

Study plan

Name of study plan: bak.prez.od 20/21 (pro B3710)

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 90

Elective courses credits: 0

Sum of credits in the plan: 90

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 90

The role of the block: Z

Code of the group: 1.S.BP 20/21

Name of the group: 1.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 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 Olga Vraštilová, Tomáš Tasák, Magdalena Hykšová, Bohumil Ková, Ondřej Navrátil Bohumil Ková Ondřej Navrátil (Gar.)	Z,ZK	7	2P+4C+2B	Z	Z
11LA	Linear Algebra Lucie Kárná, Pavel Provinský, Martina Beváová Martina Beváová Martina Beváová (Gar.)	Z,ZK	3	2P+1C+10B	Z	Z
12ZYDI	Introduction to Transportation Engineering Vojtěch Novotný, Zuzana Arská, Dagmar Kořáková	Z,ZK	2	1P+1C	Z	Z
18MTY	Materials Science and Engineering Nela Krásová, Jan Falta, Radim Dvořák, Václav Rada, Jitka Ezníková, Jaroslav Valach, Jaroslav Valach Jaroslav Valach (Gar.)	Z,ZK	3	2P+1C+10B	Z	Z
11GIE	Geometry Pavel Provinský, Oldřich Hykš, Šárka Voráová Oldřich Hykš Oldřich Hykš (Gar.)	KZ	3	2P+2C+12B	Z	Z
14ASD	Algorithm and Data Structures Jana Kalíková, Jan Král, Tomáš Brandejský, Michal Jeábek, Marek Kalika, Zdeněk Lokaj, Alena Plašilová, Jan Procházka, Martin Šrotý, Michal Jeábek Vít Fábbera (Gar.)	KZ	3	0P+2C+8B	Z	Z
14KSP	Constructing with Computer Aid Martin Brumovský, Martin Fiala, Radek Kratochvíl, Lukáš Svoboda, Jan Vogl, Drahomír Schmidt Lukáš Svoboda Drahomír Schmidt (Gar.)	KZ	2	0P+2C+8B	Z	Z
18TED	Technical Documentation Jitka Ezníková, Vít Malinovský Jitka Ezníková (Gar.)	KZ	2	1P+1C+8B	Z	Z
15DPLG	Transportation Psychology Eva Rezlerová, Jana Štikarová	Z	2	2P+0C+6B	Z	Z
16UDOP	Introduction into Vehicles Zuzana Radová, Petr Bouchner	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 20/21 Name=1.sem.bak.prez. (od) 20/21 (pro B3710)

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 Euklidean 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
Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.			
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 20/21

Name of the group: 2.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 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 Tomáš T asák Ond ej Navrátil (Gar.)	Z,ZK	5	2P+3C+20B	L	Z
11STAT	Statistics Evženie Uglickich (Gar.)	Z,ZK	4	2P+2C+12B	L	Z
12ZTS	Railway Lines and Stations Lukáš Týfa (Gar.)	Z,ZK	4	2P+2C+10B	L	Z
18SAT	Structural Analysis Daniel Kytý (Gar.)	Z,ZK	4	2P+2C+14B	L	Z
20SYSA	Systems Analysis Zuzana B linová (Gar.)	Z,ZK	5	2P+2C+14B	L	Z
14PRG	Programming Jan Kr ál	KZ	2	0P+2C+8B	L	Z
17TEDL	Transport Technology and Logistics	KZ	3	2P+1C	L	Z
21ZALD	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=2.S.BP 20/21 Name=2.sem.bak.prez. (od) 20/21 (pro B3710)

11CAL2	Calculus 2	Z,ZK	5
Indefinite integral, 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
Basics of probability Descriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parametric tests Nonparametric tests Regression and correlation analysis			
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
The Course Programming builds on and fully extends the course 14ASD (Algorithmization and Data Structures). The knowledge of the Python programming language is expanded here so that the participant gains skills and can apply them to solve various follow-up tasks. Main topics: lists, multidimensional arrays, sorting and searching, tuples, sets, dictionaries, working with date and time, regular expressions, functions and procedures, working with files (CSV, JSON, XML).			
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 Oldřich Hykš, Zuzana Malá, Tomáš Vít, Jana Kuklová, 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	Z,ZK	4	2P+2C+12B	Z	Z
18PZP	Elasticity and Strength Nela Krásová, Jan Falta, Radim Dvořák, Jitka Ezníková, Daniel Kytý, Jan Vyšňák, Jan Šlechta, Tomáš Doktor, Tomáš Fila,	Z,ZK	3	2P+1C+10B	Z	Z
20UITS	Introduction to Intelligent Transport Systems Martin Langr, Jiří Růžka, Patrik Horážek, Vladimír Faltus, Pavel Hrubeš, Kristýna Navrátilová, Viktor Beneš	Z,ZK	7	3P+2C+20B	Z	Z
12PPOK	Designing Roads, Highways and Motorways Josef Kocourek, Petr Šatra, Tomáš Padělek, Petr Kumpošt	KZ	3	1P+2C+10B	Z	Z
14DATS	Database Systems Jana Kalíková, Jan Král, Jana Kalíková (Gar.)	KZ	2	1P+1C+10B	Z	Z
15JZ1A	Foreign Language - English 1 Eva Režlerová, Markéta Vojanová, Dana Boušová, Marie Michlová, Barbora Horáková, Marek Tomek, Jan Feit, Markéta Musilová, Peter Morpuss,	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 in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.			
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.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
11CAL1	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
11CAL2	Calculus 2 Indefinite integral, 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
11FYZ	Physics Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.	Z,ZK	5
11GIE	Geometry Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.	KZ	3
11LA	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
11STAT	Statistics Basics of probability Descriptive statistics Population and sample, limit theorem Point estimate, construction and properties Interval estimates Parametric tests Nonparametric tests Regression and correlation analysis	Z,ZK	4
12MDE	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
12PPOK	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
12ZTS	Railway Lines and Stations 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.	Z,ZK	4
12ZYDI	Introduction to Transportation Engineering 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.	Z,ZK	2
14ASD	Algorithm and Data Structures 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.	KZ	3
14DATS	Database Systems 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.	KZ	2
14KSP	Constructing with Computer Aid "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).	KZ	2
14PRG	Programming The Course Programming builds on and fully extends the course 14ASD (Algorithmization and Data Structures). The knowledge of the Python programming language is expanded here so that the participant gains skills and can apply them to solve various follow-up tasks. Main topics: lists, multidimensional arrays, sorting and searching, tuples, sets, dictionaries, working with date and time, regular expressions, functions and procedures, working with files (CSV, JSON, XML).	KZ	2
15DPLG	Transportation Psychology 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.	Z	2
15JZ1A	Foreign Language - English 1 Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.	Z	3
16UDOP	Introduction into Vehicles 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.	Z	2
17TEDL	Transport Technology and Logistics 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.	KZ	3

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.			
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.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.			
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.			
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.			
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-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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