

Study plan

Name of study plan: TUL bak.prez.21/22

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: 90

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 30

The role of the block: Z

Code of the group: 2.S.BTUL 18/19

Name of the group: 2.sem.TUL bak.prez. (od) 18/19

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	Z,ZK	5	2P+3C+20B	L	Z
11STAT	Statistics	Z,ZK	4	2P+2C+12B	L	Z
18SAT	Structural Analysis	Z,ZK	4	2P+2C+14B	L	Z
21ZEL2	Electronics Basics 2	Z,ZK	4	2P+2C	L	Z
21ZYL1	Principles of Flight 1	Z,ZK	5	2P+2C+16B	L	Z
14PRG	Programming	KZ	2	0P+2C+8B	L	Z
21LL1	Aircraft 1	KZ	3	2P+1C+10B	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.BTUL 18/19 Name=2.sem.TUL bak.prez. (od) 18/19

11CAL2	Calculus 2 Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R^n . Parametric description of regular k -dimensional surfaces in R^n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.	Z,ZK	5
11STAT	Statistics Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.	Z,ZK	4
18SAT	Structural Analysis General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.	Z,ZK	4
21ZEL2	Electronics Basics 2 Deeper knowledge of the theory of the electron. Static electricity, electrical conductivity and terminology. Production of electricity and the DC power source. DC Circuits. Electrical resistance, resistor and performance. Capacity and capacitor. Magnetism. Inductance and inductor. DC motors and generators. Theory AC, resistive, capacitive, inductive circuits. Transformers. Brushless motors and generators. Frequency filters.	Z,ZK	4
21ZYL1	Principles of Flight 1 Aerodynamic drag, relation between drag and speed, streamline, boundary layer, formula of continuity, formula of Bernoulli, 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.	Z,ZK	5

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.			
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.			
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

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 20/21

Name of the group: 1.sem.TUL bak.prez.(od) 20/21

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11CAL1	Calculus 1 <i>Ondřej Navrátil, Magdalena Hykšová, Olga Vraštilová, Oldřich Hykš, Tomáš Tásák, Magdalena Hykšová, Ondřej Navrátil (Gar.)</i>	Z,ZK	7	2P+4C+2B	Z	P
11LA	Linear Algebra <i>Martina Beváová, Pavel Provinský, Martina Beváová, Martina Beváová (Gar.)</i>	Z,ZK	3	2P+1C+10B	Z	P
12ZYDI	Introduction to Transportation Engineering <i>Zuzana Arská, Dagmar Koárková, Vojtěch Novotný</i>	Z,ZK	2	1P+1C	Z	P
21ZEL1	Electronics Basics 1 <i>Vít Fábera, Vít Fábera</i>	Z,ZK	5	3P+2C	Z	P
11GIE	Geometry <i>Oldřich Hykš, Pavel Provinský, Šárka Voráová, Vít Malinovský, Oldřich Hykš, Šárka Voráová (Gar.)</i>	KZ	3	2P+2C+12B	Z	P
14KSP	Constructing with Computer Aid <i>Lukáš Svoboda, Drahomír Schmidt, Martin Brumovský, Radek Kratochvíl, Vladimír Douda, Michal Mláda, Jan Vogl, Jan Zelenka</i>	KZ	2	0P+2C+8B	Z	P
21ZLKO	Basics of Aircraft Structures and Systems	KZ	5	2P+2C	Z	P
16UDOP	Introduction into Vehicles <i>Petr Bouchner, Zuzana Radová</i>	Z	2	2P+0C+8B	Z	P
TV-1	Physical Education	Z	1		Z	P

Characteristics of the courses of this group of Study Plan: Code=1.S.BTUL 20/21 Name=1.sem.TUL bak.prez.(od) 20/21

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.			
21ZEL1	Electronics Basics 1	Z,ZK	5
Electron theory. Static electricity, electrical conductivity and terminology. Production of electricity and the DC power source. DC Circuits. Electrical resistance, resistor and performance. Capacity and capacitor. Magnetism. Inductance and inductor. DC motors and generators. Theory AC, resistive, capacitive, inductive circuits. Transformers. Brushless motors and generators. Frequency filters.			
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 possibilities, AutoCAD environment profiles, drawings with raster foundations).			
21ZLKO	Basics of Aircraft Structures and Systems	KZ	5
Basics of screening, technical drawing, technological and operational signs. Hydraulic, pneumatic, fuel, electricity and block diagrams in aviation.			

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
TV-1	Physical Education	Z	1

Code of the group: 3.S.BTUL 19/20

Name of the group: 3.sem.TUL 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 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, Tomáš Vít, Zuzana Malá, Marek Honc, Jana Kuklová Zuzana Malá Zuzana Malá (Gar.)	Z,ZK	5	2P+2C+1B	Z	P
18PZP	Elasticity and Strength Ondřej Jiroušek, Josef Jíra, Petr Koudelka, Daniel Kytý, Jan Vyšňák, Tomáš Doktor, Jan Šlejšcht, Radim Dvořák	Z,ZK	3	2P+1C+10B	Z	P
21LCM	Aircraft Engines Daniel Hanus, Tomáš Parýzek, Denisa Svobodová Daniel Hanus	Z,ZK	3	2P+1C	Z	P
21LTA2	Aircraft 2 Karel Mündel, Daniel Urban, Karel Hylmar, Max Chopart, Kateřina Stuchlíková Max Chopart	Z,ZK	2	2P+1C	Z	P
21ZYL2	Principles of Flight 2 Přemysl Vávra, Liana Karapetjan Přemysl Vávra	Z,ZK	5	2P+2C	Z	P
21TML1	Technology and Materials for Aviation 1 Jaroslav Valach, Tomáš Fila	KZ	3	2P+1C	Z	P
21ZLEN	Basic Electronics Vít Fábera, Tomáš Musil Vít Fábera	KZ	6	2P+2C	Z	P
15JZ1A	Foreign Language - English 1 Markéta Vojanová, Jiřka Heřmanová, Marek Tomek, Marie Michlová, Lenka Monková, Markéta Olehlová, Peter Morpuss, Jan Feit, Eva Rezlerová	Z	3	0P+4C+10B		P

Characteristics of the courses of this group of Study Plan: Code=3.S.BTUL 19/20 Name=3.sem.TUL bak.prez (od)19/20

11FYZ	Physics Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.	Z,ZK	5
18PZP	Elasticity and Strength Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.	Z,ZK	3
21LCM	Aircraft Engines Aircraft piston engine, theoretical background, operational characteristics and construction schemes. Propellers, operational characteristics. Turbine engine, theoretical background, thermal cycles, construction schemes, operational characteristics. Turbojet and turbofan engines, basic construction modules, and their operational characteristics. Engine control.	Z,ZK	3
21LTA2	Aircraft 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.	Z,ZK	2
21ZYL2	Principles of Flight 2 Static & dynamic longitudinal stability, neutral point, location of centre of gravity, static directional & lateral stability, dynamic directional & lateral stability, control – pitch (longitudinal), yaw (directional) & roll (lateral), roll/yaw interaction, trimming, speed of sound, Mach number, compressibility, shock waves, critical Mach number, aerodynamic heating, operating limitations, manoeuvring envelope, gust-load diagram.	Z,ZK	5
21TML1	Technology and Materials for Aviation 1 Materials and society, energy and ecology. Basics of thermodynamics of metals and their alloys. Common materials for airplane design.	KZ	3
21ZLEN	Basic Electronics 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.	KZ	6
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

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 Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R_n . Parametric description of regular k-dimensional surfaces in R_n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.	Z,ZK	5
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 Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression.	Z,ZK	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
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 Algorithm development, methods of structured programming, high-level programming languages, basics of C programming languages (types, variables, conditions, cycles, arrays, functions), programming techniques, complexity.	KZ	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
18PZP	Elasticity and Strength Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis.	Z,ZK	3
18SAT	Structural Analysis General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains.	Z,ZK	4
21LCM	Aircraft Engines Aircraft piston engine, theoretical background, operational characteristics and construction schemes. Propellers, operational characteristics. Turbine engine, theoretical background, thermal cycles, construction schemes, operational characteristics. Turbojet and turbofan engines, basic construction modules, and their operational characteristics. Engine control.	Z,ZK	3
21LL1	Aircraft 1 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.	KZ	3
21LTA2	Aircraft 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.	Z,ZK	2
21TML1	Technology and Materials for Aviation 1 Materials and society, energy and ecology. Basics of thermodynamics of metals and their alloys. Common materials for airplane design.	KZ	3
21ZALD	Basics of Air Transport 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.	KZ	2
21ZEL1	Electronics Basics 1 Electron theory. Static electricity, electrical conductivity and terminology. Production of electricity and the DC power source. DC Circuits. Electrical resistance, resistor and performance. Capacity and capacitor. Magnetism. Inductance and inductor. DC motors and generators. Theory AC, resistive, capacitive, inductive circuits. Transformers. Brushless motors and generators. Frequency filters.	Z,ZK	5

21ZEL2	Electronics Basics 2	Z,ZK	4
Deeper knowledge of the theory of the electron. Static electricity, electrical conductivity and terminology. Production of electricity and the DC power source. DC Circuits. Electrical resistance, resistor and performance. Capacity and capacitor. Magnetism. Inductance and inductor. DC motors and generators. Theory AC, resistive, capacitive, inductive circuits. Transformers. Brushless motors and generators. Frequency filters.			
21ZLEN	Basic Electronics	KZ	6
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.			
21ZLKO	Basics of Aircraft Structures and Systems	KZ	5
Basics of screening, technical drawing, technological and operational signs. Hydraulic, pneumatic, fuel, electricity and block diagrams in aviation.			
21ZYL1	Principles of Flight 1	Z,ZK	5
Aerodynamic drag, relation between drag and speed, streamline, boundary layer, formula of continuity, formula of Bernoulli, 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.			
21ZYL2	Principles of Flight 2	Z,ZK	5
Static & dynamic longitudinal stability, neutral point, location of centre of gravity, static directional & lateral stability, dynamic directional & lateral stability, control – pitch (longitudinal), yaw (directional) & roll (lateral), roll/yaw interaction, trimming, speed of sound, Mach number, compressibility, shock waves, critical Mach number, aerodynamic heating, operating limitations, manoeuvring envelope, gust-load diagram.			
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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