

# Study plan

Name of study plan: PIL bak.prez.16/17

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: 180

The role of the block: Z

Code of the group: 1.S.BPIL 15/16

Name of the group: 1.sem.PIL bak.prez.(od) 15/16

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
11CAL1	<b>Calculus 1</b> Ondřej Navrátil, Magdalena Hykšová, Olga Vraštilová, Oldřich Hykš, Tomáš Tásák <b>Magdalena Hykšová</b> Ondřej Navrátil (Gar.)	Z,ZK	7	2P+4C+2B	Z	Z
11LA	<b>Linear Algebra</b> Martina Bevářová, Pavel Provinský <b>Martina Bevářová</b> Martina Bevářová (Gar.)	Z,ZK	3	2P+1C+10B	Z	Z
12ZYDI	<b>Introduction to Transportation Engineering</b> Zuzana Arská, Dagmar Koárková, Vojtěch Novotný	Z,ZK	2	1P+1C	Z	Z
21UVYP	<b>Introduction to the Training of Aviation Personnel</b>	Z,ZK	5	2+2	Z	Z
21ZEL1	<b>Electronics Basics 1</b> Vít Fábera <b>Vít Fábera</b>	Z,ZK	5	3P+2C	Z	Z
11GIE	<b>Geometry</b> Oldřich Hykš, Pavel Provinský, Šárka Vorářová, Vít Malinovský <b>Oldřich Hykš</b> Šárka Vorářová (Gar.)	KZ	3	2P+2C+12B	Z	Z
21ZLKS	<b>Basics of Aircraft Structures and Systems</b> Pavol Hajla <b>Pavol Hajla</b>	KZ	4	2P+2C	Z	Z
TV-1	<b>Physical Education</b>	Z	1		Z	Z

Characteristics of the courses of this group of Study Plan: Code=1.S.BPIL 15/16 Name=1.sem.PIL bak.prez.(od) 15/16

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 Euklidian 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.
21UVYP	Introduction to the Training of Aviation Personnel	Z,ZK	5	Pilot training. History. Drive. Meteorology. Airports. Navigation. Aircraft Design. Space technology. Practical training. Flying Rules. Airspace. Presentation ATO. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.
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 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
21ZLKS	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	4
TV-1	Physical Education	Z	1

Code of the group: 2.S.BPIL 15/16

Name of the group: 2.sem.PIL bak.prez (od) 15/16

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
11CAL2	<b>Calculus 2</b> Magdalena Hykšová	Z,ZK	5	2P+3C+2B	L	Z
11FY1	<b>Physics 1</b>	Z,ZK	4	2P+2C	L	Z
11STAS	<b>Statistics</b>	Z,ZK	5	2P+2C	L	Z
21TPIV	<b>Theory of the Pilot's Training</b>	Z,ZK	6	4+4	L	Z
21ZYL1	<b>Principles of Flight 1</b>	Z,ZK	5	2P+2C+1B	L	Z
21LPX1	<b>Flight Training 1</b> Roman Matyáš Roman Matyáš	KZ	2	0P+1C	Z,L	Z
21RTFS	<b>Radiotelephony and Communication</b>	KZ	2	1P+1C	L	Z
TV-2	<b>Physical Education</b>	Z	1		L	Z

Characteristics of the courses of this group of Study Plan: Code=2.S.BPIL 15/16 Name=2.sem.PIL bak.prez (od) 15/16

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
11FY1	Physics 1 Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.	Z,ZK	4
11STAS	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	5
21TPIV	Theory of the Pilot's Training Theoretical knowledge instruction required for entry into the first phase of integrated training. Tuition refers to the syllabus provided in the CZ / ATO-010 manuals. Subjects and their minimum range is in accordance with the requirements of EU regulation no. 1178/2011 and objects are numbered in accordance with Part FCL 010 to 090. The course is finished with unclassified assessment and examination. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.	Z,ZK	6
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
21LPX1	Flight Training 1 Practical exercises for improvement of theoretical knowledge in a range of at least PPL(A) of the objects 010 - 090 in accordance with Part FCL. The basics of flight control, dual exercises, solo flights and navigation flights. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.	KZ	2
21RTFS	Radiotelephony and Communication VFR and IFR communication, basic operational procedures, standard aeronautical phraseology, broadcasting of the numbers, letters, etc., call signs, radio-communication in normal and emergency procedures, loss of communication, weather information, HF communication.	KZ	2
TV-2	Physical Education	Z	1

Code of the group: 3.S.BPIL 17/18

Name of the group: 3.sem.PIL bak.prez.17/18 (21ZDP namísto Fyziky)

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
21ZDP	<b>Knowledge, Skills and Attitudes</b> <i>Roman Matyáš</i>	Z,ZK	5	2P+2C	L	Z
21LCVL	<b>Human Factors in Aviation</b> <i>Lenka Hanáková Lenka Hanáková</i>	ZK	2	2P+0C	Z	Z
21N	<b>Navigation</b>	ZK	4	4P+0C	L	Z
21PPRJ	<b>Instrumentation</b>	ZK	5	4P+0C	Z	Z
21ZYL2	<b>Principles of Flight 2</b> <i>P emysl Vávra, Liana Karapetjan P emysl Vávra</i>	Z,ZK	5	2P+2C	Z	Z
21MEO1	<b>Meteorology 1</b>	KZ	4	2P+2C	Z	Z
21LRF	<b>Laboratories of Radiotelephony</b>	Z	2	0P+2C	Z	Z
15JZ1A	<b>Foreign Language - English 1</b> <i>Markéta Vojanová, Jitka He manová, Marek Tome ek, Marie Michlová, Lenka Monková, Markéta Olehlová, Peter Morpuss, Jan Feit, Eva Rezlerová</i>	Z	3	0P+4C+10B		Z

**Characteristics of the courses of this group of Study Plan: Code=3.S.BPIL 17/18 Name=3.sem.PIL bak.prez.17/18 (21ZDP namísto Fyziky)**

21ZDP	Knowledge, Skills and Attitudes	Z,ZK	5	Communication. Management of flight path. Automation of flight. Leadership and teamwork. Problem solving. Decision making. Situation awareness. Workload management. Upset prevention and recovery training. Mental math.
21LCVL	Human Factors in Aviation	ZK	2	Human performance & limitations, aptibility & competence, accident statistics, flight safety, basics of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, body rhythms & sleep, stress, fatigue, working methods.
21N	Navigation	ZK	4	Earth - shape, dimensions of the reference ellipsoid and geoid, position reference system (grid), large and small circles. Great-circle distance and the rhumb line. Convergence. Spherical trigonometry. Mathematical determination of elements rhumb line course and Great-circle distance. Agona, isogona. Projection of maps. ICAO and Jeppeson maps. Times - UTC, Zulu, LT. Time zones. Comparative navigation. Dead reckoning. INS / IRS, FMS.
21PPRJ	Instrumentation	ZK	5	Basic classification and construction of flight instruments, electric systems, power plant sensors and instruments, airframe sensors and instruments, measurement of air data parameters. Earth's magnetic field, magnetic compass, gyroscopic instruments, inertial navigation and reference systems, radio-navigational systems, radars, monitoring and recording systems, integrated instrument systems.
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.
21MEO1	Meteorology 1	KZ	4	Composition, size and vertical structure of the atmosphere. QNH, QFE, QFF, QNE, density and height measurements. Wind, turbulence, jet streams and standing waves. Moisture adiabatic processes. Creating and types of cloud, fog, haze. Precipitation. Types of air masses, frontal interface. Distribution of pressure, cyclones, anticyclones, non-frontal cyclone.
21LRF	Laboratories of Radiotelephony	Z	2	VFR and IFR communication, basic operational procedures, standard aeronautical frazeology, broadcasting of the numbers, letters, etc., call signs, radio-communication in normal and emergency procedures, loss of communication, weather information, HF communication.
15JZ1A	Foreign Language - English 1	Z	3	Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.

Code of the group: 4.S.BPIL 16/17

Name of the group: 4.sem.PIL bak.prez. (od) 16/17

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11MSP	<b>Modeling of Systems and Processes</b>	Z,ZK	4	2P+2C+12B	L	Z
21HVL	<b>Weight and Balance of Aircraft</b> <i>Denisa Svobodová</i>	Z,ZK	4	2P+1C	L	Z
21MET2	<b>Meteorology 2</b>	Z,ZK	5	2P+2C	L	Z
21RNG	<b>Radionavigation</b>	Z,ZK	7	3P+4C	L	Z
21LL1	<b>Aircraft 1</b>	KZ	3	2P+1C+10B	L	Z
21LPX2	<b>Flight Training 2</b> <i>Roman Matyáš Roman Matyáš</i>	KZ	2	0P+1C	L,Z	Z

21ULCT	<b>Aircraft Maintenance</b> <i>Tomáš Parýzek</i>	Z	2	2P+0C+8B	L	z
15JZ2A	<b>Foreign Language - English 2</b>	Z,ZK	3	0P+4C+10B		z

**Characteristics of the courses of this group of Study Plan: Code=4.S.BPIL 16/17 Name=4.sem.PIL bak.prez. (od) 16/17**

11MSP	Modeling of Systems and Processes	Z,ZK	4			
System and subsystem, external and internal system description, continuous and discrete system, mathematics as a tool, examples of formulation of differential and differential equations. Linear and nonlinear system, stationary and non-stationary system, causality. Convolutional integral. Laplace and Z transformations. Transfer function. Stability of LTI systems. Discretization of continuous systems. System interconnection.						
21HVL	Weight and Balance of Aircraft	Z,ZK	4			
Basic terms of mass and balance, basic aircraft masses, weighing and maximum aircrafts masses, overloading of aircraft, standard weights of passenger, baggage and crew, determination of load of aircraft, flight documentation - loadsheets, trim sheets, securing of load, determination of centre of gravity, influence of centre of gravity position on aircraft performance.						
21MET2	Meteorology 2	Z,ZK	5			
Climatic zones, tropical climatology, meteorological situation of mid-latitudes. Icing, turbulence, wind shear, thunderstorms, tornadoes, flying in the stratosphere, mountain areas, reducing visibility phenomena. Observation, weather maps, important information for flight planning.						
21RNG	Radionavigation	Z,ZK	7			
Ground direction finder (VDF), ADF, VOR and Doppler VOR, DME, ILS, MLS, ground ATC radar, weather Radar, SSR and transponder. Radar utilization for navigation during the flight. Area navigation (RNAV) - general philosophy, gauges and equipment, indication and sensors for RNAV, VOR/DME (RNAV). Autopilot and flight director. Satellite navigation, systems and backups.						
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.						
21LPX2	Flight Training 2	KZ	2			
Practical exercises for improvement of theoretical knowledge in a range MEP land and IFR from the relevant subjects in accordance with Part FCL. The basics of instrument flying, dual exercises, emergency procedures, descents and navigation flights. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.						
21ULCT	Aircraft Maintenance	Z	2			
Aircraft operations and technical operations. Maintenance and work processes. Defects search methods, status check diagnostic tools. Selection and qualification of aviation personnel. Basic documentation for maintenance. Optimization of time maintenance intervals. Regulation no. 1321/2014 Part 145. Human factors of aircraft maintenance. Regulation of director EASA for aircraft maintenance. Seminars will be focused on practical application.						
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.BPIL 17/18

Name of the group: 5.sem.PIL 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 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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
21LCM	<b>Aircraft Engines</b> <i>Daniel Hanus, Tomáš Parýzek, Denisa Svobodová Daniel Hanus</i>	Z,ZK	3	2P+1C	Z	z
21LGPS	<b>Legislation and Operational Regulations</b> <i>Radoslav Zozuák Radoslav Zozuák</i>	Z,ZK	8	4P+2C	Z	z
21LTA2	<b>Aircraft 2</b> <i>Karel Mündel, Daniel Urban, Karel Hylmar, Max Chopart, Kateřina Stuchlíková Max Chopart</i>	Z,ZK	2	2P+1C	Z	z
21VL	<b>Aircraft Performance</b> <i>Denisa Svobodová, Anna Polánecká Anna Polánecká</i>	Z,ZK	4	2P+2C	Z	z
21ZLS	<b>ATM Systems</b> <i>Vladimír Machula Vladimír Machula</i>	Z,ZK	5	2P+2C	Z	z
21PDLT	<b>Airport Design and Operation</b> <i>Ladislav Capoušek, Petr Líka Ladislav Capoušek</i>	KZ	5	2P+2C	Z	z
21APL1	<b>Aviation English 1 for Professional Pilot</b> <i>Max Chopart, Marek Šudoma Max Chopart</i>	Z	3	0P+4C	Z	z

**Characteristics of the courses of this group of Study Plan: Code=5.S.BPIL 17/18 Name=5.sem.PIL bak.prez.(od) 17/18**

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.						
21LGPS	Legislation and Operational Regulations	Z,ZK	8			
Introduction into aviation regulations. The scope of international and national organizations in civil aviation. Analysis and interpretation of the ICAO Annexes 1-19, ICAO Docs. 4444, 7030, 8168, analyses and interpretation of the European Parliament and Council Regulations (EC), European Commission Regulations (EU) and the Decisions of the Executive Director of EASA.						
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.						

21VL	Aircraft Performance	Z,ZK	4
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.			
21PDLT	Airport Design and Operation	KZ	5
Methods for the new airports design. Existing airports development. A closer look at the development of the airports operational areas. Certification of the operating areas and procedures by ICAO Airports Manual. Development planning and project preparation, regulatory basis.			
21APL1	Aviation English 1 for Professional Pilot	Z	3
Exercises focused on continuous reading specialized texts, vocabulary extension of technical English, terminology in the sphere of aircraft construction, principles of flight, aircraft engines, instruments and systems, analyzes relating to topics of air traffic, operational procedures, relevant legislation and operators procedures.			

Code of the group: 6.S.BPIL 18/19

Name of the group: 6.sem.PIL 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 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
21APL2	Aviation English 2 for Professional Pilot	Z,ZK	3	0P+4C	L	z
21EBLP	European Air Transport Safety Attitude	Z,ZK	4	2P+2C	L	z
21PAP	Flight Planning and Performance <i>Roman Matyáš</i>	Z,ZK	4	2P+2C+14B	L	z
21PPLP	Operational Procedures and IFR Flights <i>Ladislav Capoušek</i>	Z,ZK	7	4P+2C	L	z
21LIVO	Human Performance and Limitations	Z,ZK	5	2P+2C+14B	L	z
21DKL	<i>Vladimír Machula</i>	KZ	3	2P+1C	L	z
21LPX3	Flight Training 3	KZ	2	0P+1C	L	z
21LVP	MCC - Multicrew Cooperation	Z	2	2P+0C	L	z

Characteristics of the courses of this group of Study Plan: Code=6.S.BPIL 18/19 Name=6.sem.PIL bak.prez. (od) 18/19

21APL2	Aviation English 2 for Professional Pilot	Z,ZK	3
Exercises focused on repetition and smoother communication within VFR and IFR communication, communication with technical staff at the airport, a fluent conversation within the airlines.			
21EBLP	European Air Transport Safety Attitude	Z,ZK	4
Reliability and life cycle systems, reliability theory, mathematics tools for reliability, reliability analysis, maintenance systems, theory of operational safety and quality, the basic concept of security, safety management, security management strategy, hazard, risk, risk management.			
21PAP	Flight Planning and Performance	Z,ZK	4
Mass and balance. Load of aircraft. Determination of centre of gravity - loadsheet, trimsheet. Aircraft weighing. Overloading of aircraft. Basic characteristic speeds. Runway characteristics. Take off and landing performance. Drift down. ETOPS. MEL. Flight planning and monitoring. Routing. FL and speeds selection. Charts. ICAO ATC FPL. Aerodrom operation minimums. Fuel plan. Operational flight plan.			
21PPLP	Operational Procedures and IFR Flights	Z,ZK	7
Documentation Jeppesen. IFR approach segments. Precision approach ILS/PAR, MLS. Low Visibility Operation (LVO). Non precision approach - ILS without GP, VOR/DME, NDB and SRA. Airport's operational minima. Circuit approach. Holding patterns, SID and STAR. GNSS approach. Altimeter setting procedures. IFR flight procedures. RNAV approach procedures and other operation. CDF A procedures and principles of increasing airspace capacity.			
21LIVO	Human Performance and Limitations	Z,ZK	5
Human performance & limitations, aptibility & competence, accident statistics, flight safety, basics of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, body rhythms & sleep, stress, fatigue, working methods.			
21DKL		KZ	3
21LPX3	Flight Training 3	KZ	2
Practical exercises for improvement of theoretical knowledge in a range of CRM and MCC from the relevant areas in accordance with Part FCL. Multi-crew flights, cooperation, emergency procedures, pilot-in-command incapacitation. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21LVP	MCC - Multicrew Cooperation	Z	2
Flight safety analysis in relation to human factor. MCC - basic principles, phases and methods within the area of air transport. CRM - leadership, situational awareness, decision making process, communication, effect of stress to the multi-crew performance, standard operational procedures, automation.			



## List of courses of this pass:

Code	Name of the course	Completion	Credits
11CAL1	Calculus 1	Z,ZK	7
Sequence of real numbers and its limit. Basic properties of mappings. Function of one real variable, its limit and derivative. Geometric properties of n-dimensional Eukclidean space and Cartesian coordinate system. Geometric meaning of the differential of functions several real variables, differential calculus of functions of several real variables.			
11CAL2	Calculus 2	Z,ZK	5
Antiderivative, Newtonian integral, Riemannian integral of the function of one variable, improper Riemannian integral, Riemannian integral in $R^n$ . Parametric description of regular k-dimensional surfaces in $R^n$ , Riemannian integral over regular surfaces. Line and surface integrals of the second type, Stokes theorems, ordinary differential equations of the first order, linear differential equations with constant coefficients and its systems.			
11FY1	Physics 1	Z,ZK	4
Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics, electric field, directed electric current.			
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.			
11MSP	Modeling of Systems and Processes	Z,ZK	4
System and subsystem, external and internal system description, continuous and discrete system, mathematics as a tool, examples of formulation of differential and differential equations. Linear and nonlinear system, stationary and non-stationary system, causality. Convolutional integral. Laplace and Z transformations. Transfer function. Stability of LTI systems. Discretization of continuous systems. System interconnection.			
11STAS	Statistics	Z,ZK	5
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.			
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.			
21APL1	Aviation English 1 for Professional Pilot	Z	3
Exercises focused on continuous reading specialized texts, vocabulary extension of technical English, terminology in the sphere of aircraft construction, principles of flight, aircraft engines, instruments and systems, analyzes relating to topics of air traffic, operational procedures, relevant legislation and operators procedures.			
21APL2	Aviation English 2 for Professional Pilot	Z,ZK	3
Exercises focused on repetition and smoother communication within VFR and IFR communication, communication with technical staff at the airport, a fluent conversation within the airlines.			
21DKL		KZ	3
21EBLP	European Air Transport Safety Attitude	Z,ZK	4
Reliability and life cycle systems, reliability theory, mathematics tools for reliability, reliability analysis, maintenance systems, theory of operational safety and quality, the basic concept of security, safety management, security management strategy, hazard, risk, risk management.			
21HVL	Weight and Balance of Aircraft	Z,ZK	4
Basic terms of mass and balance, basic aircraft masses, weighing and maximum aircrafts masses, overloading of aircraft, standard weights of passenger, baggage and crew, determination of load of aircraft, flight documentation - loadsheet, trimsheet, securing of load, determination of centre of gravity, influence of centre of gravity position on aircraft performance.			
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.			
21LCVL	Human Factors in Aviation	ZK	2
Human performance & limitations, aptibility & competence, accident statistics, flight safety, basics of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics of flight psychology, human information processing, memory & learning, theory & model of human error, body rhythms & sleep, stress, fatigue, working methods.			
21LGPS	Legislation and Operational Regulations	Z,ZK	8
Introduction into aviation regulations. The scope of international and national organizations in civil aviation. Analysis and interpretation of the ICAO Annexes 1-19, ICAO Docs. 4444, 7030, 8168, analyses and interpretation of the European Parliament and Council Regulations (EC), European Commission Regulations (EU) and the Decisions of the Executive Director of EASA.			
21LIVO	Human Performance and Limitations	Z,ZK	5
Human performance & limitations, aptibility & competence, accident statistics, flight safety, basics of flight physiology, man & environment, breathing & circulation, sensory system, health & hygiene, health preservation, intoxication, incapacitation, basics 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.			

21LPX1	Flight Training 1	KZ	2
Practical exercises for improvement of theoretical knowledge in a range of at least PPL(A) of the objects 010 - 090 in accordance with Part FCL. The basics of flight control, dual exercises, solo flights and navigation flights. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21LPX2	Flight Training 2	KZ	2
Practical exercises for improvement of theoretical knowledge in a range MEP land and IFR from the relevant subjects in accordance with Part FCL. The basics of instrument flying, dual exercises, emergency procedures, descents and navigation flights. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21LPX3	Flight Training 3	KZ	2
Practical exercises for improvement of theoretical knowledge in a range of CRM and MCC from the relevant areas in accordance with Part FCL. Multi-crew flights, cooperation, emergency procedures, pilot-in-command incapacitation. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21LRF	Laboratories of Radiotelephony	Z	2
VFR and IFR communication, basic operational procedures, standard aeronautical phraseology, broadcasting of the numbers, letters, etc., call signs, radio-communication in normal and emergency procedures, loss of communication, weather information, HF communication.			
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.			
21LVP	MCC - Multicrew Cooperation	Z	2
Flight safety analysis in relation to human factor. MCC - basic principles, phases and methods within the area of air transport. CRM - leadership, situational awareness, decision making process, communication, effect of stress to the multi-crew performance, standard operational procedures, automation.			
21MEO1	Meteorology 1	KZ	4
Composition, size and vertical structure of the atmosphere. QNH, QFE, QFF, QNE, density and height measurements. Wind, turbulence, jet streams and standing waves. Moisture adiabatic processes. Creating and types of cloud, fog, haze. Precipitation. Types of air masses, frontal interface. Distribution of pressure, cyclones, anticyclones, non-frontal cyclone.			
21MET2	Meteorology 2	Z,ZK	5
Climatic zones, tropical climatology, meteorological situation of mid-latitudes. Icing, turbulence, wind shear, thunderstorms, tornadoes, flying in the stratosphere, mountain areas, reducing visibility phenomena. Observation, weather maps, important information for flight planning.			
21N	Navigation	ZK	4
Earth - shape, dimensions of the reference ellipsoid and geoid, position reference system (grid), large and small circles. Great-circle distance and the rhumb line. Convergence. Spherical trigonometry. Mathematical determination of elements rhumb line course and Great-circle distance. Agona, isogona. Projection of maps. ICAO and Jeppesen maps. Times - UTC, Zulu, LT. Time zones. Comparative navigation. Dead reckoning. INS / IRS, FMS.			
21PAP	Flight Planning and Performance	Z,ZK	4
Mass and balance. Load of aircraft. Determination of centre of gravity - loadsheet, trimsheet. Aircraft weighing. Overloading of aircraft. Basic characteristic speeds. Runway characteristics. Take off and landing performance. Drift down. ETOPS. MEL. Flight planning and monitoring. Routing. FL and speeds selection. Charts. ICAO ATC FPL. Aerodrom operation minimums. Fuel plan. Operational flight plan.			
21PDLT	Airport Design and Operation	KZ	5
Methods for the new airports design. Existing airports development. A closer look at the development of the airports operational areas. Certification of the operating areas and procedures by ICAO Airports Manual. Development planning and project preparation, regulatory basis.			
21PPLP	Operational Procedures and IFR Flights	Z,ZK	7
Documentation Jeppesen. IFR approach segments. Precision approach ILS/PAR, MLS. Low Visibility Operation (LVO). Non precision approach - ILS without GP, VOR/DME, NDB and SRA. Airport's operational minima. Circuit approach. Holding patterns, SID and STAR. GNSS approach. Altimeter setting procedures. IFR flight procedures. RNAV approach procedures and other operation. CDF procedures and principles of increasing airspace capacity.			
21PPRJ	Instrumentation	ZK	5
Basic classification and construction of flight instruments, electric systems, power plant sensors and instruments, airframe sensors and instruments, measurement of air data parameters. Earth's magnetic field, magnetic compass, gyroscopic instruments, inertial navigation and reference systems, radio-navigational systems, radars, monitoring and recording systems, integrated instrument systems.			
21RNG	Radionavigation	Z,ZK	7
Ground direction finder (VDF), ADF, VOR and Doppler VOR, DME, ILS, MLS, ground ATC radar, weather Radar, SSR and transponder. Radar utilization for navigation during the flight. Area navigation (RNAV) - general philosophy, gauges and equipment, indication and sensors for RNAV, VOR/DME (RNAV). Autopilot and flight director. Satellite navigation, systems and backups.			
21RTFS	Radiotelephony and Communication	KZ	2
VFR and IFR communication, basic operational procedures, standard aeronautical phraseology, broadcasting of the numbers, letters, etc., call signs, radio-communication in normal and emergency procedures, loss of communication, weather information, HF communication.			
21TPIV	Theory of the Pilot's Training	Z,ZK	6
Theoretical knowledge instruction required for entry into the first phase of integrated training. Tuition refers to the syllabus provided in the CZ / ATO-010 manuals. Subjects and their minimum range is in accordance with the requirements of EU regulation no. 1178/2011 and objects are numbered in accordance with Part FCL 010 to 090. The course is finished with unclassified assessment and examination. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21ULCT	Aircraft Maintenance	Z	2
Aircraft operations and technical operations. Maintenance and work processes. Defects search methods, status check diagnostic tools. Selection and qualification of aviation personnel. Basic documentation for maintenance. Optimization of time maintenance intervals. Regulation no. 1321/2014 Part 145. Human factors of aircraft maintenance. Regulation of director EASA for aircraft maintenance. Seminars will be focused on practical application.			
21UVYP	Introduction to the Training of Aviation Personnel	Z,ZK	5
Pilot training. History. Drive. Meteorology. Airports. Navigation. Aircraft Design. Space technology. Practical training. Flying Rules. Airspace. Presentation ATO. This course is intended only for long-term student, who are in integrated pilots training and study all courses related to Study field PIL (Professional Pilot) in all three years.			
21VL	Aircraft Performance	Z,ZK	4
21ZDP	Knowledge, Skills and Attitudes	Z,ZK	5
Communication. Management of flight path. Automation of flight. Leadership and teamwork. Problem solving. Decision making. Situation awareness. Workload management. Upset prevention and recovery training. Mental math.			

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.			
21ZLKS	Basics of Aircraft Structures and Systems	KZ	4
Basics of screening, technical drawing, technological and operational signs. Hydraulic, pneumatic, fuel, electricity and block diagrams in aviation.			
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.			
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

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