

Study plan

Name of study plan: Master Full-Time PL from 2023/24

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 full-time

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-NP-PL-22/23

Name of the group: 1st Sem. Master Full-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 Evžen Uglickich, Pavla Pecherková Pavla Pecherková	Z,ZK	4	2P+2C+12B	Z	z
11MMJ	Mathematical Models and their Applications Evžen Uglickich, Pavla Pecherková, Ivan Nagy, Michal Matowicki, Natálie Blahitka Pavla Pecherková Evžen 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 Líka, Sébastien Lán, Petr Had, Jiří Volt, Slobodan Stoji Slobodan Stoji	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-NP-PL-22/23 Name=1st Sem. Master Full-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 the 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 information about CNS (communication, navigation, surveillance) 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-NP-PL-22/23

Name of the group: 2nd Sem. Master Full-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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
21AFM	Air Traffic Management <i>Jakub Kraus, Terézia Pilmannová, Martina Hlavatá Jakub Kraus Jakub Kraus (Gar.)</i>	Z,ZK	5	3P+2C+16B	L	z
21MULD	Managerial Challenges in Air Transport <i>Peter Vittek Peter Vittek Peter Vittek (Gar.)</i>	Z,ZK	5	3P+2C+14B	L	z
21PLET	Airport Operations <i>Sébastien Lán, Petr Had, Jiří Volt Slobodan Stoji Slobodan Stoji (Gar.)</i>	Z,ZK	5	2P+2C+12B	L	z
21SPOL	Aircraft Technology Reliability <i>Natalia Guskova, Kateřina Grötschelová, Oldřich Štumbauer, Kiyofoto Benjamin Ouattara Andrej Lališ (Gar.)</i>	Z,ZK	4	2P+1C+12B	L	z
21PAM1	Programming and Modelling 1 <i>Vladimír Socha, Lenka Hanáková Vladimír Socha Vladimír Socha (Gar.)</i>	KZ	5	2P+4C+16B	L	z
15JBA2	Language - English 2 <i>Jitka Heřmanová, Dana Bouřňová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Režlerová,</i>	Z	2	0P+2C+10B	L	z

Characteristics of the courses of this group of Study Plan: Code=2S-NP-PL-22/23 Name=2nd Sem. Master Full-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-NP-PL-23/24

Name of the group: 3rd Sem. Bachelor Full-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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11MMOA	Mathematical methods for data analysis <i>Evžen Uglickich, Pavla Pecherková Pavla Pecherková Evžen Uglickich (Gar.)</i>	Z,ZK	4	2P+2C+12B	Z	z

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

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

11MMA	Mathematical methods for data analysis Stochastic modelling, estimation, prediction, filtration, control, methods of data analysis - k-means, DBSCAN, naive Bayes, decision trees, support vector machine.	Z,ZK	4
21NSR	Navigation and Flight Control Systems Navigation. Radionavigation. Satellite navigation. Flight management system. Autopilot. FMC. Practical execution of flight.	Z,ZK	5
21PLDC	Air Carrier Operations 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.	Z,ZK	5
21PAM2	Programming and Modelling 2 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.	KZ	5
21LIA1	Aviation Engineering English 1 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.	Z	3
21XNL1	Thesis seminar 1 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.	Z	2
15JBA3	Language - English 3 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.	Z	2

Code of the group: 4S-NP-PL-23/24

Name of the group: 4th Sem. Bachelor Full-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) <i>Tutors, authors and guarantors (Gar.)</i>	Completion	Credits	Scope	Semester	Role
21ELEG	European Aviation Legislation <i>Radoslav Zozuák Peter Vittek (Gar.)</i>	ZK	3	2P+0C+8B	L	z
21KST	Space Technology <i>Jakub Hospodka, Jakub Trýb Jakub Hospodka Jakub Hospodka (Gar.)</i>	ZK	3	2P+0C+10B	L	z
21LPZP	Air Traffic and the Environment <i>Peter Vittek Lud k Be o (Gar.)</i>	ZK	3	3P+0C+8B	L	z
21SYMS	System Thinking <i>Jakub Kraus Jakub Kraus Jakub Kraus (Gar.)</i>	ZK	3	2P+0C+8B	L	z
14PROM	Process Modeling <i>Marek Kalika Marek Kalika Marek Kalika (Gar.)</i>	KZ	2	2P+0C+8B	L	z
21LIA2	Aviation Engineering English 2 <i>Jitka He manová, Dana Boušová</i>	KZ	3	0P+2C+8B	L	z
21NTLE	New Trends in Aviation Technologies <i>Peter Vittek Peter Vittek Peter Vittek (Gar.)</i>	KZ	3	3P+0C+8B	L	z
21XNL2	Thesis Seminar 2 <i>Vladimír Socha, Lenka Hanáková, Marta Urbanová Vladimír Socha Vladimír Socha (Gar.)</i>	Z	2	0P+2C+6B	L	z
15JBA4	Language - English 4 <i>Jitka He manová, Dana Boušová, Lenka Monková, Peter Morpuss, Markéta Vojanová, Marie Michlová, Markéta Musilová, Jan Feit, Eva Rezlerová,</i>	ZK	2	0P+2C+10B	L	z

Characteristics of the courses of this group of Study Plan: Code=4S-NP-PL-23/24 Name=4th Sem. Bachelor Full-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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
11XN1	Master Project 1 <i>Ivan Nagy</i>	Z	2	0P+2C+4B	Z	ZP
12XN1	Master Project 1 <i>Daniel Chlebek, Jakub Zajíček, Zuzana Šárská, Dagmar Koňáková, Kristýna Neubergová, Martin Jacura, Jan Kruntorád, Ondřej Třešl, David Vodák,</i>	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 <i>Josef Mík, Přemysl Toman</i>	Z	2	0P+2C+4B	Z	ZP
17XN1	Master Project 1 <i>Václav Baroch, Michal Drábek, Alexandra Dvořáková, Veronika Faifrová, Eliška Glaserová, Rudolf Franz Heidt, Tomáš Horák, Vít Janoš, Milan Kříž,</i>	Z	2	0P+2C+4B	Z	ZP
18XN1	Master Project 1 <i>Daniel Kytý, Václav Rada, Nela Krásová</i>	Z	2	0P+2C+4B	Z	ZP
20XN1	Master Project 1 <i>Milan Šliacky, Jiří Růžka</i>	Z	2	0P+2C+4B	Z	ZP
21XN1	Master Project 1 <i>Natalia Guskova, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Slobodan Stojić, Peter Vittek, Terézia Pilmannová, Vladimír Socha,</i>	Z	2	0P+2C+4B	Z	ZP
22XN1	Master Project 1 <i>Michal Frydřín, Karel Kocián, Luboš Nouzovský, Zdeněk Svatý, Jakub Nováček</i>	Z	2	0P+2C+4B	Z	ZP
23XN1	Master Project 1	Z	2	0P+2C+4B	Z	ZP

11XN2	Master Project 2 <i>Ivan Nagy</i>	Z	2	0P+2C+8B	L	ZP
12XN2	Master Project 2 <i>Daniel Chlebek, Jakub Zají ek, Zuzana arská, Dagmar Ko árková, Kristýna Neubergová, Martin Jacura, Jan Kruntorád, Ond ej Trešl, David Vodák,</i>	Z	2	0P+2C+8B	L	ZP
14XN2	Master Project 2 <i>Vít Fábera, Tomáš Brandejský, Mária Jánešová, Jan Zelenka</i>	Z	2	0P+2C+8B	L	ZP
15XN2	Master Project 2	Z	2	0P+2C+8B	L	ZP
16XN2	Master Project 2 <i>Josef Mik, P emysl Toman</i>	Z	2	0P+2C+8B	L	ZP
17XN2	Master Project 2 <i>Václav Baroch, Michal Drábek, Alexandra Dvo á ková, Veronika Faifrová, Rudolf Franz Heid, Tomáš Horák, Vít Janoš, Milan K íž, Olga Mertlová, Vít Janoš (Gar.)</i>	Z	2	0P+2C+8B	L	ZP
18XN2	Master Project 2 <i>Nela Kr má ová, Petr Koudelka Daniel Kytý</i>	Z	2	0P+2C+8B	L	ZP
20XN2	Master Project 2 <i>Ji í R ži ka, Patrik Horaž ovský</i>	Z	2	0P+2C+8B	L	ZP
21XN2	Master Project 2 <i>Natalia Guskova, Kate ina Grötschelová, Andrej Lališ, Jakub Steiner, Jakub Kraus, Slobodan Stoji , Peter Vittek, Terézia Pilmannová, Lenka Hanáková,</i>	Z	2	0P+2C+8B	L	ZP
22XN2	Master Project 2 <i>Michal Frydrýn, Karel Kocián, Luboš Nouzovský, Zden k Svatý, Jakub Nová ek</i>	Z	2	0P+2C+8B	L	ZP
23XN2	Master Project 2	Z	2	0P+2C+8B	L	ZP
11XN3L	Master Project 3 <i>Ivan Nagy, Michal Matowicki, Bohumil Ková , Jana Kuklová, Ond ej P ibyl, Jan P íkryl Jana Kuklová Bohumil Ková (Gar.)</i>	Z	2	0P+2C+8B	Z	ZP
12XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
14XN3L	Master Project 3 <i>Vít Fábera Vít Fábera (Gar.)</i>	Z	2	0P+2C+8B	Z	ZP
15XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
16XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
17XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
18XN3L	Master Project 3 <i>Nela Kr má ová</i>	Z	2	0P+2C+8B	Z	ZP
20XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
21XN3L	Master Project 3 <i>Natalia Guskova, Kate ina Grötschelová, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Slobodan Stoji , Peter Vittek, Terézia Pilmannová,</i>	Z	2	0P+2C+8B	Z	ZP
22XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
23XN3L	Master Project 3	Z	2	0P+2C+8B	Z	ZP
11XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
12XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
14XN4L	Master Project 4 <i>Vít Fábera, Tomáš Brandejský, Mária Jánešová, Jan Zelenka</i>	Z	2	0P+5C+8B	L	ZP
15XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
16XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
17XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
18XN4L	Master Project 4 <i>Nela Kr má ová</i>	Z	2	0P+5C+8B	L	ZP
20XN4L	Master Project 4	Z	2	0P+5C+8B	L	ZP
21XN4L	Master Project 4 <i>Natalia Guskova, Kate ina Grötschelová, Andrej Lališ, Stanislav Pleninger, Jakub Steiner, Jakub Kraus, Petr Had, Ji í Volt, Slobodan Stoji ,</i>	Z	2	0P+5C+8B	L	ZP
22XN4L	Master Project 4	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	Z	2
12XN3L	Master Project 3	Z	2
14XN3L	Master Project 3	Z	2
15XN3L	Master Project 3	Z	2
16XN3L	Master Project 3	Z	2
17XN3L	Master Project 3	Z	2
18XN3L	Master Project 3	Z	2
20XN3L	Master Project 3	Z	2
21XN3L	Master Project 3	Z	2
22XN3L	Master Project 3	Z	2
23XN3L	Master Project 3	Z	2
11XN4L	Master Project 4	Z	2
12XN4L	Master Project 4	Z	2
14XN4L	Master Project 4	Z	2
15XN4L	Master Project 4	Z	2
16XN4L	Master Project 4	Z	2
17XN4L	Master Project 4	Z	2
18XN4L	Master Project 4	Z	2
20XN4L	Master Project 4	Z	2
21XN4L	Master Project 4	Z	2
22XN4L	Master Project 4	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-NP-PL-23/24

Name of the group: Comp. Sel. Courses Master Full-Time PL from 2023/24

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
00Y2XN	Active participation in a scientific project, workshop, short-term trip abroad <i>Patrik Horaž ovský Patrik Horaž ovský (Gar.)</i>	KZ	2	2P+0C		PV
21Y2BS	Unmanned aircraft systems 2 <i>Tomáš Tlu ho , Michal erný Tomáš Tlu ho</i>	KZ	2	2P+0C+8B	Z	PV
21Y2CR	CRM <i>Ladislav Capoušek</i>	KZ	2	2P+0C+8B	L	PV
21Y2FM	Aviation Company Financial Management <i>Radoslav Zozu ák Radoslav Zozu ák</i>	KZ	2	2P+0C+8B	Z	PV
21Y2LS	Air Traffic Services	KZ	2	2P+0C+8B	L	PV
21Y2MQ	Quality Management <i>Luboš Šocha</i>	KZ	2	2P+0C+8B	L	PV
21Y2MK	Marketing of Air Transport <i>Peter Vittek Peter Vittek</i>	KZ	2	2P+0C+8B	Z	PV

22Y2MN	Methods and Procedures of Aircraft Accident Investigation <i>Michal Frydřín, Karel Mündel Karel Mündel (Gar.)</i>	KZ	2	2P+0C	L	PV
21Y2MC	CNS Systems Modelling <i>Stanislav Pleninger Stanislav Pleninger</i>	KZ	2	2P+0C+8B	Z	PV
21Y2MG	Military Aerospace Technologies: Applications and Global Dynamics	KZ	2	2P+0C	Z	PV
21Y2PP	Law and Operation in Air Transport <i>Radoslav Zozuák</i>	KZ	2	2P+0C+8B	L	PV
21Y2UL	Aircraft Maintenance <i>Kateřina Stuchlíková</i>	KZ	2	2P+0C+8B	L	PV
14Y2UI	Artificial Intelligence	KZ	2	2P+0C+8B	Z,L	PV
15Y2ZA	Basic Principles of English Academic Writing and Abstract in English <i>Dana Bouřšová</i>	KZ	2	2P+0C	Z	PV

Characteristics of the courses of this group of Study Plan: Code=Y2-NP-PL-23/24 Name=Comp. Sel. Courses Master Full-Time PL from 2023/24

00Y2XN	Active participation in a scientific project, workshop, short-term trip abroad	KZ	2
21Y2BS	Unmanned aircraft systems 2 Modern trends in unmanned aircraft development. Use of unmanned aircraft. Managerial activities related to the operation of unmanned aircraft. Flights beyond the applicable legislation.	KZ	2
21Y2CR	CRM Introduction to CRM. Analysis of air accidents. Human factor. Error. Historical development of CRM. Health and fitness. Stress and its effect on the human body. Fatigue Sleep & Vigilance. Information Processing. Situational Awareness. Workload Management. Decision Making. Communication. Leadership & Team Behaviour. Automation.	KZ	2
21Y2FM	Aviation Company Financial Management 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.	KZ	2
21Y2LS	Air Traffic Services 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.	KZ	2
21Y2MQ	Quality Management 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.	KZ	2
21Y2MK	Marketing of Air Transport 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.	KZ	2
22Y2MN	Methods and Procedures of Aircraft Accident Investigation Expanding knowledge of practical procedures in aircraft accident investigation. Equipment and organisation of the investigation team. Examples of aircraft accident investigations in the Czech Republic and abroad and analysis of published final reports. Examples of the preparation of the final report of an air accident investigation.	KZ	2
21Y2MC	CNS Systems Modelling 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.	KZ	2
21Y2MG	Military Aerospace Technologies: Applications and Global Dynamics	KZ	2
21Y2PP	Law and Operation in Air Transport 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.	KZ	2
21Y2UL	Aircraft Maintenance 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.	KZ	2
14Y2UI	Artificial Intelligence History of artificial intelligence, knowledge, its representation including frames, state space search, constraints, genetic algorithms, machine learning.	KZ	2
15Y2ZA	Basic Principles of English Academic Writing and Abstract in English Theory, creating a phrasal bank according to students' specialisations, rhetorical analysis or texts/abstracts, drafting an abstract, providing effective feedback.	KZ	2

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: VP-NP-PL

Name of the group: Master Full-Time PL voluntary

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

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
15JCZ1	Czech Language for Foreign Students 1 <i>Irena Veselková</i>	Z	0	0P+2C	Z	v
15JCZ2	Czech Language for Foreign Students 2 <i>Irena Veselková</i>	Z	0	0P+2C	L	v
15JCZ3	Czech Language for Foreign Students 3 <i>Irena Veselková</i>	Z		0P+2C	Z	v
15JCZ4	Czech Language for Foreign Students 4 <i>Irena Veselková</i>	Z		0P+2C	L	v

Characteristics of the courses of this group of Study Plan: Code=VP-NP-PL Name=Master Full-Time PL voluntary

15JCZ1	Czech Language for Foreign Students 1	Z	0
Basic structures of Czech language, common communication situations, study, work, leisure time activities, introduction of myself, phonetics of Czech language, writing skills.			
15JCZ2	Czech Language for Foreign Students 2	Z	0
Basic structures of Czech language, common communication situations, study, work, leisure time activities, introduction of myself, phonetics of Czech language, writing skills.			
15JCZ3	Czech Language for Foreign Students 3	Z	
Language structures with regard to the group level. Listening and oral fluency drill. Basic terminology.			
15JCZ4	Czech Language for Foreign Students 4	Z	
Language structures with regard to the group level. Listening and oral fluency drill. Basic terminology.			

List of courses of this pass:

Code	Name of the course	Completion	Credits
00Y2XN	Active participation in a scientific project, workshop, short-term trip abroad	KZ	2
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 the 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.			
11MMA	Mathematical methods for data analysis	Z,ZK	4
Stochastic 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	Z	2
11XN4L	Master Project 4	Z	2
12XN1	Master Project 1	Z	2
12XN2	Master Project 2	Z	2
12XN3L	Master Project 3	Z	2
12XN4L	Master Project 4	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	Z	2
14XN4L	Master Project 4	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.			
15JCZ1	Czech Language for Foreign Students 1	Z	0
Basic structures of Czech language, common communication situations, study, work, leisure time activities, introduction of myself, phonetics of Czech language, writing skills.			

15JCZ2	Czech Language for Foreign Students 2	Z	0
Basic structures of Czech language, common communication situations, study, work, leisure time activities, introduction of myself, phonetics of Czech language, writing skills.			
15JCZ3	Czech Language for Foreign Students 3	Z	
Language structures with regard to the group level. Listening and oral fluency drill. Basic terminology.			
15JCZ4	Czech Language for Foreign Students 4	Z	
Language structures with regard to the group level. Listening and oral fluency drill. Basic terminology.			
15XN1	Master Project 1	Z	2
15XN2	Master Project 2	Z	2
15XN3L	Master Project 3	Z	2
15XN4L	Master Project 4	Z	2
15Y2ZA	Basic Principles of English Academic Writing and Abstract in English	KZ	2
Theory, creating a phrasal bank according to students' specialisations, rhetorical analysis of texts/abstracts, drafting an abstract, providing effective feedback.			
16XN1	Master Project 1	Z	2
16XN2	Master Project 2	Z	2
16XN3L	Master Project 3	Z	2
16XN4L	Master Project 4	Z	2
17XN1	Master Project 1	Z	2
17XN2	Master Project 2	Z	2
17XN3L	Master Project 3	Z	2
17XN4L	Master Project 4	Z	2
18XN1	Master Project 1	Z	2
18XN2	Master Project 2	Z	2
18XN3L	Master Project 3	Z	2
18XN4L	Master Project 4	Z	2
20XN1	Master Project 1	Z	2
20XN2	Master Project 2	Z	2
20XN3L	Master Project 3	Z	2
20XN4L	Master Project 4	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, surveillance) 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	Z	2
21XN4L	Master Project 4	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.			
21Y2BS	Unmanned aircraft systems 2	KZ	2
Modern trends in unmanned aircraft development. Use of unmanned aircraft. Managerial activities related to the operation of unmanned aircraft. Flights beyond the applicable legislation.			
21Y2CR	CRM	KZ	2
Introduction to CRM. Analysis of air accidents. Human factor. Error. Historical development of CRM. Health and fitness. Stress and its effect on the human body. Fatigue Sleep & Vigilance. Information Processing. Situational Awareness. Workload Management. Decision Making. Communication. Leadership & Team Behaviour. Automation.			
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.			
21Y2MG	Military Aerospace Technologies: Applications and Global Dynamics	KZ	2
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.			
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.			
22XN1	Master Project 1	Z	2

22XN2	Master Project 2	Z	2
22XN3L	Master Project 3	Z	2
22XN4L	Master Project 4	Z	2
22Y2MN	Methods and Procedures of Aircraft Accident Investigation	KZ	2
Expanding knowledge of practical procedures in aircraft accident investigation. Equipment and organisation of the investigation team. Examples of aircraft accident investigations in the Czech Republic and abroad and analysis of published final reports. Examples of the preparation of the final report of an air accident investigation.			
23XN1	Master Project 1	Z	2
23XN2	Master Project 2	Z	2
23XN3L	Master Project 3	Z	2
23XN4L	Master Project 4	Z	2

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