

# Study plan

**Name of study plan: PRE bak. studium oboru LOG roz azení v 16-17**

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Logistics and Transport Processes Control

Garantor of the study branch: doc. Ing. Denisa Mocková, Ph.D.

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 157

Elective courses credits: 23

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 139

The role of the block: Z

Code of the group: 1S PRE 15-16 P

Name of the group: 1. sem. bak. PRE 15-16 povinné p edm ty (spol. ást studia)

Requirement credits in the group: In this group you have to gain 28 credits

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

Credits in the group: 28

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
611CAL1	<b>Calculus 1</b> Romana Zibnerová	Z,ZK	7	2P+4C+2B	Z	z
611LA	<b>Linear Algebra</b> Romana Zibnerová	Z,ZK	3	2P+1C+10B	Z	z
612ZYDI	<b>Introduction to Transportation Engineering</b> Dagmar Ko árková	Z,ZK	2	1P+1C	Z	z
618MTY	<b>Materials Science and Engineering</b> Vít Malinovský	Z,ZK	3	2P+1C+10B	Z	z
620SYSA	<b>Systems Analysis</b>	Z,ZK	5	2P+2C+14B	L	z
611GIE	<b>Geometry</b> Vít Malinovský	KZ	3	2P+2C+12B	Z	z
618TED	<b>Technical Documentation</b> Vít Malinovský	KZ	2	1P+1C+8B	Z	z
616UDOP	<b>Introduction into Vehicles</b> Zuzana Radová	Z	2	2P+0C+8B	Z	z
TV-1	<b>Physical Education</b>	Z	1		Z	z

**Characteristics of the courses of this group of Study Plan: Code=1S PRE 15-16 P Name=1. sem. bak. PRE 15-16 povinné p edm ty (spol. ást studia)**

611CAL1	Calculus 1	Z,ZK	7	Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables.
611LA	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.
612ZYDI	Introduction to Transportation Engineering	Z,ZK	2	Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety.
618MTY	Materials Science and Engineering	Z,ZK	3	Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests.

620SYSA	Systems Analysis	Z,ZK	5
Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis.			
611GIE	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.			
618TED	Technical Documentation	KZ	2
Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets.			
616UDOP	Introduction into Vehicles	Z	2
Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation.			
TV-1	Physical Education	Z	1

Code of the group: 1S PRE 15-16 PV

Name of the group: 1. sem. bak. PRE 15-16 povinné p edm ty-výb r

Requirement credits in the group: In this group you have to gain 2 credits

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

Credits in the group: 2

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
614AS	Algorithm and Data Structures	KZ	2	0+2	Z	z
614AZ	Data Analysis and Processing	KZ	2	0+2	Z	z
614DB	Database Systems	KZ	2	0+2	Z	z

Characteristics of the courses of this group of Study Plan: Code=1S PRE 15-16 PV Name=1. sem. bak. PRE 15-16 povinné p edm ty-výb r

614AS	Algorithm and Data Structures	KZ	2
Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms.			
614AZ	Data Analysis and Processing	KZ	2
Main aim of this course is learn students how to prepare raw data for following processing and analysis. Knowledge of algorithms for determining the parameters of different data sources; source can be used images, text, time series, etc. The next step is the theoretical skills and knowledge to apply in solving the problem, e. g. extraction parameters from the image data or from the Internet.			
614DB	Database Systems	KZ	2
Dbf. terminology, fundamentals of relational and object database systems, database structure, relations modelling, relation algebra, dbf. tools, database design process, user interface, remote data access. Basic statement of SQL language. Expert systems and knowledge based applications, knowledge representation, methods of derivating and implementating, interface for knowledge systems design, certainty and uncertainty in knowledge systems.			

Code of the group: 2S PRE 15-16 P

Name of the group: 2. sem. bak. PRE 15-16 povinné p edm ty (spol. ást studia)

Requirement credits in the group: In this group you have to gain 28 credits

Requirement courses in the group: In this group you have to complete 8 courses

Credits in the group: 28

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
611CAL2	Calculus 2	Z,ZK	5	2P+3C+2B	L	z
611FY1	Physics 1	Z,ZK	4	2+2	L	z
611STAS	Statistics	Z,ZK	5	2+2	L	z
612ZTS	Railway Lines and Stations	Z,ZK	4	2P+2C+10B	L	z
618SAT	Structural Analysis	Z,ZK	4	2P+2C+14B	L	z
617TEDL	Transport Technology and Logistics	KZ	3	2P+1C	L	z
621ZALD	Basics of Air Transport	KZ	2	0P+2C+8B	L	z
TV-2	Physical Education	Z	1		L	z

Characteristics of the courses of this group of Study Plan: Code=2S PRE 15-16 P Name=2. sem. bak. PRE 15-16 povinné p edm ty (spol. ást studia)

611CAL2	Calculus 2	Z,ZK	5
Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R <sub>n</sub> . Parametric description of regular k-dimensional surfaces in R <sub>n</sub> , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.			
611FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
611STAS	Statistics	Z,ZK	5
Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.			
612ZTS	Railway Lines and Stations	Z,ZK	4
Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport.			
618SAT	Structural Analysis	Z,ZK	4
General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.			
617TEDL	Transport Technology and Logistics	KZ	3
Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in passenger and freight transport, organisation of traffic in each transport modus, technologic factors of the side of operator and client, organisation of city transport, logistic technologies and their application using various transport modus.			
621ZALD	Basics of Air Transport	KZ	2
History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies.			
TV-2	Physical Education	Z	1

Code of the group: 2S PRE 15-16 PV

Name of the group: 2. sem. bak. PRE 15-16 povinné p edm ty-výb r

Requirement credits in the group: In this group you have to gain 2 credits

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

Credits in the group: 2

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
614KSP	<b>Constructing with Computer Aid</b> Libor Zidek	KZ	2	0P+2C+8B	Z	z
614PRG	<b>Programming</b>	KZ	2	0P+2C+8B	L	z

Characteristics of the courses of this group of Study Plan: Code=2S PRE 15-16 PV Name=2. sem. bak. PRE 15-16 povinné p edm ty-výb r

614KSP	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).			
614PRG	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: 3S PRE 16-17 P

Name of the group: 3. sem. bak. PRE 16-17 povinné p edm ty (spol. ást studia)

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 8 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
611FY2	<b>Physics 2</b>	Z,ZK	4	2+2	Z	z
612MDE	<b>Transport Models and Transport Excesses</b> Aneta Matysková, Josef Kocourek, Tomáš Pad lek	Z,ZK	3	2P+1C+8B	Z	z
617TGA	<b>Graph Theory and its Applications in Transport</b> Josef Volek	Z,ZK	4	2P+2C+12B	Z	z
618PZP	<b>Elasticity and Strength</b> Petr Koudelka, Tomáš Doktor, Jan Šleicht	Z,ZK	3	2P+1C+10B	Z	z

620UITS	<b>Introduction to Intelligent Transport Systems</b> <i>Vladimír Faltus</i>	Z,ZK	7	3P+2C+20B	Z	z
612PPOK	<b>Designing Roads, Highways and Motorways</b> <i>Jiří arský, Petr Kumpošt, Vojtěch Nižanský</i>	KZ	3	1P+2C+10B	Z	z
623BDIS	<b>Safety Technologies of Transportation and Information Systems</b>	KZ	3	2+0	Z	z
615JZ1A	<b>Foreign Language - English 1</b> <i>Vera Pastorková</i>	Z	3	0P+4C+10B	Z	z

**Characteristics of the courses of this group of Study Plan: Code=3S PRE 16-17 P Name=3. sem. bak. PRE 16-17 povinné p edm ty (spol. část studia)**

611FY2	Physics 2 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.	Z,ZK	4			
612MDE	Transport Models and Transport Excesses 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.	Z,ZK	3			
617TGA	Graph Theory and its Applications in Transport 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.	Z,ZK	4			
618PZP	Elasticity and Strength 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.	Z,ZK	3			
620UITS	Introduction to Intelligent Transport Systems Terminology and legislative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of information and telecommunication systems for ITS. Principles and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real examples of possible applications of the principles of ITS.	Z,ZK	7			
612PPOK	Designing Roads, Highways and Motorways 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.	KZ	3			
623BDIS	Safety Technologies of Transportation and Information Systems Safety of transportation means - principles, testing, evaluation. Safety of infrastructures, critical structures, crisis scenarios. Safety of information systems and their robustness.	KZ	3			
615JZ1A	Foreign Language - English 1 Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistic forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.	Z	3			

Code of the group: 4S P LOG 16-17 P

Name of the group: 4. sem. PREZ bak. LOG 16-17 povinné p edm ty

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

Requirement courses in the group: In this group you have to complete 8 courses

Credits in the group: 26

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
611MSP	<b>Modeling of Systems and Processes</b>	Z,ZK	4	2P+2C+12B	L	z
617LGT	<b>Logistics</b>	Z,ZK	6	3P+2C+18B	L	z
617SFID	<b>Public Administration and Financing in Transport</b>	Z,ZK	4	2P+1C+12B	L	z
611LP	<b>Linear Programming</b>	KZ	3	2P+1C+12B	L	z
616DPO	<b>Vehicle Technology</b>	KZ	2	2P+0C+10B	L	z
617EMY	<b>Management Science</b>	Z	2	2P+0C+8B	L	z
617PAZ	<b>Carriage and Forwarding</b>	Z	2	2P+0C+8B	L	z
615JZ2A	<b>Foreign Language - English 2</b>	Z,ZK	3	0P+4C+10B	L	z

**Characteristics of the courses of this group of Study Plan: Code=4S P LOG 16-17 P Name=4. sem. PREZ bak. LOG 16-17 povinné p edm ty**

611MSP	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			
617LGT	Logistics Logistics definition, basic concepts, store, warehouse, transport and handling equipment, logistics technology, logistics centers, information and intelligent logistics systems, logistics city.	Z,ZK	6			
617SFID	Public Administration and Financing in Transport Basic issues of transport and transport policy in the social context, environmental issues in transport, economical aspects of transport, public administration and financing of transport.	Z,ZK	4			

611LP	Linear Programming	KZ	3
Formulation of the problem of linear programming, transcription of some practical problems to the linear programming problems. Simplex and convex polyedra. Simplex method, basic solutions, duality principle in linear programming, stability of solution of linear programming problem. Traffic problem.			
616DPO	Vehicle Technology	KZ	2
Vehicle. Functions, principles. Drive, vehicle construction. Road transport, safety, heavy duty vehicle desing, dynamics. Rail transport, safety, carriage design. Drive. Electric traction. Transshipment. Technological components of various modes of transport. Management and control of various means of transport. Safety.			
617EMY	Management Science	Z	2
The introduction to economical-mathematical models before its application in concrete technical and economical cases. The basic mathematical methods to modelise economical situations. Several classes of problems are formulated and different methods used in qualitatively distinct real situations are introduced. The tasks of interpretation and application.			
617PAZ	Carriage and Forwarding	Z	2
Contracts of carriage and forwarding, waybills and documents; transport modes, multimodal transport, tariffs and prices in transport, rights and obligations of carriers, hauliers and forwarders, duty and tariff agreements, INCOTERMS, insurance in transport.			
615JZ2A	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.			

Code of the group: 5S P LOG 17-18 P

Name of the group: 5. sem. PREZ bak. LOG 17-18 povinné p edm ty

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 7 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
617EDPO	<b>Economics of Transport Company</b> <i>Alexandra Dvo á ková</i>	Z,ZK	5	2P+2C+14B	Z	z
617FEU	<b>Public Administration and Financing in Transport</b> <i>Alexandra Dvo á ková</i>	Z,ZK	4	2P+1C+14B	Z	z
617MAS	<b>Small and Medium Enterprise</b> <i>Alexandra Dvo á ková</i>	Z,ZK	3	2P+1C+12B	Z	z
617TVD	<b>Technology of Public Transport</b> <i>Michal Drábek</i>	Z,ZK	5	2P+2C+14B	Z	z
614DMG	<b>Datamining</b> <i>Ond ej Smíšek</i>	KZ	2	0P+2C+8B	Z	z
617MEKA	<b>Methods of Economics Analysis</b> <i>Otto Pastor</i>	KZ	2	2P+0C+8B	Z	z
623ZAP	<b>Basics of Law</b> <i>Milena Macková</i>	Z	2	2P+0C+10B	Z	z

Characteristics of the courses of this group of Study Plan: Code=5S P LOG 17-18 P Name=5. sem. PREZ bak. LOG 17-18 povinné p edm ty

617EDPO	Economics of Transport Company	Z,ZK	5
Economy, marginal utility, marginal costs, function of supply and demand, market equilibrium, perfect competition and types of market arrangement. Transportation market, transport company, it's environment, balance sheet, costs, revenue, profit and maximalization of profit. Financial management in transport, business plan, taxation in transport.			
617FEU	Public Administration and Financing in Transport	Z,ZK	4
To get a basic overview of the EU regional policy and its practical execution on the level of the member state, specific ability to find and analyze information about the EU support programmes.			
617MAS	Small and Medium Enterprise	Z,ZK	3
Small and medium enterprise - plans, market, analysis, finance, management, decision making, survival, growth.			
617TVD	Technology of Public Transport	Z,ZK	5
The course contents a detailed description of new knowledge and basic principles of hierarchical planning of public transport system accenting the general transport planning and quantified transport demand. The course would be oriented on multiple and multi-level optimisation of passenger public transport system.			
614DMG	Datamining	KZ	2
Types of data sources and knowledge, data warehouses and OLAP technology for data mining, data preprocessing in the process of knowledge acquisition systems for data mining, mining characteristics of concepts (classes), mining association rules from relational db. and data warehousing, classification (decisions tree, Bayesian cob., using neural networks). Prediction. Cluster analysis. Mining in complex structured data, multimedia dbf., www.			
617MEKA	Methods of Economics Analysis	KZ	2
The techniques of economical analysis in the domain of analysis of dependencies, analysis and construction of time series and comparsion of statistical values using differencies and indices.			
623ZAP	Basics of Law	Z	2
Basic orientation in the Czech legal system. The course is primarily intended to provide students with orientation in fundamentals of the Czech Republic, legal system and in various forms of law, including adoption of the basic principles of European Community law. The course consists of selected chapters from the public and private law and European Community law.			

Name of the block: Semestrální projekt

Minimal number of credits of the block: 6

The role of the block: ZP

Code of the group: PROJ 16-17

Name of the group: projekty 16-17 (4., 5., 6. sem.)

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

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

Credits in the group: 6

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
616X31	Project 1	Z	2	0P+1C	L	ZP
615X31	Project 1	Z	2	0P+1C	L	ZP
612X31	Project 1	Z	2	0P+1C	L	ZP
622X31	Project 1	Z	2	0P+1C	L	ZP
617X31	Project 1	Z	2	0P+1C	L	ZP
617X32	Project 2	Z	2	0P+2C	Z	ZP
612X32	Project 2	Z	2	0P+2C	Z	ZP
622X32	Project 2	Z	2	0P+2C	Z	ZP
615X32	Project 2	Z	2	0P+2C	Z	ZP
616X32	Project 2	Z	2	0P+2C	Z	ZP
615X33	Project 3	Z	2	0P+1C	L	ZP
616X33	Project 3	Z	2	0P+1C	L	ZP
612X33	Project 3	Z	2	0P+1C	L	ZP
617X33	Project 3	Z	2	0P+1C	L	ZP
622X33	Project 3	Z	2	0P+1C	L	ZP

Characteristics of the courses of this group of Study Plan: Code=PROJ 16-17 Name=projekty 16-17 (4., 5., 6. sem.)

616X31	Project 1	Z	2
615X31	Project 1	Z	2
612X31	Project 1	Z	2
622X31	Project 1	Z	2
617X31	Project 1	Z	2
617X32	Project 2	Z	2
612X32	Project 2	Z	2
622X32	Project 2	Z	2
615X32	Project 2	Z	2
616X32	Project 2	Z	2
615X33	Project 3	Z	2
616X33	Project 3	Z	2
612X33	Project 3	Z	2
617X33	Project 3	Z	2
622X33	Project 3	Z	2

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 6

The role of the block: PV

Code of the group: PVP PRE 16-17

Name of the group: 3x PVP pro bak. PREZ v 16-17: LOG (LS 16-17 + ZS+LS 17-18)

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

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

Credits in the group: 6

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
617Y1AF	Alternative Forms of Transportation Project Financing	KZ	2	2+0	Z	PV

618Y1AM	<b>Anatomy, Mobility and Safety of Man</b>	KZ	2	2P+0C	Z	PV
614Y1AV	<b>Animation and Visualization</b>	KZ	2	2P+0C	L	PV
620Y1AE	<b>Applied Electronics</b>	KZ	2	2P+0C	Z	PV
614Y1BE	<b>Barrierless Transport</b>	KZ	2	2P+0C	L	PV
615Y1BO	<b>Work Safety and Health Protection in Transportation</b>	KZ	2	2P+0C	L	PV
614Y1BM	<b>Biometric Methods</b>	KZ	2	2P+0C	Z	PV
623Y1DZ	<b>Data and Their Processing for Engineering Fields Needs</b>	KZ	2	2P+0C	Z	PV
615Y1DU	<b>History of Art and Society</b>	KZ	2	2+0	Z	PV
615Y1DZ	<b>History of Railway</b>	KZ	2	2P+0C	L	PV
612Y1DS	<b>Project Documentation in Practice</b>	KZ	2	2P+0C	Z	PV
617Y1EV	<b>Public Sector Economy</b>	KZ	2	2P+0C	Z	PV
620Y1EK	<b>Qualification in Electrical Engineering</b>	KZ	2	2P+0C	L	PV
616Y1EN	<b>Energy Requirements of Vehicles</b>	KZ	2	2P+0C	L	PV
620Y1EA	<b>Environmental Aspects of Transport</b>	KZ	2	2P+0C	Z	PV
615Y1EH	<b>European Integration within Historical Context</b>	KZ	2	2P+0C	Z	PV
618Y1EM	<b>Experimental Methods in Mechanics</b>	KZ	2	2P+0C	Z	PV
621Y1FN	<b>Factors Affecting the Rate of Accidents in Aviation</b>	KZ	2	2+0	Z	PV
615Y1FD	<b>French Area Studies and Transportation</b>	KZ	2	2P+0C	L	PV
614Y1HW	<b>Computer Hardware</b>	KZ	2	2P+0C	L	PV
615Y1HL	<b>(History of Civil Aviation)</b>	KZ	2	2P+0C	L	PV
615Y1HD	<b>History of City Mass Transport</b>	KZ	2	2P+0C	Z	PV
612Y1HD	<b>Traffic Noise</b>	KZ	2	2P+0C	L	PV
615Y1HE	<b>Work Hygiene and Ergonomics in Traffic</b>	KZ	2	2P+0C	Z	PV
616Y1IS	<b>Interactive Systems and Simulations</b>	KZ	2	2P+0C	L	PV
612Y1KN	<b>Combined Transportation</b>	KZ	2	2P+0C	Z	PV
623Y1KO	<b>Quantum Physics and Optoelectronics</b>	KZ	2	2P+0C	L	PV
621Y1LA	<b>Aerobatics</b>	KZ	2	2+0	L	PV
621Y1LR	<b>Radio Technology in Aviation</b>	KZ	2	2+0	L	PV
617Y1LL	<b>Logistics of Passenger and Freight Air Transport</b>	KZ	2	2P+0C	L	PV
620Y1LN	<b>Location and Navigation</b>	KZ	2	2P+0C	L	PV
621Y1MZ	<b>Managerial Ethics</b>	KZ	2	2+0	Z	PV
617Y1MD	<b>Marketing in Transportation</b> <i>Alexandra Dvořáková</i>	KZ	2	2P+0C	Z	PV
611Y1MM	<b>Mathematical Models in Economy</b>	KZ	2	2P+0C	Z	PV
618Y1MT	<b>Engineering Materials</b>	KZ	2	2P+0C	L	PV
614Y1MP	<b>Modeling Complex Assemblies and Models in Parametric Modeller</b>	KZ	2	2P+0C	Z	PV
617Y1ND	<b>Maritime Transportation</b>	KZ	2	2+0	Z	PV
615Y1NE	<b>German in the Economy and Society</b>	KZ	2	2P+0C	Z	PV
621Y1OL	<b>Security of Air Transport</b>	KZ	2	2+0	L	PV
623Y1OK	<b>Protection of Critical Objects and Infrastructures</b>	KZ	2	2P+0C	L	PV
620Y1OI	<b>Fare Collection and Information Systems</b>	KZ	2	2P+0C	L	PV
614Y1OP	<b>Operating System</b>	KZ	2	2P+0C	Z	PV
617Y1OF	<b>Personal Finance</b> <i>Alexandra Dvořáková</i>	KZ	2	2P+0C	Z	PV
611Y1PV	<b>Parametrical and Multicriterial Programming</b>	KZ	2	2P+0C	Z	PV
617Y1PM	<b>Personnel Management</b>	KZ	2	2P+0C	L	PV
612Y1PC	<b>Pedestrian and Cycling Transport</b>	KZ	2	2P+0C	L	PV
614Y1PG	<b>Computer Graphics</b>	KZ	2	2P+0C	L	PV
614Y1P2	<b>Computer Aid of Transportation Projecting 2</b>	KZ	2	2P+0C	Z	PV
618Y1PS	<b>Computer Simulations in Mechanics</b>	KZ	2	2P+0C	L	PV
614Y1PI	<b>Corporate Information System</b>	KZ	2	2P+0C	Z	PV
614Y1PZ	<b>Advanced Data Processing in Spreadsheets</b> <i>Jan Mejstřík</i>	KZ	2	2P+0C	Z	PV

612Y1PD	<b>Assessment of Transport</b> <i>Kristýna Neubergová</i>	KZ	2	2P+0C	Z	PV
620Y1PK	<b>Product Quality Management Processes</b>	KZ	2	2P+0C	Z	PV
614Y1PJ	<b>C Programming Language</b>	KZ	2	2P+0C	Z	PV
612Y1C1	<b>Designing Roads in Civil 3D I</b>	KZ	2	2P+0C	L	PV
612Y1C2	<b>Designing Roads in Civil 3D II</b>	KZ	2	2P+0C	Z	PV
614Y1PA	<b>3D Modeling in AutoCAD</b>	KZ	2	2P+0C	Z	PV
616Y1PV	<b>Operation, Construction and Maintenance of Vehicles</b>	KZ	2	2P+0C	L	PV
612Y1PU	<b>Organization Disposition of Railway Stations</b>	KZ	2	2P+0C	L	PV
616Y1RE	<b>Control and Electronic Vehicle Systems</b>	KZ	2	2P+0C	Z	PV
621Y1RZ	<b>Human Resources Management</b>	KZ	2	2P+0C	L	PV
617Y1ST	<b>Titan Simulation</b>	KZ	2	2P+0C	L	PV
620Y1SC	<b>Sensors and Actuators</b>	KZ	2	2P+0C	L	PV
611Y1SI	<b>Transportation Software Engineering</b>	KZ	2	2P+0C	Z	PV
622Y1SZ	<b>Forensic Expertise</b>	KZ	2	2+0	L	PV
616Y1KS	<b>Quality and Reliability of Vehicles</b>	KZ	2	2P+0C	Z	PV
612Y1SU	<b>Management and Maintenance of Roads</b>	KZ	2	2P+0C	L	PV
621Y1TH	<b>Aircraft Technical Handling</b>	KZ	2	2P+0C	Z	PV
611Y1TG	<b>Graph Theory</b>	KZ	2	2P+0C	L	PV
614Y1TI	<b>Creating Interactive Internet Applications</b>	KZ	2	2P+0C	L	PV
621Y1UT	<b>Airports Maintenance</b>	KZ	2	2+0	L	PV
614Y1UP	<b>Editing of Theses in MS Word</b>	KZ	2	2P+0C	L	PV
618Y1UK	<b>Introduction of Rail Vehicles</b>	KZ	2	2P+0C	L	PV
612Y1VC	<b>Waterways and Shipping</b>	KZ	2	2P+0C	Z	PV
623Y1VS	<b>Negotiation and Cooperation</b>	KZ	2	2P+0C	Z	PV
614Y1VM	<b>Development of Applications for Mobile Devices</b>	KZ	2	2P+0C	Z	PV
616Y1VT	<b>Development in Railroad Vehicles</b>	KZ	2	2P+0C	L	PV
614Y1W1	<b>Webdesign 1</b>	KZ	2	2P+0C	Z	PV
614Y1W2	<b>Webdesign 2</b>	KZ	2	2P+0C	L	PV
616Y1ZG	<b>Introduction into Applied Computer Graphics</b>	KZ	2	2P+0C	L	PV
621Y1ZA	<b>Basics of Aerobatics</b>	KZ	2	2+0	L	PV
614Y1ZM	<b>Fundamentals of Parametric and Adaptive Programming</b>	KZ	2	2P+0C	L	PV
611Y1ZM	<b>Foundation of MATLAB Programming</b>	KZ	2	2P+0C	L	PV
612Y1ZU	<b>Principles of Urbanism</b>	KZ	2	2P+0C	Z	PV
616Y1ZL	<b>Vehicle Testing, Legislation and Construction</b>	KZ	2	2P+0C	Z	PV

**Characteristics of the courses of this group of Study Plan: Code=PVP PRE 16-17 Name=3x PVP pro bak. PREZ v 16-17: LOG (LS 16-17 + ZS+LS 17-18)**

617Y1AF	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.					
618Y1AM	Anatomy, Mobility and Safety of Man	KZ	2		
Survey of tissues. Anatomical structure and growth of bones. Articular joint. Remodelling of bone tissue. Anatomical structure of muscles. Blood circulation and nervous system. Structure and biomechanics of muscular-skeletal system. Injury of human organs and musculo-skeletal system during traffic accidents. Mobility of ill and injured man and his treatment. Human joint prostheses. Protective means and traffic safety regulations.					
614Y1AV	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.					
620Y1AE	Applied Electronics	KZ	2		
Basic electronic semiconductor components, their principles, characteristics and typical connection diagrams. Semiconductor PN junction diodes, transistors, thyristor, operational amplifiers, basic logic gates. Functions of basic electronic circuits and methods for their designs (rectifiers, voltage regulator with Zener diode, transistor as an amplifier, operational amplifier as an inverting and noninverting amplifier).					
614Y1BE	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.					
615Y1BO	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.					

614Y1BM	Biometric Methods	KZ	2
Basic biometric terms, authentication methods, principles and performance measurement of biometric systems, overview of biometric technologies, hand geometry, iris recognition, retina recognition method, 2D and 3D face recognition, vein patterns on the wrist, ear biometrics, fingerprint recognition, skin spectroscopy, behavioral methods, the use of biometrics in transport applications, safety and risks of biometric technologies.			
623Y1DZ	Data and Their Processing for Engineering Fields Needs	KZ	2
Courses of risk, basic terms, data collection, data sets, data random uncertainty and data epistemic uncertainty, data processing, hazard, risk, value scales, analytical, empirical and heuristic methods, hazard determination and risk determination, methods for variants' creation, decision support systems.			
615Y1DU	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.			
615Y1DZ	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.			
612Y1DS	Project Documentation in Practice	KZ	2
Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts.			
617Y1EV	Public Sector Economy	KZ	2
Economic and financial theory of public sector, public choice theory, externalities, decisions about public finance allocation, economic assessment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects and their economic efficiency assessment, way of elaboration of PPP projects, funding from EU funds, program HDM-4.			
620Y1EK	Qualification in Electrical Engineering	KZ	2
Practical experience with measurements in laboratories, electrical equipment, power supply, electrical installation of low voltage, electric shock hazard, symbols and labeling, nominal voltage, maximum allowed currents, electrical equipment protection against short circuit and overload protection, control and revision, first aid, legislation, standards and regulations in relation to health and safety and electrical engineering.			
616Y1EN	Energy Requirements of Vehicles	KZ	2
Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis.			
620Y1EA	Environmental Aspects of Transport	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.			
615Y1EH	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.			
618Y1EM	Experimental Methods in Mechanics	KZ	2
The purpose and role of experimental mechanics. Sensors for mechanical testing. Overview of experimental methods. Destructive and non-destructive testing of materials. Design of experimental procedures and sample preparation. Tensile and bending tests. Electrical resistance strain gages. Optical based strain measurement. Fatigue and lifetime prediction. Instrumented hardness testing. Introduction to electron microscopy. Errors in measurement.			
621Y1FN	Factors Affecting the Rate of Accidents in Aviation	KZ	2
Introduction. The scope of international and national organizations in civil aviation. The scope of the investigation organisations within the state and international committees. Analysis and interpretation of ICAO Annexes 13 and 19. Analysis and interpretation of the Regulation (EC), Regulation (EU). Human factor. Utilization of information from the investigation reports.			
615Y1FD	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.			
614Y1HW	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).			
615Y1HL	(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.			
615Y1HD	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.			
612Y1HD	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.			
615Y1HE	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 man. Practical examples from the field of transportation; relevant legislative.			
616Y1IS	Interactive Systems and Simulations	KZ	2
Principles of vehicle movement. Forces in moving vehicle, origin, classification, assessment. Adhesion. Traction output. Drives, source systems, classification, structure, operational and energetic singularity. Sources of energy. Calculations to assess output quantities and energetic intensity. Auxiliary systems energy consumption.			
612Y1KN	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.			
623Y1KO	Quantum Physics and Optoelectronics	KZ	2
Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components.			

621Y1LA	<b>Aerobatics</b> Methodology of flying aerobatic figures. Aerodynamics and flight mechanics of aerobatic figures. Aerobatic training syllabi and aerobatic competitions. Creating an aerobatic sequence. Safety in aerobatics, accidents related to aerobatics. Physiological aspects of flying aerobatics. Aircraft structure loads and construction fatigue strength of aerobatic aircraft. Upset recovery training (UPRT) for commercial pilots and related accidents.	KZ	2
621Y1LR	<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
617Y1LL	<b>Logistics of Passenger and Freight Air Transport</b> 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.	KZ	2
620Y1LN	<b>Location and Navigation</b> Description and examples of road networks, localization on the network. Routing algorithms, their properties and implementation. Description and examples of datasets for finding transport connections, routing algorithms, their properties and implementation.	KZ	2
621Y1MZ	<b>Managerial Ethics</b> The basic terminology of managerial ethics. Basics of etiquette and rules of social contact. Social events. Etiquette of working contacts. The art of presentation and negotiation. Personal image. Diplomatic protocol. Managerial ethics. Business ethics.	KZ	2
617Y1MD	<b>Marketing in Transportation</b> General principles of marketing applied to transport issues, marketing tools suitable for transport as a service, specifics of public passenger transport and the resulting differences in the application of marketing.	KZ	2
611Y1MM	<b>Mathematical Models in Economy</b> 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.	KZ	2
618Y1MT	<b>Engineering Materials</b> 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.	KZ	2
614Y1MP	<b>Modeling Complex Assemblies and Models in Parametric Modeller</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
617Y1ND	<b>Maritime Transportation</b> 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.	KZ	2
615Y1NE	<b>German in the Economy and Society</b> Recent economic and social issues of German speaking countries and of the EU. Reading and listening of texts. Lexical, grammatical and semantic analysis of texts. Discussion on selected topics.	KZ	2
621Y1OL	<b>Security of Air Transport</b> The development of civil aviation. Definitions and regulations. History of acts of unlawful interference. Terrorism in aviation. National security program. Crisis management. Protection at airports - operational procedures. Modern means of protection and control.	KZ	2
623Y1OK	<b>Protection of Critical Objects and Infrastructures</b> Types of technological systems, critical item, risks and their courses, criticality, vulnerability, connectivity, dependability, resilience, failure, protection, safety of critical objects and critical infrastructures.	KZ	2
620Y1OI	<b>Fare Collection and Information Systems</b> 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).	KZ	2
614Y1OP	<b>Operating System</b> Distributions. Installation GNU/Linux OS. X-window system. Rights management - users and groups, ACL rights. Filesystems and attributes. Programs and processes. OS boot, runlevels. Basic console programs / commands. Config files. SW management, package systems. Programs in graphic shell - text, spreadsheet, graphic editors, sound, video and communication. Services management. Safe and secure configuration of OS. Remote administration.	KZ	2
617Y1OF	<b>Personal Finance</b> Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance).	KZ	2
611Y1PV	<b>Parametrical and Multicriterial Programming</b> 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.	KZ	2
617Y1PM	<b>Personnel Management</b> Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication.	KZ	2
612Y1PC	<b>Pedestrian and Cycling Transport</b> 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.	KZ	2
614Y1PG	<b>Computer Graphics</b> 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.	KZ	2
614Y1P2	<b>Computer Aid of Transportation Projecting 2</b> Overview of CAx application for transportation projecting aid. AutoCAD environment possibilities of basic tasks automatizing (programming, scripting, data exchange). Advanced blocks modification (attributes, relation to databases). Work in projecting group, external references. Basic tasks for communication projecting (clotoidic transition curve, cross-and longitudinal section). Basics of 3D modelling.	KZ	2
618Y1PS	<b>Computer Simulations in Mechanics</b> Principles and overview of programs for stress analysis of structures. Numerical methods in mechanics, finite element method. Geometric model development and adaptation of geometry from other CAE systems. Assignment of material properties. The types of elements and their use. Discretization of solid model. Boundary conditions and application of the load. Basic tasks of structural and modal analysis. Introduction to complex nonlinear problems.	KZ	2

614Y1PI	Corporate Information System	KZ	2
Data-information-knowledge, components of information system, syntactic and semantic sense of data, structure of corporate information system, particular information system (personalistic, production, storage, etc.), corporate information politics and information control, risks of information system operation, legal environment of information system operation, state information system, information system security, data protection, safety politics.			
614Y1PZ	Advanced Data Processing in Spreadsheets	KZ	2
Students will be familiar with principles of working in a spreadsheet. Graphic layout of the table appearance, formatting of numbers, insertion of formulas and functions, including addressing, error detection. Working with large spreadsheets, filters, advanced filters, database functions. Pivot tables and charts, conditional formatting, solution finding, solver, macros, data analysis. Examples and questions from various companies and training.			
612Y1PD	Assessment of Transport	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.			
620Y1PK	Product Quality Management Processes	KZ	2
General principles of organization management. Management systems and international standards; quality management systems. Quality products, processes, systems. A framework of standards for systems management, management principles. Principles of process management, monitoring and measurement systems management. Uniform framework of standards for systems management. Process management principles. Metrology and testing. Product certification.			
614Y1PJ	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.			
612Y1C1	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.			
612Y1C2	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.			
614Y1PA	3D Modeling in AutoCAD	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.			
616Y1PV	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.			
612Y1PU	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.			
616Y1RE	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.			
621Y1RZ	Human Resources Management	KZ	2
The position of human resources in the organization and related disciplines file. Substance, importance and challenges of human resources management. Internal and external environment of human resource management. Human resource planning. Search, recruitment and selection of employees. Motivation, evaluation and remuneration of staff. Positioning, dismissal and redundancies of employees. Education of employees. Planning career management.			
617Y1ST	Titan Simulation	KZ	2
Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions.			
620Y1SC	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.			
611Y1SI	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.			
622Y1SZ	Forensic Expertise	KZ	2
Historical evolution of forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report.			
616Y1KS	Quality and Reliability of Vehicles	KZ	2
Quality and reliability theory in design, development, production and operation of vehicles. Definition and possible approach to quality and reliability. Key legislation. FMEA (Failure Mode and Effects Analysis), QFD (Quality Function Deployment), DFx (Design for Assembly, Manufacturing, Quality, Services ...) and other methods used in industrial applications. Knowledge-based systems of quality and reliability, data collection.			
612Y1SU	Management and Maintenance of Roads	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.			
621Y1TH	Aircraft Technical Handling	KZ	2
Aircraft towing and pushing tractors. GPU. Air conditioning and heating units. Aircraft fuel equipment. De-icing and anti-icing units. Loading and unloading units. Equipment for passengers boarding and offboarding. Operational processes of aircraft technical handling and regulations. Modernization and technical progress.			
611Y1TG	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.			

614Y1TI	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.			
621Y1UT	Airports Maintenance	KZ	2
Summer airport maintenance. Summer maintenance equipment. Winter airport maintenance. Winter maintenance equipment. De-icing / anti-icing of aircraft. De-icing / anti-icing liquid. Operating procedures, limitations, practices.			
614Y1UP	Editing of Theses in MS Word	KZ	2
Students will be introduced to the principles of creating and editing large documents and basic typographic rules. They will properly apply styles, create tables of contents, lists of figures, tables, graphs, etc. Footnotes, captions, index. They practice corrections of finished documents. The goal is to prepare students for seamless editing dissertations and theses, so that they are able to concentrate mainly on writing a thesis.			
618Y1UK	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.			
612Y1VC	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.			
623Y1VS	Negotiation and Cooperation	KZ	2
Code of conduct for negotiation. The influence of personality traits on the negotiations. Negotiation and commanding. Teamwork. Variants teams. Informal and formal role in the team. Principles of negotiation, the essence of negotiation, the differences in negotiation in business and in crisis situations, the principle of "win both", specifications and bidding, the role of trust.			
614Y1VM	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.			
616Y1VT	Development in Railroad Vehicles	KZ	2
Railroad vehicles traction. Railroad vehicle parameters regulation. Control and driving of railroad vehicles. Importance in heavy duty and personal transportation. Critical situation assesment. New materials in design. International standardization.			
614Y1W1	Webdesign 1	KZ	2
Students will learn the basics of communication HTTP, URL and addressing, markup languages HTML and XHTML, HTML tags, rules of web accessibility and usability, CSS properties and selectors, the issue of web browsers, creating one to three column layout pages, sites validation, conditional comments. Topics will be practiced on practical examples.			
614Y1W2	Webdesign 2	KZ	2
Students will learn advanced techniques CSS, responsive webdesign, CSS frontends, content management systems, JavaScript, jQuery, SEO, web server installation + configuration directives. Topics will be practiced on practical examples.			
616Y1ZG	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.			
621Y1ZA	Basics of Aerobatics	KZ	2
The history, development and aerobatics in present, aerodynamics and mechanics of flight during marginal flight modes, piloting technique of individual elements, competition aerobatics, aerobatics programs, preparation for practicing aerobatics and safety training, competitive psychology and concentration on performance.			
614Y1ZM	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.			
611Y1ZM	Foundation of MATLAB Programming	KZ	2
To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging.			
612Y1ZU	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.			
616Y1ZL	Vehicle Testing, Legislation and Construction	KZ	2
Vehicle construction, aggregate computing, driving resistance, building and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, creation of technical legislation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.			

Name of the block: Jazyky

Minimal number of credits of the block: 6

The role of the block: J

Code of the group: JZ 2 PRE (5.-6.SEM)

Name of the group: Jazyky bak. PRE pro 5. a 6. sem. (2.cizí jazyk) - pro B3710

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

Requirement courses in the group: In this group you have to complete 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
615JZ3F	Foreign Language - French 3	Z	3	CP+4C+10B	Z	J
615JZ3I	Foreign Language - Italian 3	Z	3	CP+4C+10B	Z	J
615JZ3N	Foreign Language - German 3 <i>René Skalický</i>	Z	3	CP+4C+10B	Z	J
615JZ3R	Foreign Language - Russian 3 <i>Vilma Gottwaldová</i>	Z	3	CP+4C+10B	Z	J
615JZ3S	Foreign Language - Spanish 3	Z	3	CP+4C+10B	Z	J
615JZ4F	Foreign Language - French 4	Z,ZK	3	CP+4C+10B	L	J
615JZ4I	Foreign Language - Italian 4	Z,ZK	3	CP+4C+10B	L	J
615JZ4N	Foreign Language - German 4	Z,ZK	3	CP+4C+10B	L	J
615JZ4R	Foreign Language - Russian 4	Z,ZK	3	CP+4C+10B	L	J
615JZ4S	Foreign Language - Spanish 4	Z,ZK	3	CP+4C+10B	L	J

**Characteristics of the courses of this group of Study Plan: Code=JZ 2 PRE (5.-6.SEM) Name=Jazyky bak. PRE pro 5. a 6. sem. (2.cizí jazyk) - pro B3710**

615JZ3F	Foreign Language - French 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.	Z	3		
615JZ3I	Foreign Language - Italian 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.	Z	3		
615JZ3N	Foreign Language - German 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.	Z	3		
615JZ3R	Foreign Language - Russian 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.	Z	3		
615JZ3S	Foreign Language - Spanish 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.	Z	3		
615JZ4F	Foreign Language - French 4 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,ZK	3		
615JZ4I	Foreign Language - Italian 4 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,ZK	3		
615JZ4N	Foreign Language - German 4 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,ZK	3		
615JZ4R	Foreign Language - Russian 4 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,ZK	3		
615JZ4S	Foreign Language - Spanish 4 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,ZK	3		

## List of courses of this pass:

Code	Name of the course	Completion	Credits
611CAL1	Calculus 1 Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables.	Z,ZK	7
611CAL2	Calculus 2 Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in $R_n$ . Parametric description of regular k-dimensional surfaces in $R_n$ , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.	Z,ZK	5
611FY1	Physics 1 Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.	Z,ZK	4
611FY2	Physics 2 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.	Z,ZK	4
611GIE	Geometry 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.	KZ	3
611LA	Linear Algebra 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.	Z,ZK	3
611LP	Linear Programming Formulation of the problem of linear programming, transcription of some practical problems to the linear programming problems. Simplex and convex polyedra. Simplex method, basic solutions, duality principle in linear programming, stability of solution of linear programming problem. Traffic problem.	KZ	3
611MSP	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
611STAS	Statistics Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.	Z,ZK	5
611Y1MM	Mathematical Models in Economy 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.	KZ	2
611Y1PV	Parametrical and Multicriterial Programming 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.	KZ	2
611Y1SI	Transportation Software Engineering 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.	KZ	2
611Y1TG	Graph Theory 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.	KZ	2
611Y1ZM	Foundation of MATLAB Programming To explain the principle of algorithmization, flow charts, description of MATLAB environment and its settings, MATLAB help, mathematical operators, matrices and elements operations, control flow, inputs and outputs, graphics, optimization and program code debugging.	KZ	2
612MDE	Transport Models and Transport Excesses 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.	Z,ZK	3
612PPOK	Designing Roads, Highways and Motorways 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.	KZ	3
612X31	Project 1	Z	2
612X32	Project 2	Z	2
612X33	Project 3	Z	2
612Y1C1	Designing Roads in Civil 3D I 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.	KZ	2
612Y1C2	Designing Roads in Civil 3D II 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.	KZ	2

612Y1DS	Project Documentation in Practice	KZ	2
Project documentation creating. Project documentation types. Support materials for project documentation creating. Building permit obtaining process. Budget and pricing. Practical creation of some project documentation parts.			
612Y1HD	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.			
612Y1KN	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.			
612Y1PC	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.			
612Y1PD	Assessment of Transport	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.			
612Y1PU	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.			
612Y1SU	Management and Maintenance of Roads	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.			
612Y1VC	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.			
612Y1ZU	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.			
612ZTS	Railway Lines and Stations	Z,ZK	4
Rail transport. Railway track geometry parameters. Route layout of railway lines. Railway line construction - railway substructure and superstructure. Spatial layout of railway lines. Railway control systems in relation to infrastructure. Operating and carriage points. Railway lines net and category. Traction in rail transport.			
612ZYDI	Introduction to Transportation Engineering	Z,ZK	2
Role of transportation in land-use planning. Basic terms in transportation engineering. Traffic survey and traffic prognosis. Introduction to topic of roads, public mass transport. Negative impacts of transportation to environment and safety.			
614AS	Algorithm and Data Structures	KZ	2
Students will be familiarized with selected basic and derived data structures, algorithms, their properties and their design procedure. Students will analyze problems, propose theoretical solutions to the set task and the resulting algorithm write by means of flowcharts, practice in reading algorithms recorded by means of the flowchart and use the basics of Boolean algebra with forming the conditions for the algorithms.			
614AZ	Data Analysis and Processing	KZ	2
Main aim of this course is learn students how to prepare raw data for following processing and analysis. Knowledge of algorithms for determining the parameters of different data sources; source can be used images, text, time series, etc. The next step is the theoretical skills and knowledge to apply in solving the problem, e. g. extraction parameters from the image data or from the Internet.			
614DB	Database Systems	KZ	2
Dbf. terminology, fundamentals of relational and object database systems, database structure, relations modelling, relation algebra, dbf. tools, database design process, user interface, remote data access. Basic statement of SQL language. Expert systems and knowledge based applications, knowledge representation, methods of derivating and implementating, interface for knowledge systems design, certainty and uncertainty in knowledge systems.			
614DMG	Datamining	KZ	2
Types of data sources and knowledge, data warehouses and OLAP technology for data mining, data preprocessing in the process of knowledge acquisition systems for data mining, mining characteristics of concepts (classes), mining association rules from relational db. and data warehousing, classification (decisions tree, Bayesian cob., using neural networks). Prediction. Cluster analysis. Mining in complex structured data, multimedia dbf., www.			
614KSP	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).			
614PRG	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.			
614Y1AV	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.			
614Y1BE	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.			

614Y1BM	<b>Biometric Methods</b>	KZ	2
Basic biometric terms, authentication methods, principles and performance measurement of biometric systems, overview of biometric technologies, hand geometry, iris recognition, retina recognition method, 2D and 3D face recognition, vein patterns on the wrist, ear biometrics, fingerprint recognition, skin spectroscopy, behavioral methods, the use of biometrics in transport applications, safety and risks of biometric technologies.			
614Y1HW	<b>Computer Hardware</b>	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).			
614Y1MP	<b>Modeling Complex Assemblies and Models in Parametric Modeller</b>	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.			
614Y1OP	<b>Operating System</b>	KZ	2
Distributions. Installation GNU/Linux OS. X-window system. Rights management - users and groups, ACL rights. Filesystems and attributes. Programs and processes. OS boot, runlevels. Basic console programs / commands. Config files. SW management, package systems. Programs in graphic shell - text, spreadsheet, graphic editors, sound, video and communication. Services management. Safe and secure configuration of OS. Remote administration.			
614Y1P2	<b>Computer Aid of Transportation Projecting 2</b>	KZ	2
Overview of CAx application for transportation projecting aid. AutoCAD environment possibilities of basic tasks automatizing (programming, scripting, data exchange). Advanced blocks modification (attributes, relation to databases). Work in projecting group, external references. Basic tasks for communication projecting (clothoid transition curve, cross-and longitudinal section). Basics of 3D modelling.			
614Y1PA	<b>3D Modeling in AutoCAD</b>	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.			
614Y1PG	<b>Computer Graphics</b>	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.			
614Y1PI	<b>Corporate Information System</b>	KZ	2
Data-information-knowledge, components of information system, syntactic and semantic sense of data, structure of corporate information system, particular information system (personalistic, production, storage, etc.), corporate information politic and information control, risks of information system operation, legal environment of information system operation, state information system, information system security, data protection, safety politics.			
614Y1PJ	<b>C Programming Language</b>	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.			
614Y1PZ	<b>Advanced Data Processing in Spreadsheets</b>	KZ	2
Students will be familiar with principles of working in a spreadsheet. Graphic layout of the table appearance, formatting of numbers, insertion of formulas and functions, including addressing, error detection. Working with large spreadsheets, filters, advanced filters, database functions. Pivot tables and charts, conditional formatting, solution finding, solver, macros, data analysis. Examples and questions from various companies and training.			
614Y1TI	<b>Creating Interactive Internet Applications</b>	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.			
614Y1UP	<b>Editing of Theses in MS Word</b>	KZ	2
Students will be introduced to the principles of creating and editing large documents and basic typographic rules. They will properly apply styles, create tables of contents, lists of figures, tables, graphs, etc. Footnotes, captions, index. They practice corrections of finished documents. The goal is to prepare students for seamless editing dissertations and theses, so that they are able to concentrate mainly on writing a thesis.			
614Y1VM	<b>Development of Applications for Mobile Devices</b>	KZ	2
Object oriented programming, Java programming language, development environment, operating system Android, development application - widgets, containers, threads, menu, permissions, services, GUI.			
614Y1W1	<b>Webdesign 1</b>	KZ	2
Students will learn the basics of communication HTTP, URL and addressing, markup languages HTML and XHTML, HTML tags, rules of web accessibility and usability, CSS properties and selectors, the issue of web browsers, creating one to three column layout pages, sites validation, conditional comments. Topics will be practiced on practical examples.			
614Y1W2	<b>Webdesign 2</b>	KZ	2
Students will learn advanced techniques CSS, responsive webdesign, CSS frontends, content management systems, JavaScript, jQuery, SEO, web server installation + configuration directives. Topics will be practiced on practical examples.			
614Y1ZM	<b>Fundamentals of Parametric and Adaptive Programming</b>	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.			
615JZ1A	<b>Foreign Language - English 1</b>	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.			
615JZ2A	<b>Foreign Language - English 2</b>	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.			
615JZ3F	<b>Foreign Language - French 3</b>	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.			
615JZ3I	<b>Foreign Language - Italian 3</b>	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.			

615JZ3N	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.			
615JZ3R	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.			
615JZ3S	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.			
615JZ4F	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.			
615JZ4I	Foreign Language - Italian 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.			
615JZ4N	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.			
615JZ4R	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.			
615JZ4S	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.			
615X31	Project 1	Z	2
615X32	Project 2	Z	2
615X33	Project 3	Z	2
615Y1BO	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.			
615Y1DU	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.			
615Y1DZ	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.			
615Y1EH	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.			
615Y1FD	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.			
615Y1HD	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.			
615Y1HE	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 man. Practical examples from the field of transportation; relevant legislative.			
615Y1HL	(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.			
615Y1NE	German in the Economy and Society	KZ	2
Recent economic and social issues of German speaking countries and of the EU. Reading and listening of texts. Lexical, grammatical and semantic analysis of texts. Discussion on selected topics.			
616DPO	Vehicle Technology	KZ	2
Vehicle. Functions, principles. Drive, vehicle construction. Road transport, safety, heavy duty vehicle desing, dynamics. Rail transport, safety, carriage design. Drive. Electric traction. Transshipment. Technological components of various modes of transport. Management and control of various means of transport. Safety.			
616UDOP	Introduction into Vehicles	Z	2
Vehicles and transportation systems. Functionality and setup. Movement and drive principles. Engines and their characteristics. Rail, road, air and water transport. Alternative means of transport. Lifting equipment and conveyors. Legislation.			

616X31	Project 1	Z	2
616X32	Project 2	Z	2
616X33	Project 3	Z	2
616Y1EN	Energy Requirements of Vehicles Dynamics and the driving inertial of the vehicles. Types of energy - kinetic, static, heat, chemical and others. Ways of energy change into kinetic energy. Combustion engine, electric drive, steam engine, air engine. Energy accumulation means, accumulator, flywheel, fuel cell. Energy recuperation. WTW analysis.	KZ	2
616Y1IS	Interactive Systems and Simulations Principles of vehicle movement. Forces in moving vehicle, origin, classification, assesment. Adhesion. Traction output. Drives, source systems, classification, structure, operational and energetic singularity. Sources of energy. Calculations to assess output quantities and energetic intensity. Auxiliary systems energy consumption.	KZ	2
616Y1KS	Quality and Reliability of Vehicles Quality and reliability theory in design, development, production and operation of vehicles. Definition and possible approach to quality and reliability. Key legislation. FMEA (Failure Mode and Effects Analysis), QFD (Quality Function Deployment), DfX (Design for Assamy, Manufacturing, Quality, Services ...) and other methods used in industrial applications. Knowledge-based systems of quality and reliability, data collection.	KZ	2
616Y1PV	Operation, Construction and Maintenance of Vehicles Methods of vehicle production. Vehicle maintenance. Vehicle diagnostics. Maintenance and repair plans. Engine maintenance and emission measurement. Transmission mechanism. General principles of engine diagnostics.	KZ	2
616Y1RE	Control and Electronic Vehicle Systems 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.	KZ	2
616Y1VT	Development in Railroad Vehicles Railroad vehicles traction. Railroad vehicle parametres regulation. Control and driving of railroad vehicles. Importance in heavy duty and personal transportation. Critical situation assesment. New materials in design. International standardization.	KZ	2
616Y1ZG	Introduction into Applied Computer Graphics 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.	KZ	2
616Y1ZL	Vehicle Testing, Legislation and Construction Vehicle costruction, aggregate computing, driving resistance, building and parameters of traction, constructional arrangement of personal cars, trucks, buses, motorbikes, legislation in the EU and in the world, creation of technical legislation, testing methods, vehicle tests, accelerated tests, mathematical modelling in testing.	KZ	2
617EDPO	Economics of Transport Company Economy, marginal utility, marginal costs, function of supply and demand, market equilibrium, perfect competition and types of market arrangement. Transportation market, transport company, it's environment, balance sheet, costs, revenue, profit and maximalization of profit. Financial management in transport, business plan, taxation in transport.	Z,ZK	5
617EMY	Management Science The introduction to economical-mathematical models before its application in concrete technical and economical cases. The basic mathematical methods to modelise economical situations. Several classes of problems are formulated and different methods used in qualitatively distinct real situations are introduced. The tasks of interpretation and application.	Z	2
617FEU	Public Administration and Financing in Transport To get a basic overview of the EU regional policy and its practical execution on the level of the member state, specific ability to find and analyze information about the EU support programmes.	Z,ZK	4
617LGT	Logistics Logistics definition, basic concepts, store, warehouse, transport and handling equipment, logistics technology, logistics centers, information and intelligent logistics systems, logistics city.	Z,ZK	6
617MAS	Small and Medium Enterprise Small and medium enterprise - plans, market, analysis, finance, management, decision making, survival, growth.	Z,ZK	3
617MEKA	Methods of Economics Analysis The techniques of economical analysis in the domain of analysis of dependencies, analysis and construction of time series and comparsion of statistical values using differencies and indices.	KZ	2
617PAZ	Carriage and Forwarding Contracts of carriage and forwarding, waybills and documents; transport modes, multimodal transport, tariffs and prices in transport, rights and obligations of carriers, hauliers and forwarders, duty and tariff agreements, INCOTERMS, insurance in transport.	Z	2
617SFID	Public Administration and Financing in Transport Basic issues of transport and transport policy in the social context, environmental issues in transport, economical aspects of transport, public administration and financing of transport.	Z,ZK	4
617TEDL	Transport Technology and Logistics Basic terms in transport technology and logistics, particular steps of transport planning, line planning, timetabling, planning in pasanger and freight transport, organisation of traffic in each transport modus, technologic factors of the side of operator and client, organisation of city transport, logistic technologies and their application using various transport modus.	KZ	3
617TGA	Graph Theory and its Applications in Transport 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.	Z,ZK	4
617TVD	Technology of Public Transport The course contents a detailed description of new knowledge and basic principles of hierarchical planning of public transport system accenting the general transport planning and quantified transport demand. The course would be oriented on multiple and multi-level optimisation of passenger public transport system.	Z,ZK	5
617X31	Project 1	Z	2
617X32	Project 2	Z	2
617X33	Project 3	Z	2
617Y1AF	Alternative Forms of Transportation Project Financing 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.	KZ	2
617Y1EV	Public Sector Economy Economic and financial theory of public sector, public choice theory, externalites, decisions about public finance allocation, economic assesment of public projects (CBA, MCA, CEA), tax system of the CR, state budget, management of public projects a their economic efficiency assesment, way of elaboration of PPP projects, funding from EU funds, program HDM-4.	KZ	2

617Y1LL	<b>Logistics of Passenger and Freight Air Transport</b> 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.	KZ	2
617Y1MD	<b>Marketing in Transportation</b> General principles of marketing applied to transport issues, marketing tools suitable for transport as a service, specifics of public passenger transport and the resulting differences in the application of marketing.	KZ	2
617Y1ND	<b>Maritime Transportation</b> 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.	KZ	2
617Y1OF	<b>Personal Finance</b> Personal finance (budget, financing of basic living needs), debt (loans and credits, payment instruments, interest and fees, debt trap), financing of housing (rent, mortgage, savings, consumer loans, refinancing), savings and investments (investment horizon, return, risk, investment strategy), insurance (insurance types, suitability and adequacy), securing the future (retirement savings and insurance).	KZ	2
617Y1PM	<b>Personnel Management</b> Human sources, work group, man as personality, planning, choice, evaluation and education of human sources, work adaptation, teamwork, intercultural communication.	KZ	2
617Y1ST	<b>Titan Simulation</b> Titan is a management game simulating the business decisions. Lets 2-8 student groups to produce and compete in the market with the same product. Students set a price and determine the quantity and capacity of production, plan budgets for marketing, research and development. They become familiar with the consequences of their decisions by the form of financial corporate reports and they use this information for other business decisions.	KZ	2
618MTY	<b>Materials Science and Engineering</b> Basic course of materials science and engineering explains mechanical properties of structural materials based on their bonding forces and microstructure. However the main attention is paid to metals as the most important engineering materials, also other major classes of materials are presented, namely ceramics, polymers and composites. Attention is also paid to degradation processes in materials, to defectoscopy and to main mechanical tests.	Z,ZK	3
618PZP	<b>Elasticity and Strength</b> 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.	Z,ZK	3
618SAT	<b>Structural Analysis</b> General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.	Z,ZK	4
618TED	<b>Technical Documentation</b> Technical standards, international standardization, technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets.	KZ	2
618Y1AM	<b>Anatomy, Mobility and Safety of Man</b> 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.	KZ	2
618Y1EM	<b>Experimental Methods in Mechanics</b> The purpose and role of experimental mechanics. Sensors for mechanical testing. Overview of experimental methods. Destructive and non-destructive testing of materials. Design of experimental procedures and sample preparation. Tensile and bending tests. Electrical resistance strain gages. Optical based strain measurement. Fatigue and lifetime prediction. Instrumented hardness testing. Introduction to electron microscopy. Errors in measurement.	KZ	2
618Y1MT	<b>Engineering Materials</b> 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.	KZ	2
618Y1PS	<b>Computer Simulations in Mechanics</b> Principles and overview of programs for stress analysis of structures. Numerical methods in mechanics, finite element method. Geometric model development and adaptation of geometry from other CAE systems. Assignment of material properties. The types of elements and their use. Discretization of solid model. Boundary conditions and application of the load. Basic tasks of structural and modal analysis. Introduction to complex nonlinear problems.	KZ	2
618Y1UK	<b>Introduction of Rail Vehicles</b> 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.	KZ	2
620SYSA	<b>Systems Analysis</b> Introduction to system sciences, system viewpoint, terminology, typical system analysis tasks, system identification, system interface and interface tasks, processes, system behaviour and its analysis, strong functions and processes, genetic code, system identity, system architecture. Tools for system analysis - Petri nets, decision tables, algorithms for structural tasks. Soft and hard systems, methods for soft system analysis.	Z,ZK	5
620UITS	<b>Introduction to Intelligent Transport Systems</b> Terminology and legislative framework telematics systems and their architecture. Telematics systems in practice and their operation. Fundamentals of information and telecommunication systems for ITS. Principles and technical support measurement of traffic data, localization and navigation. Practical work with traffic data. Real examples of possible applications of the principles of ITS.	Z,ZK	7
620Y1AE	<b>Applied Electronics</b> Basic electronic semiconductor components, their principles, characteristics and typical connection diagrams. Semiconductor PN junction diodes, transistors, thyristor, operational amplifiers, basic logic gates. Functions of basic electronic circuits and methods for their designs (rectifiers, voltage regulator with Zener diode, transistor as an amplifier, operational amplifier as an inverting and noninverting amplifier).	KZ	2
620Y1EA	<b>Environmental Aspects of Transport</b> 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.	KZ	2

620Y1EK	<b>Qualification in Electrical Engineering</b>	KZ	2
Practical experience with measurements in laboratories, electrical equipment, power supply, electrical installation of low voltage, electric shock hazard, symbols and labeling, nominal voltage, maximum allowed currents, electrical equipment protection against short circuit and overload protection, control and revision, first aid, legislation, standards and regulations in relation to health and safety and electrical engineering.			
620Y1LN	<b>Location and Navigation</b>	KZ	2
Description and examples of road networks, localization on the network. Routing algorithms, their properties and implementation. Description and examples of datasets for finding transport connections, routing algorithms, their properties and implementation.			
620Y1OI	<b>Fare Collection and Information Systems</b>	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).			
620Y1PK	<b>Product Quality Management Processes</b>	KZ	2
General principles of organization management. Management systems and international standards; quality management systems. Quality products, processes, systems. A framework of standards for systems management, management principles. Principles of process management, monitoring and measurement systems management. Uniform framework of standards for systems management. Process management principles. Metrology and testing. Product certification.			
620Y1SC	<b>Sensors and Actuators</b>	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.			
621Y1FN	<b>Factors Affecting the Rate of Accidents in Aviation</b>	KZ	2
Introduction. The scope of international and national organizations in civil aviation. The scope of the investigation organisations within the state and international committees. Analysis and interpretation of ICAO Annexes 13 and 19. Analysis and interpretation of the Regulation (EC), Regulation (EU). Human factor. Utilization of information from the investigation reports.			
621Y1LA	<b>Aerobatics</b>	KZ	2
Methodology of flying aerobatic figures. Aerodynamics and flight mechanics of aerobatic figures. Aerobatic training syllabi and aerobatic competitions. Creating an aerobatic sequence. Safety in aerobatics, accidents related to aerobatics. Physiological aspects of flying aerobatics. Aircraft structure loads and construction fatigue strength of aerobatic aircraft. Upset recovery training (UPRT) for commercial pilots and related accidents.			
621Y1LR	<b>Radio Technology in Aviation</b>	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.			
621Y1MZ	<b>Managerial Ethics</b>	KZ	2
The basic terminology of managerial ethics. Basics of etiquette and rules of social contact. Social events. Etiquette of working contacts. The art of presentation and negotiation. Personal image. Diplomatic protocol. Managerial ethics. Business ethics.			
621Y1OL	<b>Security of Air Transport</b>	KZ	2
The development of civil aviation. Definitions and regulations. History of acts of unlawful interference. Terrorism in aviation. National security program. Crisis management. Protection at airports - operational procedures. Modern means of protection and control.			
621Y1RZ	<b>Human Resources Management</b>	KZ	2
The position of human resources in the organization and related disciplines file. Substance, importance and challenges of human resources management. Internal and external environment of human resource management. Human resource planning. Search, recruitment and selection of employees. Motivation, evaluation and remuneration of staff. Positioning, dismissal and redundancies of employees. Education of employees. Planning career management.			
621Y1TH	<b>Aircraft Technical Handling</b>	KZ	2
Aircraft towing and pushing tractors. GPU. Air conditioning and heating units. Aircraft fuel equipment. De-icing and anti-icing units. Loading and unloading units. Equipment for passengers onboarding and offboarding. Operational processes of aircraft technical handling and regulations. Modernization and technical progress.			
621Y1UT	<b>Airports Maintenance</b>	KZ	2
Summer airport maintenance. Summer maintenance equipment. Winter airport maintenance. Winter maintenance equipment. De-icing / anti-icing of aircraft. De-icing / anti-icing liquid. Operating procedures, limitations, practices.			
621Y1ZA	<b>Basics of Aerobatics</b>	KZ	2
The history, development and aerobatics in present, aerodynamics and mechanics of flight during marginal flight modes, piloting technique of individual elements, competition aerobatics, aerobatics programs, preparation for practicing aerobatics and safety training, competitive psychology and concentration on performance.			
621ZALD	<b>Basics of Air Transport</b>	KZ	2
History, definitions, terminology, basic rules. VFR/IFR. Basics of aerodynamics. Propulsion of aircraft. Aircraft design. Basics of navigation, radio navigation. Weight, balance, performance. Flight planning, optimization of speed and heights, minimum fuel. Limitations of operation, maintenance, service life of aircraft. Traffic management, ground handling, security. Air crew. Airlines and economics. Space technologies.			
622X31	<b>Project 1</b>	Z	2
622X32	<b>Project 2</b>	Z	2
622X33	<b>Project 3</b>	Z	2
622Y1SZ	<b>Forensic Expertise</b>	KZ	2
Historical evolution of forensic engineering, forensic activity, current legislature in the Czech Republic, different disciplines, notion of forensic, forensic legislation, basic forensic acts, expert role in the obtaining proofs, forensic methodology. Notion of the evidence, general principles of evidence obtaining, metrology, protocol, evidences collection, site inspection, forensic report, elements. Finding, expert testimony / report.			
623BDIS	<b>Safety Technologies of Transportation and Information Systems</b>	KZ	3
Safety of transportation means - principles, testing, evaluation. Safety of infrastructures, critical structures, crisis scenarios. Safety of information systems and their robustness.			
623Y1DZ	<b>Data and Their Processing for Engineering Fields Needs</b>	KZ	2
Courses of risk, basic terms, data collection, data sets, data random uncertainty and data epistemic uncertainty, data processing, hazard, risk, value scales, analytical, empirical and heuristic methods, hazard determination and risk determination, methods for variants' creation, decision support systems.			
623Y1KO	<b>Quantum Physics and Optoelectronics</b>	KZ	2
Ground of quantum physics. Application of quantum physics in practice. Optoelectronics. Production of optoelectronics components.			
623Y1OK	<b>Protection of Critical Objects and Infrastructures</b>	KZ	2
Types of technological systems, critical item, risks and their courses, criticality, vulnerability, connectivity, dependability, resilience, failure, protection, safety of critical objects and critical infrastructures.			

623Y1VS	Negotiation and Cooperation	KZ	2
Code of conduct for negotiation. The influence of personality traits on the negotiations. Negotiation and commanding. Teamwork. Variants teams. Informal and formal role in the team. Principles of negotiation, the essence of negotiation, the differences in negotiation in business and in crisis situations, the principle of "win both", specifications and bidding, the role of trust.			
623ZAP	Basics of Law	Z	2
Basic orientation in the Czech legal system. The course is primarily intended to provide students with orientation in fundamentals of the Czech Republic, legal system and in various forms of law, including adoption of the basic principles of European Community law. The course consists of selected chapters from the public and private law and European Community law.			
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1

For updated information see <http://bilakniha.cvut.cz/en/FF.html>

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