Study plan

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

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Technology in Transportation and Telecommunications
Type of study: Bachelor full-time
Required credits: 180
Elective courses credits: 0
Sum of credits in the plan: 180
Note on the plan:

Name of the block: Compulsory courses
Minimal number of credits of the block: 120
The role of the block: Z

Code of the group: 2.S.BTUL 13/14
Name of the group: 2.sem.TUL bak.prez. 13/14
Requirement credits in the group: In this group you have to gain 30 credits
Requirement courses in the group: In this group you have to complete 12 courses
Credits in the group: 30
Note on the group:

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

Characteristics of the courses of this group of Study Plan: Code=2.S.BTUL 13/14 Name=2.sem.TUL bak.prez. 13/14

17EDOT	Economy, Transport, Telecommunications	KZ	2
Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.			
11FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
11MVP	Mathematical Analysis of Function of More Variables	Z,ZK	3
Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R3, application of integral calculus in physics.			
18MRI2	Materials 2	KZ	2
Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.			
11PT	Probability	Z	2
Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.			

12PKD	Rail Transport Designing	Z,ZK	3
Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.			
14SIAP	Networks and Protocols	KZ	2
Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquirement from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.			
18ST	Statics	Z,ZK	3
General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.			
17TDL	Transport Technology and Logistics	Z,ZK	3
Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in pasanger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means.			
TV-2	Physical Education	Z	1
20UIS	Introduction to ITS	Z,ZK	3
Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.			
14UPRO	Introduction to Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			

Code of the group: 4.S.BTUL 13/14
Name of the group: 4.sem.TUL bak.prez. 13/14
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
15JZ2A	**Foreign Language - English 2** *Dana Boušová, Marie Michlová, Věra Pastorková, Jan Feit, Eva Rezlerová, Jitka Heřmanová, Markéta Musilová, Markéta Vojanová, Peter Morpuss, ...*	Z,ZK	3	0P+4C+10B		z
18CSU	**Parts of Machines**	KZ	3	2+1	L	z
14ELT	**Electrotechnics**	Z,ZK	4	2+2	L	z
18KIAD	**Kinematics and Dynamics**	Z,ZK	2	2+1	L	z
21LL1	**Aircraft 1**	KZ	3	2P+1C+10B	L	z
21LR	**Radio Technology in Aviation**	ZK	2	2+0	L	z
21LRY	**Aircraft Engines**	Z,ZK	2	2+1	L	z
18MC	**Materials Exercices**	Z	2	0+2	L	z
21PY1	**Aircraft Maintenance Technology 1**	KZ	3	2+1	L	z
18SAS	**Joints and Parts of Technical Joints**	KZ	3	2+1	L	z
21ZLE1	**Principles of Flight 1**	KZ	3	2+1	L	z

Characteristics of the courses of this group of Study Plan: Code=4.S.BTUL 13/14 Name=4.sem.TUL bak.prez. 13/14

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.			
18CSU	Parts of Machines	KZ	3
Transmissions, overview and classification, mechanical transmission, parts of transmission, gear relation, design and dimensioning of shafts and bearings, gears, materials of gears, gear boxes.			
14ELT	Electrotechnics	Z,ZK	4
Theory of electron. Static electricity, conductance, and electrotechnical terminology. Power and direct current generation. Direct current circuits. Electric resistance, resistor, and power. Capacity and capacitor. Magnetism. Inductance and induction coil. Direct current engines and generators. Theory of alternate current. Resistant, capacity, and inductive circuits. Transformers. Alternate current engines and generators. Frequency filters.			
18KIAD	Kinematics and Dynamics	Z,ZK	2
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Princle of D´Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
21LL1	Aircraft 1	KZ	3
Aircraft structural and conceptual design types - definitions and basic knowledge of the problem. Development of requirements, aircraft definitions and categorisation. Aircraft loadings. Systems of primary and secondary airframe structure. Airframe and propulsion unit. Lectures are devoted to aeroplane topics.			

21LR	Radio Technology in Aviation	ZK	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.			
21LRY	Aircraft Engines	Z,ZK	2
Aircraft piston engine, theoretical background, operational characteristics and construction schemes. Propellers, operational characterictics. Turbine engine, theoretical background, thermal cycles, construction schemes, operational characteristics. Turbojet and turbofan engines, basic construction modules, and their operational characteristics. Engine control.			
18MC	Materials Exercices	Z	2
Different kinds of processing applied to metals and their alloys. Casting, forming, welding, machining and powder metallurgy.			
21PY1	Aircraft Maintenance Technology 1	KZ	3
Fundamentals of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.			
18SAS	Joints and Parts of Technical Joints	KZ	3
Connection of machine parts, their construction and technology production, design of joints, kinds of fit, bearings, bearing location.			
21ZLE1	Principles of Flight 1	KZ	3
Aerodynamic drag, relation between drag and speed, streamline, boundary layer, continuity equation, Bernoulli's equation, lift and drag, air flow and pressures around wing, angle of attack, reactions of wing in air flow, lift and drag of a wing and an aircraft, coefficient of lift and drag, critical angle of attack, wing with final span, induced drag, interference, devices for lift and drag increase.			

Code of the group: 5.S.BTUL 13/14
Name of the group: 5.sem.TUL bak.prez.13/14
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
20ZENT	**Basic Electronics**	Z,ZK	3	2+1	Z	z
21KAS1	**Aircraft Construction and Systems 1**	Z,ZK	3	2+2	Z	z
21LLG1	**Aviation Legislation 1** *Jiří Ďuk* ***Jiří Ďuk***	Z,ZK	4	2P+1C	Z	z
21LTA2	**Aircraft 2** *Karel Mündel* ***Karel Mündel***	Z,ZK	2	2P+1C	Z	z
21ZLE2	**Principles of Flight 2**	Z,ZK	4	2+1	Z	z
14DB	**Database Systems**	KZ	2	0+2	Z	z
21DKV	**Aviation Datalink Communication**	KZ	2	2+0	Z	z
21LICL	**Human Factors in Aviation**	KZ	2	2+0	Z	z
21PY2	**Aircraft Maintenance Technology 2**	KZ	2	2+1	Z	z
21TMY1	**Turbine Engines 1**	KZ	3	2+2	Z	z
21LAB1	**Aviation English for Bachelor Studies 1**	Z	3	0+4	Z	z

Characteristics of the courses of this group of Study Plan: Code=5.S.BTUL 13/14 Name=5.sem.TUL bak.prez.13/14

20ZENT	Basic Electronics	Z,ZK	3
The subject is focused on switching elements, operational amplifier, generation harmonic and nonharmonic signals, sources, conduction of high frequencies signals. Analog-Digital and Digital-Analog convertor. Extensive part is also dedicated to digital logical circuits and microprocessors.			
21KAS1	Aircraft Construction and Systems 1	Z,ZK	3
Aircraft construction requirements and functions: fuselage, wings, flight controls, undercarriage, aircraft pylon, nacelle. Aircraft systems requirements and functions: drainage, water distribution systems and aircraft ligthing.			
21LLG1	Aviation Legislation 1	Z,ZK	4
Introduction to aviation legislation. Sphere of action of the CAA, ICAO, EASA. Part M and ML (continuing airworthiness), maintenance programmes, ADs, airworthiness reviews. Part 21 (initial airworthiness), design and production of aircraft.			
21LTA2	Aircraft 2	Z,ZK	2
Manufacturers responsibility, responsibilities of operator and professional supervising. Legislation in area of airworthiness. International and national standards. Static solidity of aircraft structures. Aeroelasticity. Inherent and operational reliability of aircraft structure. Fatigue strength. Aircraft structure lifetime presumption.			
21ZLE2	Principles of Flight 2	Z,ZK	4
Ways of producing thrust, propeller, jet propulsion, thrust and momentum, propulsion efficiency, aerodynamics of fixed and variable pitch propeller, propeller operation modes, propeller airstream effect, gyroscopic effect, balance of forces in horizontal flight, glide and landing, performances, take off and climb, acceleration, positive load, manoeuvres, stability and controllability, transsonic speeds.			
14DB	Database Systems	KZ	2
Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.			
21DKV	Aviation Datalink Communication	KZ	2
The subject acquaints students with aviation communication domain. Stress is put on the datalink systems. Students are acquainted both with technical aspect and with operation problem so that they are able to understand data flows necessary for provision safe, fluent and economic air traffic.			

21LICL	Human Factors in Aviation	KZ	2
Human performace & limitations, capability & competence, accident statistics, flight safety, fundamentals of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, fundamentals of flight psychology, human information processing, memory & learning, theory & model of human error, body rhythms & sleep, stress, fatigue, working methods.			
21PY2	Aircraft Maintenance Technology 2	KZ	2
Classification, maintenance, checks and repair of construction parts: joints, bearing, hoses, pipes, gearing, brakes, dampers, shaft, springs.			
21TMY1	Turbine Engines 1	KZ	3
First part of the course Turbine Engines is focused on the explanation and description of the purpose, operation and construction characteristics of aircraft turbojet and turbofan engines. Thermal engine, thermal cycle and its basic parameters, power output and thermal efficiency, basic construction modules, operational and construction characteristics.			
21LAB1	Aviation English for Bachelor Studies 1	Z	3
Aircrafts, flight basics, airports, meteorology, navigation, airspace management, emergency procedures, avition accidents, flight planning, human factor, civil avition organization, history of aviation, enviromental aspects of aviation.			

Code of the group: 6.S.BTUL 13/14
Name of the group: 6.sem.TUL bak.prez. 13/14
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
21KAS2	**Aircraft Construction and Systems 2**	Z,ZK	6	4+3	L	z
21LAB2	**Aviation English for Bachelor Studies 2**	Z,ZK	3	0+4	L	z
21LCU	**Aviation Maintenance Human Factors**	Z,ZK	3	2+1	L	z
21LLG2	**Aviation Legislation 2** *Jiří Ďuk* ***Jiří Ďuk***	ZK	2	2P+0C	L	z
21TMY2	**Turbine Engines 2**	Z,ZK	4	3+2	L	z
21V	**Aircraft Propellers** *Martin Novák Martin Novák (Gar.)*	Z,ZK	6	3P+2C	L	z
21PY3	**Aircraft Maintenance Technology 3**	KZ	4	2+2	L	z
14ISYS	**Information Systems**	KZ	2	2+0	L	z

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

21KAS2	Aircraft Construction and Systems 2	Z,ZK	6
Aircraft systems requirements and functions: air condition, pressurization, oxygen systems, tyres, hydraulics, fuel systems, electrical systems, deicing system, fire protection system.			
21LAB2	Aviation English for Bachelor Studies 2	Z,ZK	3
Aircrafts, flight basics, airports, meteorology, navigation, airspace management, emergency procedures, avition accidents, flight planning, human factor, civil avition organization, history of aviation, enviromental aspects of aviation, IFR / VFR communication, abbreviations in aviation, Q-codes.			
21LCU	Aviation Maintenance Human Factors	Z,ZK	3
Assessment of aviation accident statistics. Analysis of failure chains. Human factors analytical and clasificatory systems. Risk management.			
21LLG2	Aviation Legislation 2	ZK	2
Commission regulation (EU) 1321/2014, Part 66, Part 145, Part 147, Part CAMO, Part CAO, Commission regulation (EU) 965/2012			
21TMY2	Turbine Engines 2	Z,ZK	4
Second part of the course Turbine Engines is focused on explanation and description of the purpose, operation and construction characteristics of following aircraft turbine engines utility systems: Lubrication system, cooling and internal air systems, fuel systems, starting and ignition, controls and instrumentation. Purpose, operation principles and construction schemes of turboprop engines, turboshaft and auxiliary power units.			
21V	Aircraft Propellers	Z,ZK	6
Theory of propeller blade, propeller load, propeller construction, control of blade angle, de-icing system, maintenance and repair of propellers.			
21PY3	Aircraft Maintenance Technology 3	KZ	4
Particular technologies: diagnostics, surface treatments, airframe production, airframe jointing/bonding, sandwich construction, composite construction.			
14ISYS	Information Systems	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these toole use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.			

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 60
The role of the block: P

Code of the group: 1.S.BTUL 13/14
Name of the group: 1.sem.TUL bak.prez.13/14
Requirement credits in the group: In this group you have to gain 30 credits
Requirement courses in the group: In this group you have to complete 12 courses

Credits in the group: 30
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
17E	**Economics**	Z,ZK	3	2+1	Z	P
11GIE	**Geometry** *Oldřich Hykš, Pavel Provinský, Šárka Voráčová* ***Oldřich Hykš*** *Oldřich Hykš (Gar.)*	KZ	3	2P+2C+12B	Z	P
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	P
11LA	**Linear Algebra** *Pavel Provinský, Lucie Kárná, Martina Bečvářová* ***Martina Bečvářová*** *Martina Bečvářová (Gar.)*	Z,ZK	3	2P+1C+10B	Z	P
11MTA	**Mathematical Analysis**	Z,ZK	4	2+2	Z	P
18MRI1	**Materials 1**	Z,ZK	3	2+1	Z	P
TV-1	**Physical Education**	Z	1		Z	P
18TTED	**Creation of Technical Documentation**	KZ	2	2+1	Z	P
22UN	**Traffic Accidents Introduction**	Z	2	2+0	Z	P
12ZADI	**Introduction to Transportation Engineering**	Z,ZK	3	2+1	Z	P
14ZINF	**Fundamentals of Informatics**	KZ	2	0+2	Z	P
21ZLD	**Introduction to Air Transport**	KZ	2	2+1	Z	P

Characteristics of the courses of this group of Study Plan: Code=1.S.BTUL 13/14 Name=1.sem.TUL bak.prez.13/14

17E	Economics	Z,ZK	3
Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.			
11GIE	Geometry	KZ	3
Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet`s trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilites, AutoCAD environment profiles, drawings with raster foundaments).			
11LA	Linear Algebra	Z,ZK	3
Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.			
11MTA	Mathematical Analysis	Z,ZK	4
Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.			
18MRI1	Materials 1	Z,ZK	3
Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephectostopic testing. Corosion.			
TV-1	Physical Education	Z	1
18TTED	Creation of Technical Documentation	KZ	2
Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.			
22UN	Traffic Accidents Introduction	Z	2
Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.			
12ZADI	Introduction to Transportation Engineering	Z,ZK	3
Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.			
14ZINF	Fundamentals of Informatics	KZ	2
Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions.			
21ZLD	Introduction to Air Transport	KZ	2
Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.			

Code of the group: 3.S.BTUL 13/14
Name of the group: 3.sem.TUL bak.prez.13/14
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
15JZ1A	**Foreign Language - English 1** *Dana Boušová, Marie Michlová, Jan Feit, Eva Rezlerová, Jitka Heřmanová, Markéta Musilová, Markéta Vojanová, Peter Morpuss, Lenka Monková, ...*	Z	3	0P+4C+10B	Z	P
11DAD	**Differential and Difference Equations**	Z,ZK	3	2+1	Z	P
11FY2	**Physics 2**	Z,ZK	4	2+2	Z	P
12MDE	**Transport Models and Transport Excesses** *Milan Dont, Josef Kocourek*	Z,ZK	3	2P+1C+8B	Z	P
12PPOK	**Designing Roads, Highways and Motorways** *Josef Kocourek, Petr Šatra, Tomáš Padělek, Petr Kumpošt*	KZ	3	1P+2C+10B	Z	P
18PZP	**Elasticity and Strength** *Jan Vyčichl, Jitka Řezníčková, Daniel Kytýř, Jan Šleichrt, Tomáš Doktor, Tomáš Fíla, Nela Krčmářová, Jan Falta, Radim Dvořák, ...*	Z,ZK	3	2P+1C+10B	Z	P
11SIS	**Statistics**	Z,ZK	2	1+1	Z	P
20SSA	**Systems Analysis**	Z,ZK	3	2+1	Z	P
14UATT	**Introduction to Automatization and Telecommunication Systems**	KZ	2	3+0	Z	P
16UDDM	**Introduction to Transportation and Manipulation Technics**	ZK	2	2+0	Z	P
14ZAET	**Fundamentals of Electrotechnics**	KZ	2	2+1	Z	P

Characteristics of the courses of this group of Study Plan: Code=3.S.BTUL 13/14 Name=3.sem.TUL bak.prez.13/14

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.

11DAD	Differential and Difference Equations	Z,ZK	3

Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function.

11FY2	Physics 2	Z,ZK	4

Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.

12MDE	Transport Models and Transport Excesses	Z,ZK	3

Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.

12PPOK	Designing Roads, Highways and Motorways	KZ	3

Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.

18PZP	Elasticity and Strength	Z,ZK	3

Tension and compression. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.

11SIS	Statistics	Z,ZK	2

Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.

20SSA	Systems Analysis	Z,ZK	3

Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.

14UATT	Introduction to Automatization and Telecommunication Systems	KZ	2

Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transpotation, modelling and projecting of transport systems, integrated technological and infromation system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.

16UDDM	Introduction to Transportation and Manipulation Technics	ZK	2

Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.

14ZAET	Fundamentals of Electrotechnics	KZ	2

Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementar methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triplangel and principle of superposition in direct current circuits.

List of courses of this pass:

Code	Name of the course	Completion	Credits
11DAD	Differential and Difference Equations	Z,ZK	3
Difference equations and its systems. Some solvable types of differential equations of the first order. Linear differential equations of the n-th order. Methods for solution of the homogeneous equation, solution of inhomogeneous equation by means of variation of constants. Power series and their use for solution of differential equation. Boundary value problem. Eigennumbers and function for differential equation. Fourier series of function.			
11FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
11FY2	Physics 2	Z,ZK	4
Magnetic field, electromagnetic field. Optics, quantum character of electromagnetic radiation. Introduction into quantization, hydrogen atom. Multi-electron atoms, the nuclei. Basics of solid body physics.			
11GIE	Geometry	KZ	3
Differential geometry of curves - parameterization, the arc of the curve, torsion and curvature, Frenet`s trihedron. Kinematics - a curve as a trajectory of the motion, the velocity, and acceleration of a particle moving on a curved path.			
11LA	Linear Algebra	Z,ZK	3
Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification.			
11MTA	Mathematical Analysis	Z,ZK	4
Sequences and series of real numbers and its convergence. Basic properties of functions. Differential and integral calculus of the real function of one real variable. Power series, Fourier series and foundations of Fourier transform.			
11MVP	Mathematical Analysis of Function of More Variables	Z,ZK	3
Metric spaces, sequences in metric spaces, limit of sequence in metric space. Differential calculus of functions of several variables, differential of function, partial derivations, implicitly defined functions, extremes of functions of several variables. Integral calculus of functions of several variables, Riemann integral, integral over curves and surfaces in R3, application of integral calculus in physics.			
11PT	Probability	Z	2
Descriptive statistics. Basic probability concepts: elementary events and events, definitions and interpretation of probability. Random variable, probability distribution, probability mass and density, moments, some discrete and continuous distributions. Random vectors: joint and marginal distributions, mean vector, covariance matrix. Mixed distributions, mixture of distributions. Law of large numbers, central limit theorem.			
11SIS	Statistics	Z,ZK	2
Point estimation, properties of point estimators, methods of point estimation. Testing statistical hypothesis. Fit test, independence test. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, general linear model, statistical inference in linear regression, analysis of variance, multiple regression, use of matrices in regression.			
12MDE	Transport Models and Transport Excesses	Z,ZK	3
Parameters of the traffic flow and methods for their measurement. Models of the traffic flow, communications load, line and urban systems. Theory of queues, shock waves. Quality of transport and its assessment. Statistical characteristics of transport. Transport excesses, their analysis, the causes, identify and minimize the consequences. Improving of transport safety and fluency.			
12PKD	Rail Transport Designing	Z,ZK	3
Railway lines network. Vehicle and track relation. Traction. Track geometrical parameters. Clearance profile. Railway lines routing. Superstructure and substructure of the railway lines. Switches. Railway stations. City rail transport.			
12PPOK	Designing Roads, Highways and Motorways	KZ	3
Definition, types, ownership, maintenance, management and categorization of roads and highways. Curve and transition curve. Sinuosity and standard speed. Route in rural areas. Range of vision for stopping and overtaking. Road body - shapes and proportions, bottom and superstructure. Drainage and components of roads. Safety device. Crossings, junctions, intersections.			
12ZADI	Introduction to Transportation Engineering	Z,ZK	3
Traffic survey. Terrestrial roads. Residential zone. Land - use planning. Railway transport. Public mass transport. Integrated traffic systems. Traffic prognosis. Traffic safety. Air transport. Traffic and environment.			
14DB	Database Systems	KZ	2
Basic concepts of database systems, conceptual model, relational data model, the principles of normal forms, relational database design, security and integrity of data, database queries, relational algebra, SQL language, client / server, multilayer architectures, distributed database systems. Access to data via the WWW.			
14ELT	Electrotechnics	Z,ZK	4
Theory of electron. Static electricity, conductance, and electrotechnical terminology. Power and direct current generation. Direct current circuits. Electric resistance, resistor, and power. Capacity and capacitor. Magnetism. Inductance and induction coil. Direct current engines and generators. Theory of alternate current. Resistant, capacity, and inductive circuits. Transformers. Alternate current engines and generators. Frequency filters.			
14ISYS	Information Systems	KZ	2
State-of-the-art tools of objects control (control and planning) including problems related to these toole use, theory of information and knowledge, knowledge and expert systems, IS planning methodologies, transaction systems, theory of computer networks, semantic webs and sensitivity analysis.			
14KSP	Constructing with Computer Aid	KZ	2
"CAD systems" term determination. CAD role in projecting system model. Existing CAD systems on Czech market. Project creation, basic common work rules in graphic applications and CA systems. Co-ordinated systems, CAD environment skill (basics of constructing, dimensioning, modifications, user interfaces, projecting possibilites, AutoCAD environment profiles, drawings with raster foundaments).			
14SIAP	Networks and Protocols	KZ	2
Basic communication model, history and development of the Internet, principle of data transfer through computer networks (TCP/IP), performance of basic network protocols (ARP, RARP, TCP, UDP, Telnet, FTP, DNS, DHCP POP3, IMAP), data acquirement from the Internet sources, communicating ability via the Internet and fundamentals of own web presentation design by the means of web sites.			

14UATT	Introduction to Automatization and Telecommunication Systems	KZ	2
Basic axioms of technical cybernetics, automatization in transportation, human as the weakest element, signalling in transpotation, modelling and projecting of transport systems, integrated technological and infromation system in post, principle of telecommunication signal transmission, solving of telecommunication networks, modulating methods, multimedial networks and services, NGN networks.			
14UPRO	Introduction to Programming	KZ	2
Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.			
14ZAET	Fundamentals of Electrotechnics	KZ	2
Basic electrotechnic terms, circuit quantities. Periodic courses characteristics. Electric circuits elements and basic circuit members. Assignating of bipoles and basic circuit elements. Solution to direct current circuits with a help of circuit analysis elementar methods: method of consecutive reduction, unloaded voltage divider, current divider. Transfiguration star-triplangel and principle of superposition in direct current circuits.			
14ZINF	Fundamentals of Informatics	KZ	2
Introduction to faculty network, MS-Word and Open Office, use of styles and advanced features, computer functions and information transmission. Number systems incl. arithmetic calculations. Algorithms and their proprieties. Flow charts for algorithms drawing. Mathematic and logic ordering algorithms incl. functions and procedures. Work with MS-Excel - tables, graphs, calculations, functions.			
15JZ1A	Foreign Language - English 1	Z	3
Grammatical Structures and Style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.			
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.			
16UDDM	Introduction to Transportation and Manipulation Technics	ZK	2
Means of transportation and transportation systems. Principles, functions and arrangement of means of transportation. Motors and their characteristics. Water transportation. Manipulating technics. Principles of lifting machines and conveyors. Legislature.			
17E	Economics	Z,ZK	3
Microeconomic and macroeconomic interpretation of economic relations. Method and subject of the economics. Economic decision making of consumers and producers. Market structures. Labour and capital, efficiency, ownership, public choice.			
17EDOT	Economy, Transport, Telecommunications	KZ	2
Transport, telecommunications, demand, supply, indicators, economic development, legislation, European union, regulation, liberalisation, transport modes, ITS, sustainability.			
17TDL	Transport Technology and Logistics	Z,ZK	3
Basic terms in transport technology and logistics. Particular steps of transport planning. Quantification of carriage relations. Line planning. Timetabling. Planning in pasanger and freight transport. Organisation of traffic in each transport means. Technological factors from the point of view of operator and client. Organisation of public city transport. Logistic technologies and their application using various transport means.			
18CSU	Parts of Machines	KZ	3
Transmissions, overview and classification, mechanical transmission, parts of transmission, gear relation, design and dimensioning of shafts and bearings, gears, materials of gears, gear boxes.			
18KIAD	Kinematics and Dynamics	Z,ZK	2
Motion along a line, motion along a curve. Kinematics of rigid plane, kinematics of rigid body. Point mass kinematics, system of point masses. Point mass dynamics and system of point masses, equation of motion. Method of Newton. Princle of D´Alembert. Free and forced vibration with one degree of freedom. Viscous damping. Impact theory. Introduction to the solution of vibration with multiple degrees of freedom.			
18MC	Materials Exercices	Z	2
Different kinds of processing applied to metals and their alloys. Casting, forming, welding, machining and powder metallurgy.			
18MRI1	Materials 1	Z,ZK	3
Crystal structure. Basics of thermodynamics of metals and their alloys. Balanced binary diagrams. Alloys of iron with carbon. Deterioration of solid solutions. Heating processing of steel and cast irons. Physical features. Mechanical features. Dephectostopic testing. Corosion.			
18MRI2	Materials 2	KZ	2
Fundamental concepts, notions. The main materials groups. Semiconductors. Polymers. Special types of steel. Properties and application of the composite materials.			
18PZP	Elasticity and Strength	Z,ZK	3
Tension and compression. Bending of beam. Shear stress in bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joints of structures. Analysis of deflection curve of beams. Torsion of circular cross sections. Combined loading. Stability.			
18SAS	Joints and Parts of Technical Joints	KZ	3
Connection of machine parts, their construction and technology production, design of joints, kinds of fit, bearings, bearing location.			
18ST	Statics	Z,ZK	3
General system of forces. Calculation of reactions of mass objects and compound systems. Assessment of internal forces on statically determinate beam and simple framework. Principle of virtual works. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss construction, method of joints and method of sections. Geometry of cross sections. Plane fiber polygons and catenary cables.			
18TTED	Creation of Technical Documentation	KZ	2
Technical standards, international standardization, types of technical drawings, representation of technical objects, technical diagrams and charts, dimensional and geometrical accuracy, arrangement of drawing sheets, types of schemes and their creation.			
20SSA	Systems Analysis	Z,ZK	3
Systems identification. Typical tasks of systems analysis: on the interface, routes in system, decomposition and integration, on systems feedback. Capacity tasks, process analysis. Task about behaviour, aim behaviour, the genetic code, architecture and identity of systems. Fundamentals of technical cybernetics, stability and reliability of systems.			
20UIS	Introduction to ITS	Z,ZK	3
Intelligent Transport Systems (ITS), their objectives and vision. ITS in the world, in Europe and in the Czech Republic. Architecture of ITS and the role of standardization. Information and navigation systems. ITS in road, rail and combine transport. Design of ITS, organization, preparation and implementation of the project. Current projects in the Czech Republic.			
20ZENT	Basic Electronics	Z,ZK	3
The subject is focused on switching elements, operational amplifier, generation harmonic and nonharmonic signals, sources, conduction of high frequencies signals. Analog-Digital and Digital-Analog convertor. Extensive part is also dedicated to digital logical circuits and microprocessors.			
21DKV	Aviation Datalink Communication	KZ	2
The subject acquaints students with aviation communication domain. Stress is put on the datalink systems. Students are acquainted both with technical aspect and with operation problem so that they are able to understand data flows necessary for provision safe, fluent and economic air traffic.			

21KAS1	Aircraft Construction and Systems 1	Z,ZK	3
Aircraft construction requirements and functions: fuselage, wings, flight controls, undercarriage, aircraft pylon, nacelle. Aircraft systems requirements and functions: drainage, water distribution systems and aircraft ligthing.			
21KAS2	Aircraft Construction and Systems 2	Z,ZK	6
Aircraft systems requirements and functions: air condition, pressurization, oxygen systems, tyres, hydraulics, fuel systems, electrical systems, deicing system, fire protection system.			
21LAB1	Aviation English for Bachelor Studies 1	Z	3
Aircrafts, flight basics, airports, meteorology, navigation, airspace management, emergency procedures, avition accidents, flight planning, human factor, civil avition organization, history of aviation, enviromental aspects of aviation.			
21LAB2	Aviation English for Bachelor Studies 2	Z,ZK	3
Aircrafts, flight basics, airports, meteorology, navigation, airspace management, emergency procedures, avition accidents, flight planning, human factor, civil avition organization, history of aviation, enviromental aspects of aviation, IFR / VFR communication, abbreviations in aviation, Q-codes.			
21LCU	Aviation Maintenance Human Factors	Z,ZK	3
Assessment of aviation accident statistics. Analysis of failure chains. Human factors analytical and clasificatory systems. Risk management.			
21LICL	Human Factors in Aviation	KZ	2
Human performace & limitations, capability & competence, accident statistics, flight safety, fundamentals of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, fundamentals of flight psychology, human information processing, memory & learning, theory & model of human error, body rhythms & sleep, stress, fatigue, working methods.			
21LL1	Aircraft 1	KZ	3
Aircraft structural and conceptual design types - definitions and basic knowledge of the problem. Development of requirements, aircraft definitions and categorisation. Aircraft loadings. Systems of primary and secondary airframe structure. Airframe and propulsion unit. Lectures are devoted to aeroplane topics.			
21LLG1	Aviation Legislation 1	Z,ZK	4
Introduction to aviation legislation. Sphere of action of the CAA, ICAO, EASA. Part M and ML (continuing airworthiness), maintenance programmes, ADs, airworthiness reviews. Part 21 (initial airworthiness), design and production of aircraft.			
21LLG2	Aviation Legislation 2	ZK	2
Commission regulation (EU) 1321/2014, Part 66, Part 145, Part 147, Part CAMO, Part CAO, Commission regulation (EU) 965/2012			
21LR	Radio Technology in Aviation	ZK	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.			
21LRY	Aircraft Engines	Z,ZK	2
Aircraft piston engine, theoretical background, operational characteristics and construction schemes. Propellers, operational characterictics. Turbine engine, theoretical background, thermal cycles, construction schemes, operational characteristics. Turbojet and turbofan engines, basic construction modules, and their operational characteristics. Engine control.			
21LTA2	Aircraft 2	Z,ZK	2
Manufacturers responsibility, responsibilities of operator and professional supervising. Legislation in area of airworthiness. International and national standards. Static solidity of aircraft structures. Aeroelasticity. Inherent and operational reliability of aircraft structure. Fatigue strength. Aircraft structure lifetime presumption.			
21PY1	Aircraft Maintenance Technology 1	KZ	3
Fundamentals of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment.			
21PY2	Aircraft Maintenance Technology 2	KZ	2
Classification, maintenance, checks and repair of construction parts: joints, bearing, hoses, pipes, gearing, brakes, dampers, shaft, springs.			
21PY3	Aircraft Maintenance Technology 3	KZ	4
Particular technologies: diagnostics, surface treatments, airframe production, airframe jointing/bonding, sandwich construction, composite construction.			
21TMY1	Turbine Engines 1	KZ	3
First part of the course Turbine Engines is focused on the explanation and description of the purpose, operation and construction characteristics of aircraft turbojet and turbofan engines. Thermal engine, thermal cycle and its basic parameters, power output and thermal efficiency, basic construction modules, operational and construction characteristics.			
21TMY2	Turbine Engines 2	Z,ZK	4
Second part of the course Turbine Engines is focused on explanation and description of the purpose, operation and construction characteristics of following aircraft turbine engines utility systems: Lubrication system, cooling and internal air systems, fuel systems, starting and ignition, controls and instrumentation. Purpose, operation principles and construction schemes of turboprop engines, turboshaft and auxiliary power units.			
21V	Aircraft Propellers	Z,ZK	6
Theory of propeller blade, propeller load, propeller construction, control of blade angle, de-icing system, maintenance and repair of propellers.			
21ZLD	Introduction to Air Transport	KZ	2
Air transport as a component of complex transport system. International status of civil aviation. International organizations in Europe and worldwide. Characteristics of air transport. Commercial air transport. Technical operations of aeroplanes.			
21ZLE1	Principles of Flight 1	KZ	3
Aerodynamic drag, relation between drag and speed, streamline, boundary layer, continuity equation, Bernoulli's equation, lift and drag, air flow and pressures around wing, angle of attack, reactions of wing in air flow, lift and drag of a wing and an aircraft, coefficient of lift and drag, critical angle of attack, wing with final span, induced drag, interference, devices for lift and drag increase.			
21ZLE2	Principles of Flight 2	Z,ZK	4
Ways of producing thrust, propeller, jet propulsion, thrust and momentum, propulsion efficiency, aerodynamics of fixed and variable pitch propeller, propeller operation modes, propeller airstream effect, gyroscopic effect, balance of forces in horizontal flight, glide and landing, performances, take off and climb, acceleration, positive load, manoeuvres, stability and controllability, transsonic speeds.			
22UN	Traffic Accidents Introduction	Z	2
Traffic accident as a physical process, systematic submission, vehicle x human x infrastructure interaction, accidents statistics, aircraft accidents, accidents on railways, accidents on waterways, road traffic accidents, other aspects, accidental prevention.			
TV-1	Physical Education	Z	1
TV-2	Physical Education	Z	1

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Generated: day 2024-03-28, time 19:25.