Study plan

Name of study plan: Master Part-Time PL from 2022/23

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Air Traffic Control and Management
Type of study: Follow-up master combined
Required credits: 120
Elective courses credits: 0
Sum of credits in the plan: 120
Note on the plan:

Name of the block: Compulsory courses
Minimal number of credits of the block: 104
The role of the block: Z

Code of the group: 1S-NK-PL-22/23
Name of the group: 1st Sem. Master Part-Time PL from 2022/23
Requirement credits in the group: In this group you have to gain 28 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 28
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
11APAS	**Applied Statistics** *Evženie Uglickich, Pavla Pecherková* ***Pavla Pecherková***	Z,ZK	4	2P+2C+12B	Z	z
11MMJ	**Mathematical Models and their Applications** *Evženie Uglickich, Pavla Pecherková, Ivan Nagy, Michal Matowicki, Natálie Blahitka* ***Pavla Pecherková*** *Evženie Uglickich (Gar.)*	Z,ZK	4	2P+2C+12B	Z	z
21BILD	**Safety Engineering in Aviation** *Natalia Guskova, Kateřina Grötschelová, Andrej Lališ* ***Andrej Lališ***	Z,ZK	4	2P+2C+12B	Z	z
21CNSS	**CNS Systems** *Stanislav Pleninger, Jakub Steiner* ***Stanislav Pleninger***	Z,ZK	5	3P+2C+16B	Z	z
21LETS	**Airport** *Jakub Kraus, Petr Líkař, Sébastien Lán, Petr Had, Jiří Volt, Slobodan Stojić* ***Slobodan Stojić***	Z,ZK	4	1P+2C+12B	Z	z
21PEKL	**Principles and Models in Air Transport Economics** *Peter Vittek* ***Peter Vittek***	Z,ZK	5	4P+2C+16B	Z	z
15J2A1	**Language - English 1** *Jitka Heřmanová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Rezlerová*	Z	2	0P+2C+10B	Z	z

Characteristics of the courses of this group of Study Plan: Code=1S-NK-PL-22/23 Name=1st Sem. Master Part-Time PL from 2022/23

11APAS	Applied Statistics	Z,ZK	4
Descriptive statistics, data preprocessing, discretize continuous data. Hypothesis testing - continuous and discrete variables. Regression and correlation analysis. Multivariable methods - multiple regression analysis, logistic regression analysis, ROC curve, MANOVA, PCA, Factor analysis. Power analysis, preparation, processing and evaluation of hte experiment.			
11MMJ	Mathematical Models and their Applications	Z,ZK	4
System. Regression, discrete and logistic models. Bayesian estimation of model parameters. Parameter estimation of normal regression, discrete and logistic models. Classification with logistic model. One-step and multi-step prediction with regression and discrete models. State model. State estimation. Kalman filter. Control with regression and discrete models.			
21BILD	Safety Engineering in Aviation	Z,ZK	4
The course is focused on understanding the issue of safety, learning how to assess new systems in terms of safety and acquiring principles of safety management. Students will learn explaining accidents and incident causes and bridge their theoretical knowledge with practical problems of air transport.			
21CNSS	CNS Systems	Z,ZK	5
Course provides full technical informations about CNS (communication, navigation, surveilance) systems used in aviation. Systems are presented in perspective of future development.			
21LETS	Airport	Z,ZK	4
Methods of designing new airports and developing existing ones. Connection of the airport to the surrounding infrastructure. Airport economics. Detailed look at the development of movement areas. Certification of airside movement areas and procedures according to EASA CS-ADR-DSN. Development planning - design, preparation and regulatory basis. Environmental aspects of airport operations.			

21PEKL	Principles and Models in Air Transport Economics	Z,ZK	5
The course contains the most important and typical models on which the economics of air transport is based. It covers the principles of regulation, airline infrastructure models, market structure, analyses airline costs, and looks in detail at the low-cost and charter airline model. It also focuses on airline alliances, air cargo, airline strategies and the economic principles of safety and security.			
15J2A1	Language - English 1	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			

Code of the group: 2S-NK-PL-22/23
Name of the group: 2nd Sem. Master Part-Time PL from 2022/23
Requirement credits in the group: In this group you have to gain 26 credits
Requirement courses in the group: In this group you have to complete 6 courses
Credits in the group: 26
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
21AFM	**Air Traffic Management** *Jakub Kraus, Terézia Pilmannová, Martina Hlavatá* ***Jakub Kraus*** *Jakub Kraus (Gar.)*	Z,ZK	5	3P+2C+16B	L	z
21MULD	**Managerial Challenges in Air Transport** *Peter Vittek* ***Peter Vittek*** *Peter Vittek (Gar.)*	Z,ZK	5	3P+2C+14B	L	z
21PLET	**Airport Operations** *Sébastien Lán, Petr Had, Jiří Volt* ***Slobodan Stojić*** *Slobodan Stojić (Gar.)*	Z,ZK	5	2P+2C+12B	L	z
21SPOL	**Aircraft Technology Reliability** *Natalia Guskova, Kateřina Grötschelová, Oldřich Štumbauer, Kiyofolo Benjamin Ouattara Andrej Lališ (Gar.)*	Z,ZK	4	2P+1C+12B	L	z
21PAM1	**Programming and Modelling 1** *Vladimír Socha, Lenka Hanáková* ***Vladimír Socha*** *Vladimír Socha (Gar.)*	KZ	5	2P+4C+16B	L	z
15JBA2	**Language - English 2** *Jitka Heřmanová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Rezlerová, ...*	Z	2	0P+2C+10B	L	z

Characteristics of the courses of this group of Study Plan: Code=2S-NK-PL-22/23 Name=2nd Sem. Master Part-Time PL from 2022/23

21AFM	Air Traffic Management	Z,ZK	5
Current ATM system and its functional blocks. View of ATM data (technical architecture and configuration, transmission systems and networks). Data exchange with neighboring ATM systems. Monitoring systems and technical supervision. ATM simulation. ATM conceptions and strategies for next years. EUROCONTROL - CFMU. FAB. ATS's - AOC's data applications.			
21MULD	Managerial Challenges in Air Transport	Z,ZK	5
The course contains a list of basic managerial tasks in aviation. The basic managerial tasks are quality assurance and operational safety, marketing operations, marketing context implementation, airline network management, fleet management and revenue management. The core disciplines also include project management, cost management and project resource planning and management.			
21PLET	Airport Operations	Z,ZK	5
Planning, design and modelling of airport processes in airside, landside and terminal buildings. Impact of infrastructure and equipment on airport capacity. Available tools and practices for increasing capacity. Operational analytics, capacity and traffic load forecasting. Purpose and development of an airport masterplan.			
21SPOL	Aircraft Technology Reliability	Z,ZK	4
Subject deals with tuition of separate attributes of reliability (no failure, vitality, maintainability, and so on) and main criterions of safety of production and working of aerospace engineering. General legalities are in the framework of tuition demonstrated on the example of calculation of reliability of integral characteristics of materials and they are practical illustration of its security in The Czech Police Aviation Department.			
21PAM1	Programming and Modelling 1	KZ	5
Harmonic signals, their generation. Real signals, sampling theorem, aliasing. Signal filtering. Fourier transform (FT), discrete Fourier transform (DFT), fast Fourier transform (FFT). Spectrum estimation, spectral power density. Image - basic processing methods, 2D Fourier transform, noise filtering, edge detection, linear and non-linear methods, brightness transforms, geometric transforms, image compression.			
15JBA2	Language - English 2	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			

Code of the group: 3S-NK-PL-23/24
Name of the group: 3rd Sem. Bachelor Part-Time PL from 2023/24
Requirement credits in the group: In this group you have to gain 26 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 26
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
11MMOA	**Mathematical methods for data analysis** *Evženie Uglickich, Pavla Pecherková* ***Pavla Pecherková*** *Evženie Uglickich (Gar.)*	Z,ZK	4	2P+2C+12B	Z	z

21NSR	**Navigation and Flight Control Systems** *Milan Kameník, Ladislav Capoušek, Jakub Hospodka, Jakub Trýb* ***Jakub Hospodka***	Z,ZK	5	3P+2C+14B	Z	z
21PLDC	**Air Carrier Operations** *Miloš Strouhal* ***Miloš Strouhal***	Z,ZK	5	3P+2C+16B	Z	z
21PAM2	**Programming and Modelling 2** *Vladimír Socha, Lenka Hanáková* ***Vladimír Socha***	KZ	5	2P+4C+16B	Z	z
21LIA1	**Aviation Engineering English 1** *Jitka Heřmanová, Dana Boušová* ***Jitka Heřmanová***	Z	3	0P+2C+8B	Z	z
21XNL1	**Thesis seminar 1** *Vladimír Socha, Lenka Hanáková* ***Vladimír Socha***	Z	2	0P+1C+4B	Z	z
15JBA3	**Language - English 3** *Jitka Heřmanová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Rezlerová, ...*	Z	2	0P+2C+10B	Z	z

Characteristics of the courses of this group of Study Plan: Code=3S-NK-PL-23/24 Name=3rd Sem. Bachelor Part-Time PL from 2023/24

11MMOA	Mathematical methods for data analysis	Z,ZK	4
Stocastic modelling, estimation, prediction, filtration, control, methods of data analysis - k-means, DBSCAN, naive Bayes, decision trees, support vector machine.			
21NSR	Navigation and Flight Control Systems	Z,ZK	5
Navigation. Radionavigation. Satellite navigation. Flight management system. Autopilot. FMC. Practical execution of flight.			
21PLDC	Air Carrier Operations	Z,ZK	5
Mission and importance of air transport. Legislation. Airlines - structure, strategy. Performances in air transport. Cost structure. Fuel management. Cargo. Aircraft maintenance (organization) and economics of aircraft operation. Ground handling and other services. Safety / Security / Quality and Compliance monitoring. Revenue management. Air transport and environment.			
21PAM2	Programming and Modelling 2	KZ	5
Descriptive statistics, classical statistical analysis. Statistical hypothesis testing. Analysis of variance (ANOVA), one-factor, two-factor ANOVA. Non-parametric methods. Linear regression. Correlation, correlation coefficient. Non-linear regression models, procedure for regression analysis of a non-linear model. Basics of machine learning. Classification by nearest neighbour method. SVM classifiers. Decision trees.			
21LIA1	Aviation Engineering English 1	Z	3
Lectures include various types of the language exercises and are focused on the following topics - EUR-Lex and European Legislation, ICAO Annexes and SARPs, AMCs and GMs, Civil Aviation Authorities, Accident investigation, Aircraft Airworthiness, Aircraft documentations and manuals, Medical certification, Emergency response plan.			
21XNL1	Thesis seminar 1	Z	2
Introduction, scientific publications, publications devoted to scientific writing, grey literature, difference between bachelor and master thesis. Time management. Formal and graphic design, mathematical typesetting, typography, paragraphing, transitions between paragraphs. LaTeX. Research, databases, critical work with text, digital notes, working with notes, outline. Rhetorical exercises / presentation skills.			
15JBA3	Language - English 3	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.Optional courses for certificates FCE, CAE.			

Code of the group: 4S-NK-PL-23/24
Name of the group: 4th Sem. Bachelor Part-Time PL from 2023/24
Requirement credits in the group: In this group you have to gain 24 credits
Requirement courses in the group: In this group you have to complete 9 courses
Credits in the group: 24
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**
21ELEG	**European Aviation Legislation** *Radoslav Zozuľák Peter Vittek (Gar.)*	ZK	3	2P+0C+8B	L	z
21KST	**Space Technology** *Jakub Hospodka, Jakub Trýb* ***Jakub Hospodka*** *Jakub Hospodka (Gar.)*	ZK	3	2P+0C+10B	L	z
21LPZP	**Air Traffic and the Environment** *Peter Vittek Luděk Beňo (Gar.)*	ZK	3	3P+0C+8B	L	z
21SYMS	**System Thinking** *Jakub Kraus* ***Jakub Kraus*** *Jakub Kraus (Gar.)*	ZK	3	2P+0C+8B	L	z
14PROM	**Process Modeling** *Marek Kalika* ***Marek Kalika*** *Marek Kalika (Gar.)*	KZ	2	2P+0C+8B	L	z
21LIA2	**Aviation Engineering English 2** *Jitka Heřmanová, Dana Boušová*	KZ	3	0P+2C+8B	L	z
21NTLE	**New Trends in Aviation Technologies** *Peter Vittek* ***Peter Vittek*** *Peter Vittek (Gar.)*	KZ	3	3P+0C+8B	L	z
21XNL2	**Thesis Seminar 2** *Vladimír Socha, Lenka Hanáková, Marta Urbanová* ***Vladimír Socha*** *Vladimír Socha (Gar.)*	Z	2	0P+2C+6B	L	z
15JBA4	**Language - English 4** *Jitka Heřmanová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Rezlerová, ...*	ZK	2	0P+2C+10B	L	z

Characteristics of the courses of this group of Study Plan: Code=4S-NK-PL-23/24 Name=4th Sem. Bachelor Part-Time PL from 2023/24

21ELEG	European Aviation Legislation	ZK	3
The content of the subject "European Aviation Legislation" is the legal regulation of air operation, the system and structure of the national and European legal system, the legal effects of EU legal acts in the Czech national environment and their impact on national regulation with a focus on requirements and criteria of individual regulations on aviation transport and transportation.			
21KST	Space Technology	ZK	3
Universe and its basic characteristics. Fundamentals of astrophysics. Kepler´s laws. Solar system. Earth's and its atmosphere and outer space. Space transport vehicles. Rockets and rocket engines and their structure and operational characteristics. Space crafts and satellites, space flight. Orbital mechanics. Application of space technologies for global navigation and communication. Space exploration and piloted space flights and missions.			
21LPZP	Air Traffic and the Environment	ZK	3
The course is about ecology, sustainable development, ecological stability, environmental protection and environmental legislation. It also focuses on air traffic with respect to the environment, current issues, threats and solutions.			
21SYMS	System Thinking	ZK	3
System, its structure, algorithmization, complexity, emergence, mind setting, critical thinking, teamwork, feedback and communication, goal setting, uncertainties and arguments, decision making under uncertainty.			
14PROM	Process Modeling	KZ	2
Definition of the process, role, KPI's, areas of interest. Process Map, definition, purpose, clear examples and demonstrations, recommendations and standards, SIPOC. Process model, definition, purpose, procedures and tools, static and dynamic models. BPMN language, syntax and semantics, process flows. Implementation of practical examples, As-Is, To-Be, optimization and evaluation.			
21LIA2	Aviation Engineering English 2	KZ	3
Lectures include various types of the language exercises and are focused on the following topics - Aviation associations, ISAGO and IGOM, EUROCONTROL, Airport Council International, International Air Transport Association, Airport Engineering, Airline business, Future development in civil aviation.			
21NTLE	New Trends in Aviation Technologies	KZ	3
The course includes an introduction to all the technologies that are currently important to aviation, such as new aircraft design concepts, new types of propulsion, and new types of aviation fuels. The course also covers new types of urban mobility, virtual reality systems, biomechanical analysis. ATM technologies are another component, and the course also looks at smart airports, the use of blockchain, and airport simulations.			
21XNL2	Thesis Seminar 2	Z	2
Selected chapters from the structure. PRISMA and meta-analysis methods. Citation, citation managers. English. Statistical inference. Presentation of results. Graphic design of the work, own and adopted graphics. Ethical principles in scientific work, publishing process, journals (impacted, open access, predatory journals). Rhetorical exercises / presentation skills. Specifics of state exams.			
15JBA4	Language - English 4	ZK	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.Optional courses for certificates FCE, CAE.			

Name of the block: Semestrální projekt
Minimal number of credits of the block: 8
The role of the block: ZP

Code of the group: X2-NX-PL-22/23
Name of the group: Research Groups Master PL from 2022/23
Requirement credits in the group: In this group you have to gain 8 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 8
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
11XN1	**Master Project 1** *Pavla Pecherková, Jana Kuklová* ***Jana Kuklová*** *Jana Kuklová (Gar.)*	Z	2	0P+2C+4B	Z	ZP
12XN1	**Master Project 1** *Daniel Chlebek, Jakub Zajíček, Zuzana Čarská, Dagmar Kočárková, Kristýna Neubergová, Martin Jacura, Jan Kruntorád, Ondřej Trešl, David Vodák, ...*	Z	2	0P+2C+4B	Z	ZP
14XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
15XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP
16XN1	**Master Project 1** *Josef Mík, Přemysl Toman*	Z	2	0P+2C+4B	Z	ZP
17XN1	**Master Project 1** *Václav Baroch, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Eliška Glaserová, Rudolf Franz Heidu, Tomáš Horák, Vít Janoš, Milan Kříž, ...*	Z	2	0P+2C+4B	Z	ZP
18XN1	**Master Project 1** *Daniel Kytýř, Václav Rada, Nela Krčmářová*	Z	2	0P+2C+4B	Z	ZP
20XN1	**Master Project 1** *Milan Sliacky, Jiří Růžička*	Z	2	0P+2C+4B	Z	ZP
21XN1	**Master Project 1** *Natalia Guskova, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Slobodan Stojić, Peter Vittek, Terézia Pilmannová, Vladimír Socha, ...*	Z	2	0P+2C+4B	Z	ZP
22XN1	**Master Project 1** *Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý, Jakub Nováček*	Z	2	0P+2C+4B	Z	ZP
23XN1	**Master Project 1**	Z	2	0P+2C+4B	Z	ZP

11XN2	**Master Project 2** *Pavla Pecherková, Jana Kuklová* ***Jana Kuklová*** *Jana Kuklová (Gar.)*	Z	2	0P+2C+8B	L	ZP
12XN2	**Master Project 2** *Daniel Chlebek, Jakub Zajíček, Zuzana Čarská, Dagmar Kočárková, Kristýna Neubergová, Martin Jacura, Jan Kruntorád, Ondřej Trešl, David Vodák, ...*	Z	2	0P+2C+8B	L	ZP
14XN2	**Master Project 2** *Vít Fábera, Tomáš Brandejský, Mária Jánešová, Jan Zelenka*	Z	2	0P+2C+8B	L	ZP
15XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
16XN2	**Master Project 2** *Josef Mík, Přemysl Toman*	Z	2	0P+2C+8B	L	ZP
17XN2	**Master Project 2** *Václav Baroch, Michal Drábek, Alexandra Dvořáčková, Veronika Faifrová, Rudolf Franz Heidu, Tomáš Horák, Vít Janoš, Milan Kříž, Olga Mertlová, ... Vít Janoš (Gar.)*	Z	2	0P+2C+8B	L	ZP
18XN2	**Master Project 2** *Nela Krčmářová, Petr Koudelka, Tomáš Fíla* ***Daniel Kytýř***	Z	2	0P+2C+8B	L	ZP
20XN2	**Master Project 2** *Milan Sliacky, Jiří Růžička, Patrik Horažďovský*	Z	2	0P+2C+8B	L	ZP
21XN2	**Master Project 2** *Natalia Guskova, Kateřina Grötschelová, Andrej Lališ, Jakub Steiner, Jakub Kraus, Slobodan Stojić, Peter Vittek, Terézia Pilmannová, Lenka Hanáková, ...*	Z	2	0P+2C+8B	L	ZP
22XN2	**Master Project 2** *Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý, Jakub Nováček*	Z	2	0P+2C+8B	L	ZP
23XN2	**Master Project 2**	Z	2	0P+2C+8B	L	ZP
11XN3L	**Master Project 3 for study programme PL** *Ivan Nagy, Michal Matowicki, Jana Kuklová, Bohumil Kovář, Ondřej Přibyl, Jan Přikryl* ***Jana Kuklová*** *Bohumil Kovář (Gar.)*	Z	2	0P+2C+8B	Z	ZP
12XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
14XN3L	**Master Project 3 for study programme PL** *Vít Fábera Vít Fábera (Gar.)*	Z	2	0P+2C+8B	Z	ZP
15XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
16XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
17XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
18XN3L	**Master Project 3 for study programme PL** *Nela Krčmářová*	Z	2	0P+2C+8B	Z	ZP
20XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
21XN3L	**Master Project 3 for study programme PL** *Natalia Guskova, Kateřina Grötschelová, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Slobodan Stojić, Peter Vittek, Terézia Pilmannová, ...*	Z	2	0P+2C+8B	Z	ZP
22XN3L	**Master Project 3 for study programme PL**	Z	2	0P+2C+8B	Z	ZP
23XN3L	**Master Project 3**	Z	2	0P+2C+8B	Z	ZP
11XN4L	**Master Project 4 for study programme PL** ***Jana Kuklová***	Z	2	0P+5C+8B	L	ZP
12XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
14XN4L	**Master Project 4 for study programme PL** *Vít Fábera, Tomáš Brandejský, Mária Jánešová, Jan Zelenka*	Z	2	0P+5C+8B	L	ZP
15XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
16XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
17XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
18XN4L	**Master Project 4 for study programme PL** *Nela Krčmářová*	Z	2	0P+5C+8B	L	ZP
20XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
21XN4L	**Master Project 4 for study programme PL** *Natalia Guskova, Kateřina Grötschelová, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Petr Had, Jiří Volt, Slobodan Stojić, ...*	Z	2	0P+5C+8B	L	ZP
22XN4L	**Master Project 4 for study programme PL**	Z	2	0P+5C+8B	L	ZP
23XN4L	**Master Project 4**	Z	2	0P+5C+8B	L	ZP

Characteristics of the courses of this group of Study Plan: Code=X2-NX-PL-22/23 Name=Research Groups Master PL from 2022/23

11XN1	Master Project 1	Z	2
12XN1	Master Project 1	Z	2
14XN1	Master Project 1	Z	2
15XN1	Master Project 1	Z	2
16XN1	Master Project 1	Z	2
17XN1	Master Project 1	Z	2
18XN1	Master Project 1	Z	2
20XN1	Master Project 1	Z	2
21XN1	Master Project 1	Z	2

22XN1	Master Project 1	Z	2
23XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
12XN2	Master Project 2	Z	2
14XN2	Master Project 2	Z	2
15XN2	Master Project 2	Z	2
16XN2	Master Project 2	Z	2
17XN2	Master Project 2	Z	2
18XN2	Master Project 2	Z	2
20XN2	Master Project 2	Z	2
21XN2	Master Project 2	Z	2
22XN2	Master Project 2	Z	2
23XN2	Master Project 2	Z	2
11XN3L	Master Project 3 for study programme PL	Z	2
12XN3L	Master Project 3 for study programme PL	Z	2
14XN3L	Master Project 3 for study programme PL	Z	2
15XN3L	Master Project 3 for study programme PL	Z	2
16XN3L	Master Project 3 for study programme PL	Z	2
17XN3L	Master Project 3 for study programme PL	Z	2
18XN3L	Master Project 3 for study programme PL	Z	2
20XN3L	Master Project 3 for study programme PL	Z	2
21XN3L	Master Project 3 for study programme PL	Z	2
22XN3L	Master Project 3 for study programme PL	Z	2
23XN3L	Master Project 3	Z	2
11XN4L	Master Project 4 for study programme PL	Z	2
12XN4L	Master Project 4 for study programme PL	Z	2
14XN4L	Master Project 4 for study programme PL	Z	2
15XN4L	Master Project 4 for study programme PL	Z	2
16XN4L	Master Project 4 for study programme PL	Z	2
17XN4L	Master Project 4 for study programme PL	Z	2
18XN4L	Master Project 4 for study programme PL	Z	2
20XN4L	Master Project 4 for study programme PL	Z	2
21XN4L	Master Project 4 for study programme PL	Z	2
22XN4L	Master Project 4 for study programme PL	Z	2
23XN4L	Master Project 4	Z	2

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 8
The role of the block: PV

Code of the group: Y2-NK-PL-22/23
Name of the group: Comp. Sel. Courses Master Part-Time PL from 2022/23
Requirement credits in the group: In this group you have to gain 8 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 8
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
21Y2FM	**Aviation Company Financial Management** *Radoslav Zozuľák* ***Radoslav Zozuľák***	KZ	2	2P+0C+8B	Z	PV
21Y2LS	**Air Traffic Services**	KZ	2	2P+0C+8B	L	PV
21Y2MQ	**Quality Management** *Luboš Socha*	KZ	2	2P+0C+8B	L	PV
21Y2MK	**Marketing of Air Transport** *Peter Vittek* ***Peter Vittek***	KZ	2	2P+0C+8B	Z	PV
21Y2MC	**CNS Systems Modelling** *Stanislav Pleninger* ***Stanislav Pleninger***	KZ	2	2P+0C+8B	Z	PV
21Y2PP	**Law and Operation in Air Transport** *Radoslav Zozuľák*	KZ	2	2P+0C+8B	L	PV
21Y2UL	**Aircraft Maintenance** *Kateřina Stuchlíková*	KZ	2	2P+0C+8B	L	PV
14Y2UI	**Artificial Intelligence**	KZ	2	2P+0C+8B	Z,L	PV

21Y2VA	**Selected Chapters of Aerodynamics**	KZ	2	2P+0C+8B	L	PV

Characteristics of the courses of this group of Study Plan: Code=Y2-NK-PL-22/23 Name=Comp. Sel. Courses Master Part-Time PL from 2022/23

21Y2FM	Aviation Company Financial Management	KZ	2
Theories of corporate finance - financial statements, budget, forecast. Financial policy of the company. Financial resources - long-term financial resources, depreciation, retained earnings, shares, bonds, loans, leasing, capital. Financial and economic analysis of the company - structure and content.			
21Y2LS	Air Traffic Services	KZ	2
Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training Systém of Air Traffic Controllers. Future development of ATS.			
21Y2MQ	Quality Management	KZ	2
History, basic definition. Pioneers in the field of quality. International quality organisations and quality promotion in the Czech Republic. Quality management system. Environmental management systems. Integrated management systems. Risk management in the context of the requirements of ISO standards. Sectoral quality management systems. Comprehensive quality management, excellence models and corporate social responsibility. Quality audits.			
21Y2MK	Marketing of Air Transport	KZ	2
The content of the course "Marketing in air transport" is the management of activities and processes using available marketing tools and processes for analysis, strategy development and implementation of sales of goods and services in the aviation industry. In addition to the theoretical foundations of marketing, the lectures present systems of market, competition and product analysis, creation of marketing strategies and planning.			
21Y2MC	CNS Systems Modelling	KZ	2
The course is designed as a set of model tasks in the field of communication navigation and surveillance systems in aviation, addressed using mathematical approaches and software tools. A large part is devoted to air targets tracking, measurement-to-track association, track filtering and multisensor tracking.			
21Y2PP	Law and Operation in Air Transport	KZ	2
Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods.			
21Y2UL	Aircraft Maintenance	KZ	2
Approved Maintenance Organisations (AMOs), Continuing Airworthiness Management Organisations (CAMOs), Maintenance Training Organisations (MTOs), technical documentation and additional ICA (Instructions for Continued Airworthiness) instructions, aircraft release to service procedure, maintenance programmes and scheduling, modifications and general repair methods, aircraft centre of gravity and weights, human factors in aircraft maintenance.			
14Y2UI	Artificial Intelligence	KZ	2
History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.			
21Y2VA	Selected Chapters of Aerodynamics	KZ	2
Physical properties of real gases, atmosphere, aeronautical applications of external and internal aerodynamics, compressible internal flow, inlet nozzles and drive nozzles, compressible external flow, supercritical wings and profiles, vertical and oblique shock wave, energy losses, aeronautical aerodynamic profiles of wings, propellers, blades gratings, lift, drag, polar, viscosity, laminar and turbulent flow, boundary layer.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
11APAS	Applied Statistics	Z,ZK	4
Descriptive statistics, data preprocessing, discretize continuous data. Hypothesis testing - continuous and discrete variables. Regression and correlation analysis. Multivariable methods - multiple regression analysis, logistic regression analysis, ROC curve, MANOVA, PCA, Factor analysis. Power analysis, preparation, processing and evaluation of hte experiment.			
11MMJ	Mathematical Models and their Applications	Z,ZK	4
System. Regression, discrete and logistic models. Bayesian estimation of model parameters. Parameter estimation of normal regression, discrete and logistic models. Classification with logistic model. One-step and multi-step prediction with regression and discrete models. State model. State estimation. Kalman filter. Control with regression and discrete models.			
11MMOA	Mathematical methods for data analysis	Z,ZK	4
Stocastic modelling, estimation, prediction, filtration, control, methods of data analysis - k-means, DBSCAN, naive Bayes, decision trees, support vector machine.			
11XN1	Master Project 1	Z	2
11XN2	Master Project 2	Z	2
11XN3L	Master Project 3 for study programme PL	Z	2
11XN4L	Master Project 4 for study programme PL	Z	2
12XN1	Master Project 1	Z	2
12XN2	Master Project 2	Z	2
12XN3L	Master Project 3 for study programme PL	Z	2
12XN4L	Master Project 4 for study programme PL	Z	2
14PROM	Process Modeling	KZ	2
Definition of the process, role, KPI's, areas of interest. Process Map, definition, purpose, clear examples and demonstrations, recommendations and standards, SIPOC. Process model, definition, purpose, procedures and tools, static and dynamic models. BPMN language, syntax and semantics, process flows. Implementation of practical examples, As-Is, To-Be, optimization and evaluation.			
14XN1	Master Project 1	Z	2
14XN2	Master Project 2	Z	2
14XN3L	Master Project 3 for study programme PL	Z	2
14XN4L	Master Project 4 for study programme PL	Z	2

14Y2UI	Artificial Intelligence	KZ	2
History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.			
15J2A1	Language - English 1	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
15JBA2	Language - English 2	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.			
15JBA3	Language - English 3	Z	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.Optional courses for certificates FCE, CAE.			
15JBA4	Language - English 4	ZK	2
Presentation Skills - expert technical discourse and style; Analysis of expert texts and their production; Preparation for overseas work engagement.Optional courses for certificates FCE, CAE.			
15XN1	Master Project 1	Z	2
15XN2	Master Project 2	Z	2
15XN3L	Master Project 3 for study programme PL	Z	2
15XN4L	Master Project 4 for study programme PL	Z	2
16XN1	Master Project 1	Z	2
16XN2	Master Project 2	Z	2
16XN3L	Master Project 3 for study programme PL	Z	2
16XN4L	Master Project 4 for study programme PL	Z	2
17XN1	Master Project 1	Z	2
17XN2	Master Project 2	Z	2
17XN3L	Master Project 3 for study programme PL	Z	2
17XN4L	Master Project 4 for study programme PL	Z	2
18XN1	Master Project 1	Z	2
18XN2	Master Project 2	Z	2
18XN3L	Master Project 3 for study programme PL	Z	2
18XN4L	Master Project 4 for study programme PL	Z	2
20XN1	Master Project 1	Z	2
20XN2	Master Project 2	Z	2
20XN3L	Master Project 3 for study programme PL	Z	2
20XN4L	Master Project 4 for study programme PL	Z	2
21AFM	Air Traffic Management	Z,ZK	5
Current ATM system and its functional blocks. View of ATM data (technical architecture and configuration, transmission systems and networks). Data exchange with neighboring ATM systems. Monitoring systems and technical supervision. ATM simulation. ATM conceptions and strategies for next years. EUROCONTROL - CFMU. FAB. ATS's - AOC's data applications.			
21BILD	Safety Engineering in Aviation	Z,ZK	4
The course is focused on understanding the issue of safety, learning how to assess new systems in terms of safety and acquiring principles of safety management. Students will learn explaining accidents and incident causes and bridge their theoretical knowledge with practical problems of air transport.			
21CNSS	CNS Systems	Z,ZK	5
Course provides full technical informations about CNS (communication, navigation, surveilance) systems used in aviation. Systems are presented in perspective of future development.			
21ELEG	European Aviation Legislation	ZK	3
The content of the subject "European Aviation Legislation" is the legal regulation of air operation, the system and structure of the national and European legal system, the legal effects of EU legal acts in the Czech national environment and their impact on national regulation with a focus on requirements and criteria of individual regulations on aviation transport and transportation.			
21KST	Space Technology	ZK	3
Universe and its basic characteristics. Fundamentals of astrophysics. Kepler´s laws. Solar system. Earth's and its atmosphere and outer space. Space transport vehicles. Rockets and rocket engines and their structure and operational characteristics. Space crafts and satellites, space flight. Orbital mechanics. Application of space technologies for global navigation and communication. Space exploration and piloted space flights and missions.			
21LETS	Airport	Z,ZK	4
Methods of designing new airports and developing existing ones. Connection of the airport to the surrounding infrastructure. Airport economics. Detailed look at the development of movement areas. Certification of airside movement areas and procedures according to EASA CS-ADR-DSN. Development planning - design, preparation and regulatory basis. Environmental aspects of airport operations.			
21LIA1	Aviation Engineering English 1	Z	3
Lectures include various types of the language exercises and are focused on the following topics - EUR-Lex and European Legislation, ICAO Annexes and SARPs, AMCs and GMs, Civil Aviation Authorities, Accident investigation, Aircraft Airworthiness, Aircraft documentations and manuals, Medical certification, Emergency response plan.			
21LIA2	Aviation Engineering English 2	KZ	3
Lectures include various types of the language exercises and are focused on the following topics - Aviation associations, ISAGO and IGOM, EUROCONTROL, Airport Council International, International Air Transport Association, Airport Engineering, Airline business, Future development in civil aviation.			
21LPZP	Air Traffic and the Environment	ZK	3
The course is about ecology, sustainable development, ecological stability, environmental protection and environmental legislation. It also focuses on air traffic with respect to the environment, current issues, threats and solutions.			
21MULD	Managerial Challenges in Air Transport	Z,ZK	5
The course contains a list of basic managerial tasks in aviation. The basic managerial tasks are quality assurance and operational safety, marketing operations, marketing context implementation, airline network management, fleet management and revenue management. The core disciplines also include project management, cost management and project resource planning and management.			
21NSR	Navigation and Flight Control Systems	Z,ZK	5
Navigation. Radionavigation. Satellite navigation. Flight management system. Autopilot. FMC. Practical execution of flight.			

21NTLE	New Trends in Aviation Technologies	KZ	3
The course includes an introduction to all the technologies that are currently important to aviation, such as new aircraft design concepts, new types of propulsion, and new types of aviation fuels. The course also covers new types of urban mobility, virtual reality systems, biomechanical analysis. ATM technologies are another component, and the course also looks at smart airports, the use of blockchain, and airport simulations.			
21PAM1	Programming and Modelling 1	KZ	5
Harmonic signals, their generation. Real signals, sampling theorem, aliasing. Signal filtering. Fourier transform (FT), discrete Fourier transform (DFT), fast Fourier transform (FFT). Spectrum estimation, spectral power density. Image - basic processing methods, 2D Fourier transform, noise filtering, edge detection, linear and non-linear methods, brightness transforms, geometric transforms, image compression.			
21PAM2	Programming and Modelling 2	KZ	5
Descriptive statistics, classical statistical analysis. Statistical hypothesis testing. Analysis of variance (ANOVA), one-factor, two-factor ANOVA. Non-parametric methods. Linear regression. Correlation, correlation coefficient. Non-linear regression models, procedure for regression analysis of a non-linear model. Basics of machine learning. Classification by nearest neighbour method. SVM classifiers. Decision trees.			
21PEKL	Principles and Models in Air Transport Economics	Z,ZK	5
The course contains the most important and typical models on which the economics of air transport is based. It covers the principles of regulation, airline infrastructure models, market structure, analyses airline costs, and looks in detail at the low-cost and charter airline model. It also focuses on airline alliances, air cargo, airline strategies and the economic principles of safety and security.			
21PLDC	Air Carrier Operations	Z,ZK	5
Mission and importance of air transport. Legislation. Airlines - structure, strategy. Performances in air transport. Cost structure. Fuel management. Cargo. Aircraft maintenance (organization) and economics of aircraft operation. Ground handling and other services. Safety / Security / Quality and Compliance monitoring. Revenue management. Air transport and environment.			
21PLET	Airport Operations	Z,ZK	5
Planning, design and modelling of airport processes in airside, landside and terminal buildings. Impact of infrastructure and equipment on airport capacity. Available tools and practices for increasing capacity. Operational analytics, capacity and traffic load forecasting. Purpose and development of an airport masterplan.			
21SPOL	Aircraft Technology Reliability	Z,ZK	4
Subject deals with tuition of separate attributes of reliability (no failure, vitality, maintainability, and so on) and main criterions of safety of production and working of aerospace engineering. General legalities are in the framework of tuition demonstrated on the example of calculation of reliability of integral characteristics of materials and they are practical illustration of its security in The Czech Police Aviation Department.			
21SYMS	System Thinking	ZK	3
System, its structure, algorithmization, complexity, emergence, mind setting, critical thinking, teamwork, feedback and communication, goal setting, uncertainties and arguments, decision making under uncertainty.			
21XN1	Master Project 1	Z	2
21XN2	Master Project 2	Z	2
21XN3L	Master Project 3 for study programme PL	Z	2
21XN4L	Master Project 4 for study programme PL	Z	2
21XNL1	Thesis seminar 1	Z	2
Introduction, scientific publications, publications devoted to scientific writing, grey literature, difference between bachelor and master thesis. Time management. Formal and graphic design, mathematical typesetting, typography, paragraphing, transitions between paragraphs. LaTeX. Research, databases, critical work with text, digital notes, working with notes, outline. Rhetorical exercises / presentation skills.			
21XNL2	Thesis Seminar 2	Z	2
Selected chapters from the structure. PRISMA and meta-analysis methods. Citation, citation managers. English. Statistical inference. Presentation of results. Graphic design of the work, own and adopted graphics. Ethical principles in scientific work, publishing process, journals (impacted, open access, predatory journals). Rhetorical exercises / presentation skills. Specifics of state exams.			
21Y2FM	Aviation Company Financial Management	KZ	2
Theories of corporate finance - financial statements, budget, forecast. Financial policy of the company. Financial resources - long-term financial resources, depreciation, retained earnings, shares, bonds, loans, leasing, capital. Financial and economic analysis of the company - structure and content.			
21Y2LS	Air Traffic Services	KZ	2
Airspace structure in Czech Republic and other countries. Introduction and description of ATS units in Czech Republic. Practical examples of TWR, APP a ACC control. History of ATS at USA and Czechoslovakia. ATS - Model of financing. Training Systém of Air Traffic Controllers. Future development of ATS.			
21Y2MC	CNS Systems Modelling	KZ	2
The course is designed as a set of model tasks in the field of communication navigation and surveillance systems in aviation, addressed using mathematical approaches and software tools. A large part is devoted to air targets tracking, measurement-to-track association, track filtering and multisensor tracking.			
21Y2MK	Marketing of Air Transport	KZ	2
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21Y2MQ	Quality Management	KZ	2
History, basic definition. Pioneers in the field of quality. International quality organisations and quality promotion in the Czech Republic. Quality management system. Environmental management systems. Integrated management systems. Risk management in the context of the requirements of ISO standards. Sectoral quality management systems. Comprehensive quality management, excellence models and corporate social responsibility. Quality audits.			
21Y2PP	Law and Operation in Air Transport	KZ	2
Development of aviation law. International conventions on civil aviation. International organisations and including of the Czech Republic in these organisations. EU legislation and civil aviation. Execution of state administration and state supervision in matters of civil aviation, in accordance with Act No. 49/1997 Col. Facilitation. Responsibilities of air carriers for passengers, luggage and cargo. The safe transport of dangerous goods.			
21Y2UL	Aircraft Maintenance	KZ	2
Approved Maintenance Organisations (AMOs), Continuing Airworthiness Management Organisations (CAMOs), Maintenance Training Organisations (MTOs), technical documentation and additional ICA (Instructions for Continued Airworthiness) instructions, aircraft release to service procedure, maintenance programmes and scheduling, modifications and general repair methods, aircraft centre of gravity and weights, human factors in aircraft maintenance.			
21Y2VA	Selected Chapters of Aerodynamics	KZ	2
Physical properties of real gases, atmosphere, aeronautical applications of external and internal aerodynamics, compressible internal flow, inlet nozzles and drive nozzles, compressible external flow, supercritical wings and profiles, vertical and oblique shock wave, energy losses, aeronautical aerodynamic profiles of wings, propellers, blades gratings, lift, drag, polar, viscosity, laminar and turbulent flow, boundary layer.			

22XN1	Master Project 1	Z	2
22XN2	Master Project 2	Z	2
22XN3L	Master Project 3 for study programme PL	Z	2
22XN4L	Master Project 4 for study programme PL	Z	2
23XN1	Master Project 1	Z	2
23XN2	Master Project 2	Z	2
23XN3L	Master Project 3	Z	2
23XN4L	Master Project 4	Z	2

For updated information see http://bilakniha.cvut.cz/en/FF.html
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