

Study plan

Name of study plan: DOS bak.prez.20/21

Faculty/Institute/Others:

Department:

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

Garantor of the study branch: doc. Ing. Jiří Arský, Ph.D.

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 124

Elective courses credits: 56

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 98

The role of the block: Z

Code of the group: 1.S.BP 19/20

Name of the group: 1.sem.bak.prez. od 19/20

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 11 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
11CAL1	Calculus 1 Magdalena Hykšová, Ondřej Navrátil, Bohumil Kovář, Tomáš Tasák, Olga Vraštilová, Ondřej Navrátil (Gar.)	Z,ZK	7	2P+4C+2B	Z	Z
11LA	Linear Algebra Lucie Kárná, Jan Píkr, Martina Bevářová, Pavel Provinský, Martina Bevářová (Gar.)	Z,ZK	3	2P+1C+10B	Z	Z
12ZYDI	Introduction to Transportation Engineering Dagmar Kořáková, Zuzana Arská, Jan Kruntorád, Nikol Dousková, Vojtěch Novotný	Z,ZK	2	1P+1C	Z	Z
18MTY	Materials Science and Engineering Michaela Neuhäuserová, Jan Falta, Václav Rada, Jaroslav Valach	Z,ZK	3	2P+1C+10B	Z	Z
11GIE	Geometry Pavel Provinský, Oldřich Hykš, Šárka Vorářová, Šárka Vorářová (Gar.)	KZ	3	2P+2C+12B	Z	Z
14ASD	Algorithm and Data Structures Kirill Smirnov, Jan Procházka, Petr Hnyk, Michal Jeábek, Marek Kalika, Zdeněk Lokaj, Jan Zelenka, Vít Fábera, Michal Jeábek (Gar.)	KZ	3	0P+2C+8B	Z	Z
14KSP	Constructing with Computer Aid Vladimír Douda, Martin Brumovský, Lukáš Kozel, Radek Kratochvíl, Filip Müller, Lukáš Svoboda, Drahomír Schmidt, Lukáš Svoboda (Gar.)	KZ	2	0P+2C+8B	Z	Z
18TED	Technical Documentation Vít Malinovský, Jitka Štejnáková	KZ	2	1P+1C+8B	Z	Z
15DPLG	Transportation Psychology Eva Rezlerová, Jana Štíkarová	Z	2	2P+0C+6B	Z	Z
16UDOP	Introduction into Vehicles Zuzana Radová, Josef Mík, Petr Bouchner, Petr Bouchner (Gar.)	Z	2	2P+0C+8B	Z	Z
TV-1	Physical Education	Z	1		Z	Z

Characteristics of the courses of this group of Study Plan: Code=1.S.BP 19/20 Name=1.sem.bak.prez. od 19/20

11CAL1	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.
11LA	Linear Algebra	Z,ZK	3	Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.
12ZYDI	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.

18MTY	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.			
11GIE	Geometry	KZ	3
Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.			
14ASD	Algorithm and Data Structures	KZ	3
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.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations).			
18TED	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.			
15DPLG	Transportation Psychology	Z	2
Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation.			
16UDOP	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: 2.S.BP 17/18

Name of the group: 2.sem.bak.prez. od 17/18

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 9 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
11CAL2	Calculus 2 Magdalena Hykšová, Ondřej Navrátil, Tomáš Tásák, Olga Vraštilová, Oldřich Hykš, Magdalena Hykšová , Magdalena Hykšová (Gar.)	Z,ZK	5	2P+3C+20B	L	Z
11STAT	Statistics Pavel Provinský, Pavla Pecherková, Šárka Jozová, Evžen Uglíckich, Ivan Nagy, Ivan Nagy , Ivan Nagy (Gar.)	Z,ZK	4	2P+2C+12B	L	Z
12ZTS	Railway Lines and Stations Jan Kruntorád, Vojtěch Novotný, Martin Jacura, Petr Šatra, Tomáš Javořík, Ondřej Trešl, Pavel Purkart, Lukáš Týfa	Z,ZK	4	2P+2C+10B	L	Z
18SAT	Structural Analysis Michaela Neuhäuserová, Jan Falta, Václav Rada, Jitka Ezníková, Radim Dvořák, Radek Kolman, Jan Vyhlídal, Tomáš Doktor, Petr Koudelka,	Z,ZK	4	2P+2C+14B	L	Z
20SYSA	Systems Analysis Jiří Růžička, Petr Bureš, Zdeněk Votruba, Zuzana Bělinová	Z,ZK	5	2P+2C+14B	L	Z
14PRG	Programming Kirill Smirnov, Jan Procházka, Michal Jeábek, Jan Zelenka, Vít Fábera, Lukáš Svoboda, Jan Král, Alena Plašilová, Jana Kalíková, Jana Kalíková (Gar.)	KZ	2	0P+2C+8B	L	Z
17TEDL	Transport Technology and Logistics Zdeněk Michl, Milan Kříž, Jiří Pospíšil, Michal Drábek, Vít Janoš	KZ	3	2P+1C	L	Z
21ZALD	Basics of Air Transport Jakub Kraus, Peter Olexa, Jakub Steiner, Tereza Topková, Sébastien Lán, Kateřina Machulová, Kateřina Machulová, Michaela Kalivodová, Sarah Van Den Bergh, Jakub Hospodka, Jakub Hospodka (Gar.)	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=2.S.BP 17/18 Name=2.sem.bak.prez. od 17/18

11CAL2	Calculus 2	Z,ZK	5
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.			
11STAT	Statistics	Z,ZK	4
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.			
12ZTS	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.			

18SAT	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.			
20SYSA	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.			
14PRG	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.			
17TEDL	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.			
21ZALD	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: 3.S.BP 20/21

Name of the group: 3.sem.bak.prez. od 20/21 (pro B3710)

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
11FYZ	Physics Tomáš Vít, Zuzana Malá, Marek Honc, Antonio Cammarata, Paolo Nicolini, Kosta Simonovic, Zuzana Malá , Zuzana Malá (Gar.)	Z,ZK	5	2P+2C+18B	Z	Z
12MDE	Transport Models and Transport Excesses Milan Dont, Josef Kocourek	Z,ZK	3	2P+1C+8B	Z	Z
17TGA	Graph Theory and its Applications in Transport Alena Rybíková, Denisa Mocková, Dušan Teichmann, Alena Rybíková (Gar.)	Z,ZK	4	2P+2C+12B	Z	Z
18PZP	Elasticity and Strength Jan Vyšňák, Tomáš Doktor, Petr Koudelka, Jan Šleichrt, Daniel Kytý, Petr Zlámal, Josef Jíra, Tomáš Fíla, Ondřej Jiroušek	Z,ZK	3	2P+1C+10B	Z	Z
20UITS	Introduction to Intelligent Transport Systems Jiří Růžička, Patrik Horažovský, Kristýna Navrátilová, Pavel Hluska, Vladimír Faltus, Pavel Hruběš, Martin Langr, Tomáš Zelinka, Jiří Růžička	Z,ZK	7	3P+2C+20B	Z	Z
12PPOK	Designing Roads, Highways and Motorways Petr Šatra, Jiří Arský, Jan Gallia, Tomáš Padělek, Petr Kumpošt	KZ	3	1P+2C+10B	Z	Z
14DATS	Database Systems Jan Král, Jana Kalíková, Martin Šrotý, Jana Kalíková (Gar.)	KZ	2	1P+1C+10B	Z	Z
15JZ1A	Foreign Language - English 1 Eva Režlerová, Dana Boušová, Jitka Heřmanová, Barbora Horáková, Marie Michlová, Lenka Monková, Markéta Olehlová, Markéta Vojanová, Peter Moppuss,	Z	3	0P+4C+10B	Z	Z

Characteristics of the courses of this group of Study Plan: Code=3.S.BP 20/21 Name=3.sem.bak.prez. od 20/21 (pro B3710)

11FYZ	Physics	Z,ZK	5
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.			
12MDE	Transport Models and Transport Excesses	Z,ZK	3
Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.			
17TGA	Graph Theory and its Applications in Transport	Z,ZK	4
Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.			
20UITS	Introduction to Intelligent Transport Systems	Z,ZK	7
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.			
12PPOK	Designing Roads, Highways and Motorways	KZ	3
Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.			

14DATS	Database Systems	KZ	2
Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.			
15JZ1A	Foreign Language - English 1	Z	3
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			

Code of the group: 4.S.BDOS VÝB R1 18/1

Name of the group: 4.sem.DOS 1.výb r p edm tu (od) 18/19

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

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

Credits in the group: 4

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11EMOP	Electromagnetic Field and Optics <i>Tomáš Vít , Zuzana Malá Tomáš Vít (Gar.)</i>	Z,ZK	4	2P+2C	L	z
12DOPS	Traffic Surveys and Simulations <i>Petr Kumpošt, Petr Richter</i>	Z,ZK	4	2P+2C	L	z

Characteristics of the courses of this group of Study Plan: Code=4.S.BDOS VÝB R1 18/1 Name=4.sem.DOS 1.výb r p edm tu (od) 18/19

11EMOP	Electromagnetic Field and Optics Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics.	Z,ZK	4
12DOPS	Traffic Surveys and Simulations Theory of traffic flow. Methods of monitoring - profile, spatially time. Automatic traffic counts. Security parameters - accidents, near-misses. Surveys in public transport. Overview of traffic microsimulation models. Getting to know the working environment applications. Explanation of movement of vehicles in the traffic system. Creating and simulation of microscopic traffic model. Evaluation of the output characteristics. 4D visualization model.	Z,ZK	4

Code of the group: 4.S.BDOS VÝB R2 17/1

Name of the group: 4.sem.DOS 2.výb r p edm tu (od) 17/18

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11MDS	Collection and Processing of Traffic Data <i>Ond ej P ibyl Ond ej P ibyl Ond ej P ibyl (Gar.)</i>	KZ	2	2P+0C	L	z
18TK	Theory of Structures <i>Josef Jíra</i>	KZ	2	2P+0C	L	z

Characteristics of the courses of this group of Study Plan: Code=4.S.BDOS VÝB R2 17/1 Name=4.sem.DOS 2.výb r p edm tu (od) 17/18

11MDS	Collection and Processing of Traffic Data Basic principles of traffic detection and data collection, specific problems of the field of traffic data. Data preprocessing and analysis for use in additional applications.	KZ	2
18TK	Theory of Structures Deformation in plane, principle of virtual work. Force (flexibility) method. Application of force method to frame analysis. Displacement (stiffness) method. Simplified and general stiffness method. Mathematical foundations of elasticity. Static analysis of complex statically indeterminate structure. Energy methods for beam analysis. Lagrange variational principle. Winkler model of elastic foundation. Pasternak model of elastic foundation.	KZ	2

Code of the group: 4.S.BDOS VÝB R3 17/1

Name of the group: 4.sem.DOS 3.výb r p edm tu (od) 17/18

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
14PPD	Computer Aid of Transportation Projecting Drahomír Schmidt Drahomír Schmidt (Gar.)	KZ	2	0P+2C	L	Z
18POM	Advanced Materials Jaroslav Valach	KZ	2	0P+2C	L	Z

Characteristics of the courses of this group of Study Plan: Code=4.S.BDOS VÝB R3 17/1 Name=4.sem.DOS 3.výb r p edm tu (od) 17/18

14PPD	Computer Aid of Transportation Projecting	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 (clotoidic transition curve, cross and longitudinal section). Basics of 3D modelling.		
18POM	Advanced Materials	KZ	2	The knowledge gained in primary materials course is further developed. In greater physical detail it explains dynamics of structure defects, phase diagrams of binary systems and other concepts. Special processes of structure control are discussed. The gained knowledge is utilized on description of contemporary technologies of material production for key industrial applications.		

Name of the block: Semestrální projekt

Minimal number of credits of the block: 6

The role of the block: ZP

Code of the group: XB 4,5,6 13/14

Name of the group: Projekty bak. 4.5.6.sem. (od)13/14 - pro B3710

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

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

Credits in the group: 6

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
11X31	Project 1 Ondřej Píbyl	Z	2	0P+1C	L	ZP
12X31	Project 1 Dagmar Koárková, Zuzana Arská, Vojtěch Novotný, Martin Jacura, Tomáš Javořík, Ondřej Trešl, Pavel Purkart, Lukáš Týfa, Josef Kocourek,	Z	2	0P+1C	L	ZP
14X31	Project 1 Marek Kalika, Jana Kaliková, Ota Hajzler	Z	2	0P+1C	L	ZP
15X31	Project 1 Eva Režlerová	Z	2	0P+1C	L	ZP
16X31	Project 1 Josef Mík, Dmitry Rozhdestvenskiy, Adam Orlický	Z	2	0P+1C	L	ZP
17X31	Project 1 Zdeněk Michl, Milan Kříž, Jiří Pospíšil, Michal Drábek, Vít Janoš, Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová,	Z	2	0P+1C	L	ZP
18X31	Project 1 Jaroslav Valach, Daniel Kytý	Z	2	0P+1C	L	ZP
20X31	Project 1 Petr Bureš	Z	2	0P+1C	L	ZP
21X31	Project 1 Jakub Hospodka	Z	2	0P+1C	L	ZP
22X31	Project 1 Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svátý	Z	2	0P+1C	L	ZP
23X31	Project 1	Z	2	0P+1C	L	ZP
11X32	Project 2	Z	2	0P+2C	Z	ZP
12X32	Project 2 Dagmar Koárková, Zuzana Arská, Vojtěch Novotný, Martin Jacura, Tomáš Javořík, Ondřej Trešl, Pavel Purkart, Lukáš Týfa, Josef Kocourek,	Z	2	0P+2C	Z	ZP
14X32	Project 2 Zdeněk Lokaj, Vít Fábera, Jan Král, Jana Kaliková, Tomáš Zelinka, Martin Šrotý, Ota Hajzler	Z	2	0P+2C	Z	ZP
15X32	Project 2 Eva Režlerová	Z	2	0P+2C	Z	ZP
16X32	Project 2 Josef Mík, Petr Bouchner, Milan Sliacky, Dmitry Rozhdestvenskiy, Adam Orlický	Z	2	0P+2C	Z	ZP
17X32	Project 2 Zdeněk Michl, Milan Kříž, Jiří Pospíšil, Michal Drábek, Vít Janoš, Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová,	Z	2	0P+2C	Z	ZP

18X32	Project 2 <i>Jarošlav Valach, Daniel Kytý</i>	Z	2	0P+2C	Z	ZP
20X32	Project 2 <i>Jiří Růžka, Petr Bureš, Patrik Horažovský, Zuzana Purkrábková, Pavel Hruběš, Martin Leso</i>	Z	2	0P+2C	Z	ZP
21X32	Project 2 <i>Terézia Pilimannová</i>	Z	2	0P+2C	Z	ZP
22X32	Project 2 <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý, Tomáš Míunek</i>	Z	2	0P+2C	Z	ZP
23X32	Project 2	Z	2	0P+2C	Z	ZP
11X33	Project 3 <i>Ondřej Píbyl</i>	Z	2	0P+1C	L	ZP
12X33	Project 3 <i>Dagmar Kořánková, Zuzana Černá, Vojtěch Novotný, Martin Jacura, Tomáš Javořík, Ondřej Trešl, Pavel Purkart, Lukáš Týfa, Josef Kocourek,</i>	Z	2	0P+1C	L	ZP
14X33	Project 3 <i>Zdeněk Lokaj, Jan Král, Jana Kalíková, Tomáš Zelinka, Martin Šrotý</i>	Z	2	0P+1C	L	ZP
15X33	Project 3 <i>Eva Rezlerová</i>	Z	2	0P+1C	L	ZP
16X33	Project 3 <i>Josef Mík, Dmitry Rozhdestvenskiy</i>	Z	2	0P+1C	L	ZP
17X33	Project 3 <i>Zdeněk Michl, Milan Kříž, Jiří Pospíšil, Michal Drábek, Vít Janoš, Alena Rybíková, Denisa Mocková, Dušan Teichmann, Veronika Faifrová,</i>	Z	2	0P+1C	L	ZP
18X33	Project 3 <i>Daniel Kytý</i>	Z	2	0P+1C	L	ZP
20X33	Project 3 <i>Petr Bureš</i>	Z	2	0P+1C	L	ZP
21X33	Project 3 <i>Jakub Hospodka</i>	Z	2	0P+1C	L	ZP
22X33	Project 3 <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý</i>	Z	2	0P+1C	L	ZP
23X33	Project 3	Z	2	0P+1C	L	ZP

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

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

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 20

The role of the block: P

Code of the group: 4.S.BDOS 17/18

Name of the group: 4.sem.DOS bak.prez. (od)17/18

Requirement credits in the group: In this group you have to gain 20 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 20

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
11MSP	Modeling of Systems and Processes Bohumil Ková, Lucie Kárná, Jan Píkrýl, Marek Honc Bohumil Ková Jan Píkrýl (Gar.)	Z,ZK	4	2P+2C+12B	L	P
12SDK	Highways, Motorways and Intersections Petr Šatra, Jiří arský, Jan Gallia, Tomáš Padlelek	Z,ZK	4	2P+2C	L	P
18KAD	Kinematics and Dynamics Vít Malinovský, Petr Zlámal, Stanislav Hračov	Z,ZK	4	2P+1C	L	P
16DPY	Vehicle Technology Josef Mík, Josef Svoboda, P emysl Toman	KZ	5	2P+2C	L	P
15JZ2A	Foreign Language - English 2 Eva Rezlerová, Dana Boušová, Jitka He manová, Barbora Horáková, Lenka Monková, Markéta Vojanová, Peter Morpuss, Marek Tomek, Jan Feit	Z,ZK	3	0P+4C+10B	L	P

Characteristics of the courses of this group of Study Plan: Code=4.S.BDOS 17/18 Name=4.sem.DOS bak.prez. (od)17/18

11MSP	Modeling of Systems and Processes	Z,ZK	4
Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).			
12SDK	Highways, Motorways and Intersections	Z,ZK	4
Roads and motorways network, transport output. Types of direction curves. Hairpin bend. Stopping sight distance and overtaking sight distance. Levels of traffic service. Design elements of crossroads and intersections. Crossroads. Roundabouts. Intersections. Special types of junctions. Capacity of crossroads and intersections. Structure of pavement of roads and motorways. Road engineering structures. Assessment of route alternatives.			
18KAD	Kinematics and Dynamics	Z,ZK	4
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Principle of D'Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
16DPY	Vehicle Technology	KZ	5
Technical nomenclature in transportation technology. Vehicle in legislation. Design. Operation. Influence on environment. Vehicle and ecology. Traction engine characteristics - combustion engines, electric engines, change of energy principles. Powertrain construction. Power transmission.			
15JZ2A	Foreign Language - English 2	Z,ZK	3
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistic forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
11CAL1	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.			
11CAL2	Calculus 2	Z,ZK	5
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.			
11EMOP	Electromagnetic Field and Optics	Z,ZK	4
Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics.			
11FYZ	Physics	Z,ZK	5
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.			
11GIE	Geometry	KZ	3
Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path.			

11LA	Linear Algebra	Z,ZK	3
Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.			
11MDS	Collection and Processing of Traffic Data	KZ	2
Basic principles of traffic detection and data collection, specific problems of the field of traffic data. Data preprocessing and analysis for use in additional applications.			
11MSP	Modeling of Systems and Processes	Z,ZK	4
Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB).			
11STAT	Statistics	Z,ZK	4
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.			
11X31	Project 1	Z	2
11X32	Project 2	Z	2
11X33	Project 3	Z	2
12DOPS	Traffic Surveys and Simulations	Z,ZK	4
Theory of traffic flow. Methods of monitoring - profile, spatially time. Automatic traffic counts. Security parameters - accidents, near-misses. Surveys in public transport. Overview of traffic microsimulation models. Getting to know the working environment applications. Explanation of movement of vehicles in the traffic system. Creating and simulation of microscopic traffic model. Evaluation of the output characteristics. 4D visualization model.			
12MDE	Transport Models and Transport Excesses	Z,ZK	3
Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.			
12PPOK	Designing Roads, Highways and Motorways	KZ	3
Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.			
12SDK	Highways, Motorways and Intersections	Z,ZK	4
Roads and motorways network, transport output. Types of direction curves. Hairpin bend. Stopping sight distance and overtaking sight distance. Levels of traffic service. Design elements of crossroads and intersections. Crossroads. Roundabouts. Intersections. Special types of junctions. Capacity of crossroads and intersections. Structure of pavement of roads and motorways. Road engineering structures. Assessment of route alternatives.			
12X31	Project 1	Z	2
12X32	Project 2	Z	2
12X33	Project 3	Z	2
12ZTS	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.			
12ZYDI	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.			
14ASD	Algorithm and Data Structures	KZ	3
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.			
14DATS	Database Systems	KZ	2
Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilities, AutoCAD environment profiles, drawings with raster foundations).			
14PPD	Computer Aid of Transportation Projecting	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 (clotoidic transition curve, cross and longitudinal section). Basics of 3D modelling.			
14PRG	Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			
14X31	Project 1	Z	2
14X32	Project 2	Z	2
14X33	Project 3	Z	2
15DPLG	Transportation Psychology	Z	2
Subject of psychology and its basic concepts. Information intake, decision-making and behaviour. Performance. Engineering psychology and vehicle construction. Psychological aspects of travel route and traffic conditions, accidents and traffic incidents. Selection and training of the staff. Work and leisure. Age as a factor in transport operation.			
15JZ1A	Foreign Language - English 1	Z	3
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			

15JZ2A	Foreign Language - English 2	Z,ZK	3
Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			
15X31	Project 1	Z	2
15X32	Project 2	Z	2
15X33	Project 3	Z	2
16DPY	Vehicle Technology	KZ	5
Technical nomenclature in transportation technology. Vehicle in legislation. Design. Operation. Influence on environment. Vehicle and ecology. Traction engine characteristics - combustion engines, electric engines, change of energy principles. Powertrain construction. Power transmission.			
16UDOP	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.			
16X31	Project 1	Z	2
16X32	Project 2	Z	2
16X33	Project 3	Z	2
17TEDL	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.			
17TGA	Graph Theory and its Applications in Transport	Z,ZK	4
Basic terms of graph theory, paths in graphs, flows in networks, location problems, design problems on graphs, optimum routing, use of graphs in other scientific disciplines.			
17X31	Project 1	Z	2
17X32	Project 2	Z	2
17X33	Project 3	Z	2
18KAD	Kinematics and Dynamics	Z,ZK	4
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Principle of D'Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
18MTY	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.			
18POM	Advanced Materials	KZ	2
The knowledge gained in primary materials course is further developed. In greater physical detail it explains dynamics of structure defects, phase diagrams of binary systems and other concepts. Special processes of structure control are discussed. The gained knowledge is utilized on description of contemporary technologies of material production for key industrial applications.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.			
18SAT	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.			
18TED	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.			
18TK	Theory of Structures	KZ	2
Deformation in plane, principle of virtual work. Force (flexibility) method. Application of force method to frame analysis. Displacement (stiffness) method. Simplified and general stiffness method. Mathematical foundations of elasticity. Static analysis of complex statically indeterminate structure. Energy methods for beam analysis. Lagrange variational principle. Winkler model of elastic foundation. Pasternak model of elastic foundation.			
18X31	Project 1	Z	2
18X32	Project 2	Z	2
18X33	Project 3	Z	2
20SYSA	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.			
20UITS	Introduction to Intelligent Transport Systems	Z,ZK	7
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.			
20X31	Project 1	Z	2
20X32	Project 2	Z	2
20X33	Project 3	Z	2
21X31	Project 1	Z	2
21X32	Project 2	Z	2
21X33	Project 3	Z	2

21ZALD	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.			
22X31	Project 1	Z	2
22X32	Project 2	Z	2
22X33	Project 3	Z	2
23X31	Project 1	Z	2
23X32	Project 2	Z	2
23X33	Project 3	Z	2
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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