ1N	<b>Foreign Language - German 1</b> 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.	Z	3
15JZ1R	<b>Foreign Language - Russian 1</b> 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.	Z	3
15JZ1S	<b>Foreign Language - Spanish 1</b> 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.	Z	3
15JZ2A	<b>Foreign Language - English 2</b> 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.	Z,ZK	3
15JZ2F	<b>Foreign Language - French 2</b> 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.	Z,ZK	3
15JZ2N	<b>Foreign Language - German 2</b> 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.	Z,ZK	3
15JZ2R	<b>Foreign Language - Russian 2</b> 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.	Z,ZK	3
15JZ2S	<b>Foreign Language - Spanish 2</b> 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.	Z,ZK	3
15JZ3A	<b>Foreign Language - English 3</b> 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.	Z	3
15JZ3F	<b>Foreign Language - French 3</b> 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.	Z	3

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. 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.			
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, nazism, 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
Aeronautics. Beginnings of aircrafts heavier than air. Czechoslovak aviation pioneers. Development of airports in the Czech Republic. World airports. Airlines of the world. Helicopters. CSA airplanes. Famous aviators. Classic era of aviation. Golden era of civil aviation. Supersonic flying. Modern era of civil aviation. Flying in the world.			
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.			
16DOPY	Vehicle Technology	KZ	3
Terminology in transportation technology. Vehicle in the terms of legislation. Construction, operation, environmental influence. Vehicles and ecology. Traction engines characteristics. Combustion and electrical engines. Power train construction. Power transmission. Conducting properties of railroad vehicles. Resistance to disrailing. Transportation technology in water transport. Transportation technology in aviation.			

16DYJ	Vehicle Dynamics	Z,ZK	3
Application of mechanics. Wheel and axle suspension mechanism. Wheel to road positioning characteristics. Wheel - road contact. Skid and its characteristics. Longitudinal dynamics, acceleration and deceleration. Vertical dynamics, spring suspension, driving characteristics. Directional dynamics, gyroscopical characteristics. Driving stability conditions. Aerodynamic forces. Driving and feedback. ABS, ESP.			
16KI	Intelligent Vehicle Design	KZ	3
Content of the subject is the basic principles of design projection of vehicles and motorcycles, legislation and special projection targets and numerical methods during design proposal etc. It also includes design rules and legislation, car body design and deformation influence during traffic accidents, restraint systems, injury biomechanics and serious injuries.			
16PBV	Passive Vehicle Safety	Z,ZK	3
Legislation and testing processes. Barrier tests. Car body properties. Injury mechanism. Critical limits for evaluation of injury seriousness. Retaining systems. Airbags. Risk of collision of various vehicle types. Safety of traffic participants. Mathematic modeling. E-call.			
16PUM	Production, Operation and Service of Vehicles	Z,ZK	3
Methods of production and servicing of vehicles, control methods, plans for servicing, engine service, emissions, gear-box, diagnostic systems.			
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
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. Maintenance 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.			
16Y1RV	Railroad Vehicles Driving	KZ	2
Electric circuits in railroad vehicles. Railroad vehicle parametres regulation. Servicing and operation of the railroad vehicles. Rail traction technology. Solution of emergency situations. Searching and solving faults.			
16Y1TJ	Technological Quality Aspects	KZ	2
Certification and accreditation. 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.			
16Y1TR	Theory of Railroad Vehicle Driving	KZ	2
Legislation in railroad transportation. Technical condition of railroad vehicles and responsibility for their condition. Railroad traffic regulations. Railroad traffic safety. Signal systems. Radiocommunication system. Powering system. Power distribution.			
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.			
17PDO	Designing of Public Transport Services	KZ	3
Transport planning, demand elasticity. Strategy and hierarchical planning of public transport system. Line network planning, concept of offer. Integrated periodic timetable. Planning process of long-distance and regional transport. Optimised number of rolling-stock, circulation plan of rolling-stock, rolling-stock strategy. Public service liability for various segments. Harmony of particular long-term plans. Controlled competition. Case studies.			
17RKM	Project Management and Crisis Management	KZ	3
Project cycle and principles of project management. Basic methods of project assessment, criteria of optimal scenario, and principles for economical and financial analysis. Project risks and uncertainties. Crisis management.			
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 specified 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.			



17Y1BB	<b>Banks and Banking</b>	KZ	2
Banks and banking system. Balance sheet, income statement, bank's capital and its functions. Banking risks. Banking products. Interest types, pay-off and loan securing, financial loan products. Banking deposit products. Banking payment-clearing products. Financial intermediation, open-end and closed-end funds, collective investment schemes. Central bank and its role. Bank regulation and supervision. International banking.			
17Y1DZ	<b>Transported Commodities Cognization</b>	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	<b>Public Sector Economy</b>	KZ	2
Economic and financial theory of public sector, public choice theory, externalities, 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	<b>Logistics of Passenger and Freight Air Transport</b>	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	<b>Maritime Transportation</b>	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.			
18MRI1	<b>Materials 1</b>	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. Dephctostopic testing. Corosion.			
18MRI2	<b>Materials 2</b>	KZ	2
Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.			
18PZP	<b>Elasticity and Strength</b>	Z,ZK	3
Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.			
18ST	<b>Statics</b>	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	<b>Creation of Technical Documentation</b>	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	<b>Project 1</b>	Z	2
18X32	<b>Project 2</b>	Z	2
18X33	<b>Project 3</b>	Z	2
18Y1AM	<b>Anatomy, Mobility and Safety of Man</b>	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	<b>Dynamics of Routes and Vehicles 1</b>	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	<b>Experimental Methods and Numerical Modelling</b>	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	<b>Engineering Materials</b>	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.			
18Y1P1	<b>Design of Structures 1</b>	KZ	2
Deformations of beam elements, 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 of beam on elastic foundation. Basics of the mathematical elasticity. Wall as a structural element. Plate as a structural member. Statical function of shells. Examples of calculations.			
18Y1SN	<b>Statically Nondetermined Structures</b>	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	<b>Introduction of Rail Vehicles</b>	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.			
18Y1ZD	<b>Basics of Two-Dimensional Design</b>	KZ	2
The comprehensive teaching method includes primary creative principles and the introduction to the logic of free shapes in the plane. The "step-by-step" procedure passing from simple relationships to more complex ones. The topics are closed by two-dimensional variations on basic conceptual elements and other tasks of the creative character.			
18Y1ZT	<b>Basics of Three-Dimensional Design</b>	KZ	2
The design tasks focus first on the three-dimensional design in defined space. The next step is the synthesis of the internal space with three-dimensional elements and correct shape modelling.			
20BAS	<b>Safety and Reliability of Systems</b>	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.			

20BOZ	Occupational Health and Safety	KZ	2
The base of legal regulations. Common principles by the locking of occupational health and safety OHS). The base requirements by the locking of OHS. Safety of technical equipments. Obligations of employers. Obligations and rights of workers. Obligations by accession to work. Work safety with electrical equipments. Work safety with computers. Industrial accidents and its documentation. First aid by electrical accidents. Important telephones.			
20NSD	Power Systems in Railway Transport	Z,ZK	2
In this course, the students are introduced to the heavy current and traction systems, introduced to safety and EMC/EMI of power traction systems, basic norms and regulations. The courses are focused on the special transport systems (metro, trolley bus, etc.) too.			
20RM	Urban Concentration and Motorway Control	Z,ZK	3
City transport management. Overall transport management. Stationary transport. Information panels, variable traffic signs. Transport system control including city public transport. Road tunnels and their technological equipment, control and safety systems. Emergency situations in transport and their solutions.			
20RU	Control of Traffic Node and Line	Z,ZK	3
Basic concepts, terms, principles and requirements for documentation. Criteria of design light signaling equipment. Hardware and software of transport node. Traffic detectors. Proposal for construction works, horizontal and vertical markings. Calculation of intersection design and its wider relations. Line management. Proposal for traffic management and current trends in transport management.			
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.			
20TZC	Technology of Control of the Railway Traffic Systems - Practice	Z	1
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
20Y1GI	Geographical Information Systems	KZ	2
Introduction to geographical information systems, creating real-world model, data models, storage of geographical data, methods of data entry, digitization, geographical coordinate systems, map projections, raster and vector representation, spatial algorithms and operations, and general transport roles in GIS.			
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.			
20ZE	Base of Electronics	Z,ZK	2
Materials for the production of semiconductors, semiconductor and implementation of electronic components, electronic components without PN junction, PN junction, semiconductor diodes, thyristors, rectifiers, zener diode, stabilization, bipolar transistors (amplifiers, switching element), unipolar transistors. Operating point. Operational amplifiers and their connections (signal amplifiers, comparators, ideal diode). Wien oscillator.			
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. Interlocking plants in public transport in cities.			
21X31	Project 1	Z	2

21X32	Project 2	Z	2
21X33	Project 3	Z	2
21Y1L	<b>Airports - Design and Operation</b> Introductory conditions for development of planning of runway systems and terminal facilities. Road construction, approximate analysis of RWY distance. Investment planning - operator activities. Certification of international airports - standard checking. Unexpected events and their handling.	KZ	2
21Y1LC	<b>Human Factor</b> Human performance & limitations, ability & competence, accident statistics, flight safety, basics of flight physiology, individuals & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, biorhythms & sleep, stress, fatigue, working methods.	KZ	2
21Y1LM	<b>Aviation Meteorology</b> Structure of atmosphere. Vertical stratification. Pressures QNH, QFE, QFF, QME. Instability. Atmospheric fronts. Atmospheric precipitation, origin & categorisation. Turbulence. Forces producing wind. Cyclone and anticyclone. Gradient wind. Geostrophical and geocyclostrophical wind. Visibilities in air transport. Dangerous meteorological aspects. Meteorological maps. Climatology. Circulation. Intertropical front. Meteorological information.	KZ	2
21Y1LR	<b>Radio Technology in Aviation</b> 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.	KZ	2
21Y1PU	<b>Aircraft Maintenance Technology</b> Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.	KZ	2
21Y1RL	<b>Air Traffic Control</b> Air traffic services and their distribution. Organization of air traffic, flow and capacity management. Airspace management. System support for aircraft flying through space. Flight plan, form, content. Separation of aircraft. Reports of air traffic services, form, content. Harmonization and integration of ATC. CFMU and its subsystems. Flexible use of airspace - FUA. RVSM, RNP. New trends in the area of ATC.	KZ	2
21Y1ZT	<b>ATM Systems</b> The course introduces classical and modern facilities, systems and technologies designed for ATS. Student obtains knowledge of technical principles and solutions of communication, navigation and surveillance systems used in aviation.	KZ	2
21ZLD	<b>Introduction to Air Transport</b> 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.	KZ	2
22UN	<b>Traffic Accidents Introduction</b> 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.	Z	2
22X31	Project 1	Z	2
22X32	Project 2	Z	2
22X33	Project 3	Z	2
23X31	Project 1	Z	2
23X32	Project 2	Z	2
23X33	Project 3	Z	2

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