

# Study plan

## Name of study plan: PIL bak.prez.18/19

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Professional Pilot

Garantor of the study branch: doc. Ing. Jakub Hospodka, Ph.D.

Program of study: Technology in Transportation and Telecommunications

Type of study: Bachelor full-time

Required credits: 150

Elective courses credits: 30

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 150

The role of the block: Z

Code of the group: 1.S.BPIL 18/19

Name of the group: 1.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
11CAL1	<b>Calculus 1</b> Magdalena Hykšová, Ondřej Navrátil, Bohumil Kovář, Tomáš Tasák, Olga Vraštilová, Ondřej Navrátil (Gar.)	Z,ZK	7	2P+4C+2B	Z	Z
11LA	<b>Linear Algebra</b> Lucie Kárná, Jan Píkr, Martina Beváová, Pavel Provinský, Martina Beváová (Gar.)	Z,ZK	3	2P+1C+10B	Z	Z
12ZYDI	<b>Introduction to Transportation Engineering</b> Dagmar Koárková, Zuzana Arská, Jan Kruntorád, Nikol Dousková, Vojtěch Novotný	Z,ZK	2	1P+1C	Z	Z
21TPLV	<b>Theory of the Pilot's Training</b> Jakub Kraus, Jakub Hospodka, Jan Žížka, Filip Bartoň, Jan Žížka, Roman Matyáš	Z,ZK	8	4P+4C	Z	Z
21UDVY	<b>Introduction to the Training of Aviation Personnel</b> Jakub Kraus, Jakub Hospodka, Roman Matyáš, Michaela Kalivodová, Milan Kameník	Z,ZK	4	2P+2C	Z	Z
11GIE	<b>Geometry</b> Pavel Provinský, Oldřich Hykš, Šárka Voráová, Šárka Voráová (Gar.)	KZ	3	2P+2C+12B	Z	Z
21LPX1	<b>Flight Training 1</b> Jakub Kraus, Jakub Hospodka, Roman Matyáš	KZ	2	0P+1C	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 18/19 Name=1.sem.PIL bak.prez.(od) 18/19

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.
21TPLV	Theory of the Pilot's Training	Z,ZK	8	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.

21UDVY	Introduction to the Training of Aviation Personnel	Z,ZK	4
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.			
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.			
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.			
TV-1	Physical Education	Z	1

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

Name of the group: 2.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
11CAL2	<b>Calculus 2</b> Magdalena Hykšová <b>Magdalena Hykšová</b> Magdalena Hykšová (Gar.)	Z,ZK	5	2P+3C+20B	L	Z
11STAT	<b>Statistics</b>	Z,ZK	4	2P+2C+12B	L	Z
21LIVO	<b>Human Performance and Limitations</b>	Z,ZK	5	2P+2C+14B	L	Z
21N	<b>Navigation</b>	ZK	4	4P+0C	L	Z
21PUPE	<b>Instrumentation</b>	ZK	4	4P+0C	L	Z
21ZYL1	<b>Principles of Flight 1</b>	Z,ZK	5	2P+2C+16B	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 18/19 Name=2.sem.PIL bak.prez (od) 18/19

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.			
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.			
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.			
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.			
21PUPE	Instrumentation	ZK	4
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.			
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.			
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.			
TV-2	Physical Education	Z	1

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

Name of the group: 3.sem.PIL 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	<b>Physics</b> Tomáš Vít , Zuzana Malá, Marek Honc <b>Zuzana Malá</b> Zuzana Malá (Gar.)	Z,ZK	5	2P+2C+1B	Z	z
21LCVL	<b>Human Factors in Aviation</b> Jakub Kraus, Jakub Hospodka, Roman Matyáš, Lenka Hanáková, ubomír Há ik, Vladimír Socha	ZK	2	2P+0C	Z	z
21ZEL1	<b>Electronics Basics 1</b> Jakub Kraus, Tomáš Musil, Jind ich Sadil, Jan Zelenka, Vít Fábera	Z,ZK	5	3P+2C	Z	z
21ZYL2	<b>Principles of Flight 2</b> Jakub Kraus, Jakub Hospodka, Roman Matyáš, Lenka Hanáková, Vojt ch Svoboda, Vladimír Machula, Václav Brož, P emysl Vávra, Liana Karapetjan, .....	Z,ZK	5	2P+2C	Z	z
21MEO1	<b>Meteorology 1</b> Jakub Kraus, Jakub Hospodka, Roman Matyáš, Iveta Kameníková	KZ	4	2P+2C	Z	z
21ZLKS	<b>Basics of Aircraft Structures and Systems</b> Jakub Kraus, Jakub Hospodka, Jan Blata, Ladislav Capoušek, František Helebrant	KZ	4	2P+2C	Z	z
21LRF	<b>Laboratories of Radiotelephony</b> Jakub Kraus, Jakub Hospodka, Milan Kameník, Pavel Valenta	Z	2	0P+2C	Z	z
15JZ1A	<b>Foreign Language - English 1</b> Eva Rezlerová, Dana Boušová, Jitka He manová, Barbora Horá ková, Marie Michlová, Lenka Monková, Markéta Olehlová, Markéta Vojanová, Peter Morpuss, .....	Z	3	0P+4C+10B	Z	z

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

11FYZ	Physics Kinematics, particle dynamics, dynamics of particle systems and rigid body. Continuum mechanics, thermodynamics.	Z,ZK	5
21LCVL	Human Factors in Aviation 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.	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
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 a climb, acceleration, positive load, manoeuvres, stability and controllability, transsonic speeds.	Z,ZK	5
21MEO1	Meteorology 1 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.	KZ	4
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
21LRF	Laboratories of Radiotelephony 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.	Z	2
15JZ1A	Foreign Language - English 1 Grammatical structures and style. Selection of conversation topics relating to transportation sciences. Extending vocabulary, developing perceptive and communicative skills. Elementary stylistics forms. Oral and written presentation of original research. Academic text principles and reading comprehension. Principles of rhetoric.	Z	3

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) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
11MSP	<b>Modeling of Systems and Processes</b> Bohumil Ková	Z,ZK	4	2P+2C+12B	L	z
21HVL	<b>Weight and Balance of Aircraft</b> Roman Matyáš	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> <i>Ladislav Keller</i>	KZ	3	2P+1C+10B	L	Z
21LPX2	<b>Flight Training 2</b>	KZ	2	0P+1C	L	Z
21ULCT	<b>Aircraft Maintenance</b>	Z	2	2P+0C+8B	L	Z
15JZ2A	<b>Foreign Language - English 2</b>	Z,ZK	3	0P+4C+10B	L	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	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).		
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 19/20

Name of the group: 5.sem.PIL 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 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>Jakub Kraus, Roman Matyáš, Pavel Valenta, Denisa Kupková, Michal Freigang, František Straka, Kateřina Stuchlíková, Tomáš Parýzek, Denisa Kupková, .....</i>	Z,ZK	3	2P+1C	Z	Z
21LGPS	<b>Legislation and Operational Regulations</b> <i>Jakub Kraus, Jakub Hospodka, Roman Matyáš, Radoslav Zozuák</i>	Z,ZK	8	4P+2C	Z	Z
21LTA2	<b>Aircraft 2</b> <i>Jakub Kraus, Jakub Hospodka, Roman Matyáš, Tomasz Balcerzak, Anna Kaeriaková, Vladimír Plos, Oldřich Štumbauer, Ladislav Keller</i>	Z,ZK	2	2P+1C	Z	Z
21VL	<b>Aircraft Performance</b> <i>Jakub Kraus, Jakub Hospodka, Roman Matyáš, Ota Hajzler, Anna Polánecká</i>	Z,ZK	4	2P+2C	Z	Z
21ZLS	<b>ATM Systems</b> <i>Jakub Kraus, Jakub Hospodka, Roman Matyáš, Vladimír Machula, Tereza Topková, Terézia Pilmannová, Stanislav Pleningr</i>	Z,ZK	5	2P+2C	Z	Z
21PDLT	<b>Airport Design and Operation</b> <i>Jakub Kraus, Jakub Hospodka, Roman Matyáš, Ladislav Capoušek, Roman Voká, Petr Líka</i>	KZ	5	2P+2C	Z	Z
21APL1	<b>Aviation English 1 for Professional Pilot</b> <i>Jakub Kraus, Jakub Hospodka, František Kuba, Sarah Van Den Bergh</i>	Z	3	0P+4C	Z	Z

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

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.		
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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
Basic terms of aircraft performance, basic characteristic speeds, runway characteristics, single and multiengine aircraft performance class B, aircraft performance class A, take off and landing performance, after take off and missed approach climb, noise abatement procedures, range of aircraft, drift down, MEL, ETOPS.			
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.			

### 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 Rn. Parametric description of regular k-dimensional surfaces in Rn, 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).			
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.			
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.			
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, 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, aptitude & 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, aptitude & 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.			
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.			
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.			
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.			
21PUPE	Instrumentation	ZK	4
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.			
21TPLV	Theory of the Pilot's Training	Z,ZK	8
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.			
21UDVY	Introduction to the Training of Aviation Personnel	Z,ZK	4
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.			
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.			
21VL	Aircraft Performance	Z,ZK	4
Basic terms of aircraft performance, basic characteristic speeds, runway characteristics, single and multiengine aircraft performance class B, aircraft performance class A, take off and landing performance, after take off and missed approach climb, noise abatement procedures, range of aircraft, drift down, MEL, ETOPS.			

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
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.			
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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