

Study plan

Name of study plan: TUL bak.prez.17/18 (v 2017-18 si ZAPSALI 11PEM)

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Technology of Aviation Maintenance

Garantor of the study branch: Ing. Martin Novák, Ph.D.

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 17/18

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

Requirement credits in the group: In this group you have to gain 30 credits

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

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|---|------------|---------|-----------|----------|------|
| 11CAL2 | Calculus 2 Magdalena Hykšová Magdalena Hykšová Magdalena Hykšová (Gar.) | Z,ZK | 5 | 2P+3C+20B | L | Z |
| 11PEM | Instrumentation and Electromagnetic Field Zuzana Malá | Z,ZK | 5 | 2P+2C | 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 |
| 14PRG | Programming | KZ | 2 | 0P+2C+8B | L | Z |
| 21LL1 | Aircraft 1 Ladislav Keller | 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 17/18 Name=2.sem.TUL bak.prez. 17/18

| | | | | |
|--------|---|------|---|---|
| 11CAL2 | Calculus 2 | Z,ZK | 5 | Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R^n . Parametric description of regular k -dimensional surfaces in R^n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems. |
| 11PEM | Instrumentation and Electromagnetic Field | Z,ZK | 5 | Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics. |
| 11STAT | Statistics | Z,ZK | 4 | Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression. |
| 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. |
| 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. |

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|---|-------------------------|----|---|
| 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 |

Code of the group: 4.S.BTUL 18/19 PEM

Name of the group: 4.sem.TUL bak.prez.18/19 (v 2017-18 si ZAPSALI 11PEM)

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 7 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 |
|--------|---|------------|---------|-----------|----------|------|
| 11MSP | Modeling of Systems and Processes Bohumil Ková | Z,ZK | 4 | 2P+2C+12B | L | z |
| 21ZYL1 | Principles of Flight 1 | Z,ZK | 5 | 2P+2C+16B | L | z |
| 21LOUL | Aviation Maintenance Human Factors | Z,ZK | 6 | 3P+2C | L | z |
| 21TML2 | Technology and Materials for Aviation 2 | Z,ZK | 5 | 2P+2C | L | z |
| 21DKL | Aviation Data Link Communication | KZ | 3 | 2P+1C | L | z |
| 21PYU1 | Aircraft Maintenance Technology 1 | KZ | 4 | 2P+2C | L | z |
| 15JZ2A | Foreign Language - English 2 | Z,ZK | 3 | 0P+4C+10B | L | z |

Characteristics of the courses of this group of Study Plan: Code=4.S.BTUL 18/19 PEM Name=4.sem.TUL bak.prez.18/19 (v 2017-18 si ZAPSALI 11PEM)

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|---|---|------|---|
| 11MSP | Modeling of Systems and Processes | Z,ZK | 4 |
| Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB). | | | |
| 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. | | | |
| 21LOUL | Aviation Maintenance Human Factors | Z,ZK | 6 |
| Assessment of aviation accident statistics. Analysis of failure chains. Human factors analytical and classificatory systems. Risk management. | | | |
| 21TML2 | Technology and Materials for Aviation 2 | Z,ZK | 5 |
| Most important materials used in aviation industry. Their physical and technological properties. Composites with metal, polymer and ceramics. Defectoscopic testing of materials. | | | |
| 21DKL | Aviation Data Link Communication | KZ | 3 |
| Categorization of communication systems in aviation, RCP, network standards and protocols, ACARS and ATN standard. Data link applications and services, ATS data link applications (CPDLC, ADS-C, FIS, ...), AOC applications, data link within surveillance domain. Inter-ATC centers communication (OLDI messages). Network Manager Operations Centre (NMOC), satellite communication. Internet on board. Wireless communication in aviation. | | | |
| 21PYU1 | Aircraft Maintenance Technology 1 | KZ | 4 |
| Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment. | | | |
| 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. | | | |

Code of the group: 5.S.BTUL 19/20

Name of the group: 5.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 6 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 |
|--------|--|------------|---------|-------|----------|------|
| 21LLG1 | Aviation Legislation 1 <i>Jakub Kraus, Jiří Luk</i> | Z,ZK | 4 | 2P+1C | Z | z |
| 21KSY1 | Aircraft Construction and Systems 1 <i>Jakub Kraus, Jiří Luk</i> | Z,ZK | 7 | 4P+3C | Z | z |
| 21ZLS | ATM Systems <i>Jakub Kraus, Jakub Hospodka, Tereza Topková, Roman Matyáš, Terézia Pilmannová, Vladimír Machula, Stanislav Pleninger</i> | Z,ZK | 5 | 2P+2C | Z | z |
| 21PYU2 | Aircraft Maintenance Technology 2 <i>Jakub Kraus, Martin Novák</i> | KZ | 4 | 2P+2C | Z | z |
| 21TUM1 | Turbine Engines 1 <i>Jakub Kraus, Martin Kála, Daniel Hanus</i> | KZ | 7 | 3P+3C | Z | z |
| 21ATL1 | English 1 for Aviation for Specialization Technology of Aviation Maintenance <i>Jakub Kraus, Slobodan Stoji</i> | Z | 3 | 0P+4C | Z | z |

Characteristics of the courses of this group of Study Plan: Code=5.S.BTUL 19/20 Name=5.sem.TUL bak.prez.(od) 19/20

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|--------|--|------|---|--|--|--|
| 21LLG1 | Aviation Legislation 1 | Z,ZK | 4 | Legislative framework (the role of the ICAO, EASA, member states, relations among Part 145, Part 66, Part 147 and Part M as well as relationships between other aviation authorities) with knowledge on level 1 for categories B1 and B2. Part 66 Maintenance Certifying Staff and Part 145 Maintenance Organisations with knowledge on level 2 for categories B1 and B2. Aircraft certification, type-certification, supplemental type-certification. | | |
| 21KSY1 | Aircraft Construction and Systems 1 | Z,ZK | 7 | Aircraft construction requirements and functions - fuselage, wings, flight controls, undercarriage, aircraft pylon, nacelle. Aircraft systems requirements and functions - drainage, water distribution systems and aircraft lighting. | | |
| 21ZLS | ATM Systems | Z,ZK | 5 | The course introduces classical and modern facilities, systems and technologies designated for ATS. Student obtains knowledge of technical principles and solutions as far as communication, navigation and surveillance aviation systems are concerned. | | |
| 21PYU2 | Aircraft Maintenance Technology 2 | KZ | 4 | Classification, maintenance, checks and repair of construction parts - joints, bearing, hoses, pipes, gearing, brakes, dampers, shaft, springs. | | |
| 21TUM1 | Turbine Engines 1 | KZ | 7 | First part of the course 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. | | |
| 21ATL1 | English 1 for Aviation for Specialization Technology of Aviation Maintenance | Z | 3 | Materials used in aviation industry structures after casting, forging and welding. Defects to come of processes. | | |

Code of the group: 6.S.BTUL 19/20

Name of the group: 6.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 6 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 |
|--------|--|------------|---------|-------|----------|------|
| 21ATL2 | English 2 for Aviation for Specialization Technology of Aviation Maintenance | Z,ZK | 3 | 0P+4C | L | z |
| 21LLG2 | Aviation Legislation 2 | ZK | 2 | 2P+0C | L | z |
| 21KSY2 | Aircraft Construction and Systems 2 | Z,ZK | 7 | 4P+3C | L | z |
| 21TUM2 | Turbine Engines 2 | Z,ZK | 7 | 3P+3C | L | z |
| 21V | Aircraft Propellers | Z,ZK | 6 | 3P+2C | L | z |
| 21PYU3 | Aircraft Maintenance Technology 3 | KZ | 5 | 2P+2C | L | z |

Characteristics of the courses of this group of Study Plan: Code=6.S.BTUL 19/20 Name=6.sem.TUL bak.prez.(od) 19/20

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|--------|--|------|---|--|--|--|
| 21ATL2 | English 2 for Aviation for Specialization Technology of Aviation Maintenance | Z,ZK | 3 | Testing of materials, reports from tests. Repair of parts with defects. | | |
| 21LLG2 | Aviation Legislation 2 | ZK | 2 | EU OPS commercial transportation by aeroplane with knowledge on level 1 for categories B1 and B2. Commission Regulation (EC) No 2042/2003 Part M with knowledge on level 2 for categories B1 and B2. Maintenance program, maintenance checks and inspections, ETOPS, MEL, AD, SB. Documentation in maintenance - maintenance manuals. Structure Repair Manual. Illustrated Parts Catalog. | | |
| 21KSY2 | Aircraft Construction and Systems 2 | Z,ZK | 7 | Aircraft systems requirements and functions - air condition, pressurization, oxygen systems, tyres, hydraulics, fuel systems, electrical systems, deicing system, fire protection system. | | |
| 21TUM2 | Turbine Engines 2 | Z,ZK | 7 | Second part of the course is focused on the 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. | | |

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|--------|--|------|---|
| 21V | Aircraft Propellers Theory of propeller blade, propeller load, propeller construction, control of blade angle, de-icing system, maintenance and repair of propellers. | Z,ZK | 6 |
| 21PYU3 | Aircraft Maintenance Technology 3 Particular technologies - diagnostics, surface treatments, airframe production, airframe jointing / bonding, sandwich construction, composite construction. | KZ | 5 |

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 17/18

Name of the group: 1.sem.TUL bak.prez.(od) 17/18

Requirement credits in the group: In this group you have to gain 30 credits

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

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-----------|----------|------|
| 11CAL1 | Calculus 1 Magdalena Hykšová, Ondřej Navrátil, Bohumil Kovář, Tomáš Tasák, Olga Vraštilová Ondřej Navrátil (Gar.) | Z,ZK | 7 | 2P+4C+2B | Z | P |
| 11LA | Linear Algebra Lucie Kárná, Jan Píkr, Martina Bevářová, Pavel Provinský Martina Bevářová (Gar.) | Z,ZK | 3 | 2P+1C+10B | Z | P |
| 12ZYDI | Introduction to Transportation Engineering Dagmar Kořánková, Zuzana Aršáková, Jan Kruntorád, Nikol Dousková, Vojtěch Novotný | Z,ZK | 2 | 1P+1C | Z | P |
| 21ZEL1 | Electronics Basics 1 Jakub Kraus, Tomáš Musil, Jindřich Sadil, Jan Zelenka, Vít Fábeka | Z,ZK | 5 | 3P+2C | Z | P |
| 11GIE | Geometry Pavel Provinský, Oldřich Hykš, Šárka Vorářová Šárka Vorářová (Gar.) | KZ | 3 | 2P+2C+12B | Z | P |
| 14KSP | Constructing with Computer Aid Vladimír Douda, Martin Brumovský, Lukáš Kozel, Radek Kratochvíl, Filip Müller, Lukáš Svoboda, Drahomír Schmidt Lukáš Svoboda (Gar.) | KZ | 2 | 0P+2C+8B | Z | P |
| 21ZLKO | Basics of Aircraft Structures and Systems Jakub Kraus, František Helebrant, Jan Blata, Kateřina Stuchlíková, Pavol Hajla | KZ | 5 | 2P+2C | Z | P |
| 16UDOP | Introduction into Vehicles Zuzana Radová, Josef Mík, Petr Bouchner Petr Bouchner (Gar.) | 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 17/18 Name=1.sem.TUL bak.prez.(od) 17/18

| | | | |
|--------|--|------|---|
| 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 |
| 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 |
| 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 |
| 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 |
| 11GIE | Geometry Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path. | KZ | 3 |
| 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 |
| 21ZLKO | Basics of Aircraft Structures and Systems Basics of screening, technical drawing, technological and operational signs. Hydraulic, pneumatic, fuel, electricity and block diagrams in aviation. | KZ | 5 |
| 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 18/19

Name of the group: 3.sem.TUL bak.prez 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 8 courses

Credits in the group: 30

Note on the group:

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|--------|--|------------|---------|-----------|----------|------|
| 11FYZ | Physics Tomáš Vít , Zuzana Malá, Marek Honc Zuzana Malá Zuzana Malá (Gar.) | Z,ZK | 5 | 2P+2C+18B | Z | P |
| 18PZP | Elasticity and Strength Petr Zlámal, Jan Vy ichl, Tomáš Doktor, Josef Jíra, Petr Koudelka, Jan Šleichrt, Tomáš Doktor, Daniel Kytý , Jan Šleichrt, | Z,ZK | 3 | 2P+1C+10B | Z | P |
| 21LCM | Aircraft Engines Jakub Kraus, Roman Matyáš, Daniel Hanus, Kateřina Stuchlíková, Denisa Kupková, Michal Freigang, František Straka, Pavel Valenta, Tomáš Paryzek, | Z,ZK | 3 | 2P+1C | Z | P |
| 21LTA2 | Aircraft 2 Jakub Kraus, Jakub Hospodka, Roman Matyáš, Tomasz Balcerzak, Anna Kariaková, Vladimír Plos, Oldřich Štumbauer, Ladislav Keller | Z,ZK | 2 | 2P+1C | Z | P |
| 21ZYL2 | Principles of Flight 2 Jakub Kraus, Jakub Hospodka, Roman Matyáš, Vladimír Machula, Vojtěch Svoboda, Václav Brož, Pětr Emysl Vávra, Lenka Hanáková, Liana Karapetjan, | Z,ZK | 5 | 2P+2C | Z | P |
| 21TML1 | Technology and Materials for Aviation 1 Jakub Kraus, Marcel Adorna, Michaela Neuhäuserová, Jaroslav Valach | KZ | 3 | 2P+1C | Z | P |
| 21ZLEN | Basic Electronics Jakub Kraus, Tomáš Musil, Vít Fábbera | KZ | 6 | 2P+2C | Z | P |
| 15JZ1A | Foreign Language - English 1 Eva Rezlerová, Dana Boušová, Jitka Hejmanová, Barbora Horáková, Marie Michlová, Lenka Monková, Markéta Olehlová, Markéta Vojanová, Peter Morpuss, | Z | 3 | 0P+4C+10B | Z | P |

Characteristics of the courses of this group of Study Plan: Code=3.S.BTUL 18/19 Name=3.sem.TUL bak.prez 18/19

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|--------|--|------|---|
| 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 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. | 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 | 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. | | | |

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|---|--|------|---|
| 11CAL2 | Calculus 2 | Z,ZK | 5 |
| Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in R^n . Parametric description of regular k -dimensional surfaces in R^n , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems. | | | |
| 11FYZ | Physics | Z,ZK | 5 |
| Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics. | | | |
| 11GIE | Geometry | KZ | 3 |
| Orthographic and oblique projections, linear perspective. Topographic surfaces and their orthogonal projection. Differential geometry of curves - parameterization, arc of the curve, torsion and curvature, Frenet's trihedron. Kinematics - a curve as a trajectory of the motion, the velocity and acceleration of a particle moving on a curved path. | | | |
| 11LA | Linear Algebra | Z,ZK | 3 |
| Vector spaces (linear combinations, linear independence, dimension, basis, coordinates). Matrices and operations. Systems of linear equations and their solvability. Determinants and their applications. Scalar product. Similarity of matrices (eigenvalues and eigenvectors). Quadratic forms and their classification. | | | |
| 11MSP | Modeling of Systems and Processes | Z,ZK | 4 |
| Mathematical methods and algorithms as a basis for system analysis. Methods for modelling and evaluating the systems in continuous and discrete time domain. Laplace transform, z-transform, and the recursive algorithms in solution of differential and difference equations, as an instrument for system description. Practical use of technical computing environment (MATLAB). | | | |
| 11PEM | Instrumentation and Electromagnetic Field | Z,ZK | 5 |
| Electric field. Electric current. Magnetic field. Electromagnetic field. Optics. Basics of solid-state physics. | | | |
| 11STAT | Statistics | Z,ZK | 4 |
| Definition of probability, random variable and its description, known distributions, random vector, function of random variable. Methods of point estimation. Testing of statistical hypothesis. Regression and correlation, linear regression, correlation coefficient, coefficient of determination, the general linear model, statistical inference in linear regression, analysis of variance, multiple regression, the use of matrices in regression. | | | |
| 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. | | | |
| 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). | | | |
| 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. | | | |
| 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. | | | |
| 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. | | | |
| 18PZP | Elasticity and Strength | Z,ZK | 3 |
| Tension and compression. Bending of beam. Shear stress during bending of beam. Design and analysis of cross section of beam. Design of riveted, bolted and welded joint of structure. Analysis of deflection curve of beam. Torsion of circle cross section. Combined loading. Stability of compressed bar and buckling. Beam on elastic foundation. Strength analysis. | | | |
| 18SAT | Structural Analysis | Z,ZK | 4 |
| General system of forces in plane and space. Calculation of reactions of bodies and structures. Assessment of internal forces on statically determinate beams and simple girders. Principle of virtual work. Kinematic method for calculation of reactions of statically determinate systems. Determination of axial forces in truss constructions. Cross-sectional characteristics of planar shapes. Fiber polygons and chains. | | | |
| 21ATL1 | English 1 for Aviation for Specialization Technology of Aviation Maintenance | Z | 3 |
| Materials used in aviation industry structures after casting, forging and welding. Defects to come of processes. | | | |
| 21ATL2 | English 2 for Aviation for Specialization Technology of Aviation Maintenance | Z,ZK | 3 |
| Testing of materials, reports from tests. Repair of parts with defects. | | | |
| 21DKL | Aviation Data Link Communication | KZ | 3 |
| Categorization of communication systems in aviation, RCP, network standards and protocols, ACARS and ATN standard. Data link applications and services, ATS data link applications (CPDLC, ADS-C, FIS, ...), AOC applications, data link within surveillance domain. Inter-ATC centers communication (OLDI messages). Network Manager Operations Centre (NMOC), satellite communication. Internet on board. Wireless communication in aviation. | | | |
| 21KSY1 | Aircraft Construction and Systems 1 | Z,ZK | 7 |
| Aircraft construction requirements and functions - fuselage, wings, flight controls, undercarriage, aircraft pylon, nacelle. Aircraft systems requirements and functions - drainage, water distribution systems and aircraft lighting. | | | |
| 21KSY2 | Aircraft Construction and Systems 2 | Z,ZK | 7 |
| Aircraft systems requirements and functions - air condition, pressurization, oxygen systems, tyres, hydraulics, fuel systems, electrical systems, deicing system, fire protection system. | | | |
| 21LCM | Aircraft Engines | Z,ZK | 3 |
| 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. | | | |
| 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 |
| Legislative framework (the role of the ICAO, EASA, member states, relations among Part 145, Part 66, Part 147 and Part M as well as relationships between other aviation authorities) with knowledge on level 1 for categories B1 and B2. Part 66 Maintenance Certifying Staff and Part 145 Maintenance Organisations with knowledge on level 2 for categories B1 and B2. Aircraft certification, type-certification, supplemental type-certification. | | | |

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| 21LLG2 | Aviation Legislation 2 EU OPS commercial transportation by aeroplane with knowledge on level 1 for categories B1 and B2. Commission Regulation (EC) No 2042/2003 Part M with knowledge on level 2 for categories B1 and B2. Maintenance program, maintenance checks and inspections, ETOPS, MEL, AD, SB. Documentation in maintenance - maintenance manuals. Structure Repair Manual. Illustrated Parts Catalog. | ZK | 2 |
| 21LOUL | Aviation Maintenance Human Factors Assessment of aviation accident statistics. Analysis of failure chains. Human factors analytical and clasificatory systems. Risk management. | Z,ZK | 6 |
| 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 |
| 21PYU1 | Aircraft Maintenance Technology 1 Basics of aircraft maintenance technology, legislation, aircraft release into operation, safety, equipment. | KZ | 4 |
| 21PYU2 | Aircraft Maintenance Technology 2 Classification, maintenance, checks and repair of construction parts - joints, bearing, hoses, pipes, gearing, brakes, dampers, shaft, springs. | KZ | 4 |
| 21PYU3 | Aircraft Maintenance Technology 3 Particular technologies - diagnostics, surface treatments, airframe production, airframe jointing / bonding, sandwich construction, composite construction. | KZ | 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 |
| 21TML2 | Technology and Materials for Aviation 2 Most important materials used in aviation industry. Their physical and technological properties. Composites with metal, polymer and ceramics. Defectoscopic testing of materials. | Z,ZK | 5 |
| 21TUM1 | Turbine Engines 1 First part of the course 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. | KZ | 7 |
| 21TUM2 | Turbine Engines 2 Second part of the course is focused on the 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. | Z,ZK | 7 |
| 21V | Aircraft Propellers Theory of propeller blade, propeller load, propeller construction, control of blade angle, de-icing system, maintenance and repair of propellers. | Z,ZK | 6 |
| 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 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 |
| 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 |
| 21ZLKO | Basics of Aircraft Structures and Systems Basics of screening, technical drawing, technological and operational signs. Hydraulic, pneumatic, fuel, electricity and block diagrams in aviation. | KZ | 5 |
| 21ZLS | ATM Systems The course introduces classical and modern facilities, systems and technologies designated for ATS. Student obtains knowledge of technical principles and solutions as far as communication, navigation and surveillance aviation systems are concerned. | Z,ZK | 5 |
| 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 |
| 21ZYL2 | Principles of Flight 2 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 an climb, acceleration, positive load, manoeuvres, stability and controllability, transsonic speeds. | Z,ZK | 5 |
| 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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