Study plan

Name of study plan: navaz. mag. PRE program IS joint degree 22/23 (nová akreditace)

Faculty/Institute/Others:
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Intelligent Transport Systems
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: Semestrální projekt
Minimal number of credits of the block: 27
The role of the block: ZP

Code of the group: XN IS EN 1-4 21/22
Name of the group: Projekty nav.prez.1.-4.sem (od) 21/22 programu IS v EN
Requirement credits in the group: In this group you have to gain 27 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 27
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
11XN1S-E	**Master project 1 for study programme IS** *Evženie Uglickich, Bohumil Kovář, Jan Přikryl* ***Jan Přikryl*** *Evženie Uglickich (Gar.)*	Z	5	0P+4C	Z	ZP
12XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
14XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
15XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
16XN1S-E	**Master project 1 for study programme IS** *David Lehet, Tereza Kunclová*	Z	5	0P+4C	Z	ZP
17XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
18XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
20XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
21XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
22XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
23XN1S-E	**Master project 1 for study programme IS**	Z	5	0P+4C	Z	ZP
11XN2S-E	**Master project 2 for study programme IS** ***Jan Přikryl***	Z	6	0P+4C	L	ZP
12XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
14XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
15XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
16XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
17XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
18XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
20XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
21XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
22XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
23XN2S-E	**Master project 2 for study programme IS**	Z	6	0P+4C	L	ZP
11XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP

12XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
14XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
15XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
16XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
17XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
18XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
20XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
21XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
22XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
23XN3S-E	**Master project 3 for study programme IS**	Z	6	0P+4C	Z	ZP
11XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
12XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
14XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
15XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
16XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
17XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
18XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
20XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
21XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
22XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP
23XN4S-E	**Master project 4 for study programme IS**	Z	10	0P+8C	L	ZP

Characteristics of the courses of this group of Study Plan: Code=XN IS EN 1-4 21/22 Name=Projekty nav.prez.1.-4.sem (od) 21/22 programu IS v EN

11XN1S-E	Master project 1 for study programme IS	Z	5
12XN1S-E	Master project 1 for study programme IS	Z	5
14XN1S-E	Master project 1 for study programme IS	Z	5
15XN1S-E	Master project 1 for study programme IS	Z	5
16XN1S-E	Master project 1 for study programme IS	Z	5
17XN1S-E	Master project 1 for study programme IS	Z	5
18XN1S-E	Master project 1 for study programme IS	Z	5
20XN1S-E	Master project 1 for study programme IS	Z	5
21XN1S-E	Master project 1 for study programme IS	Z	5
22XN1S-E	Master project 1 for study programme IS	Z	5
23XN1S-E	Master project 1 for study programme IS	Z	5
11XN2S-E	Master project 2 for study programme IS	Z	6
12XN2S-E	Master project 2 for study programme IS	Z	6
14XN2S-E	Master project 2 for study programme IS	Z	6
15XN2S-E	Master project 2 for study programme IS	Z	6
16XN2S-E	Master project 2 for study programme IS	Z	6
17XN2S-E	Master project 2 for study programme IS	Z	6
18XN2S-E	Master project 2 for study programme IS	Z	6
20XN2S-E	Master project 2 for study programme IS	Z	6
21XN2S-E	Master project 2 for study programme IS	Z	6
22XN2S-E	Master project 2 for study programme IS	Z	6
23XN2S-E	Master project 2 for study programme IS	Z	6
11XN3S-E	Master project 3 for study programme IS	Z	6
12XN3S-E	Master project 3 for study programme IS	Z	6
14XN3S-E	Master project 3 for study programme IS	Z	6
15XN3S-E	Master project 3 for study programme IS	Z	6
16XN3S-E	Master project 3 for study programme IS	Z	6
17XN3S-E	Master project 3 for study programme IS	Z	6
18XN3S-E	Master project 3 for study programme IS	Z	6
20XN3S-E	Master project 3 for study programme IS	Z	6
21XN3S-E	Master project 3 for study programme IS	Z	6
22XN3S-E	Master project 3 for study programme IS	Z	6
23XN3S-E	Master project 3 for study programme IS	Z	6
11XN4S-E	Master project 4 for study programme IS	Z	10
12XN4S-E	Master project 4 for study programme IS	Z	10
14XN4S-E	Master project 4 for study programme IS	Z	10

15XN4S-E	Master project 4 for study programme IS	Z	10
16XN4S-E	Master project 4 for study programme IS	Z	10
17XN4S-E	Master project 4 for study programme IS	Z	10
18XN4S-E	Master project 4 for study programme IS	Z	10
20XN4S-E	Master project 4 for study programme IS	Z	10
21XN4S-E	Master project 4 for study programme IS	Z	10
22XN4S-E	Master project 4 for study programme IS	Z	10
23XN4S-E	Master project 4 for study programme IS	Z	10

Name of the block: Compulsory courses
Minimal number of credits of the block: 93
The role of the block: Z

Code of the group: 1.S.NPIS EN 21/22
Name of the group: 1.sem.nav.prez (od) 21/22 - program IS v EN
Requirement credits in the group: In this group you have to gain 22 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 22
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
11MAI-E	**ITS Mathematical Tools** *Jan Přikryl* ***Jan Přikryl*** *Jan Přikryl (Gar.)*	Z,ZK	4	2P+2C	Z	z
16DITS-E	**Vehicles within ITS** *David Lehet, Jan Leistner, Filip Kotas, Jaroslav Machan*	Z,ZK	4	2P+2C	Z	z
20GINS-E	**Geographical, information, localization and navigation systems** *Petr Bureš, František Kekula, Pavel Hrubeš, Zuzana Purkrábková* ***Pavel Hrubeš***	Z,ZK	6	3P+3C	Z	z
20TSJ-E	**Telematic systems and their design** *Petr Bureš, Ondřej Přibyl* ***Petr Bureš***	Z,ZK	6	3P+2C	Z	z
23TBSS-E	**Technology and Security of Sensor Networks**	KZ	2	2P+0C	Z	z

Characteristics of the courses of this group of Study Plan: Code=1.S.NPIS EN 21/22 Name=1.sem.nav.prez (od) 21/22 - program IS v EN

11MAI-E	ITS Mathematical Tools	Z,ZK	4
Series, Fourier Series. Discrete Fourier Transform. Segmentation of signals, windows, localization. Short-term Fourier Transform. From Fourier Analysis to PDE. Fundamentals of Numerical Mathematics. Numerical solutions to ODEs and PDEs. Continuous traffic flow models described by PDE. Car-following models as ODEs.			
16DITS-E	Vehicles within ITS	Z,ZK	4
Design of the vehicle with focus on its use and function in frame of ITS. User requirement analyses. Economic aspects. Process of constructions in a concept phase, functional dependences and structure of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy transformations leading to kinetic one. Propulsion systems / traditional and alternative ones. Life-cycle analysis.			
20GINS-E	Geographical, information, localization and navigation systems	Z,ZK	6
The subject is specialized in problems of work with applications of geographic information systems with special attention to the specialization in the field of transport and telecommunication. It introduces students to geographic data management practices and tools, real world modeling, geographic data storage models, data entry and digitization methods, and a number of other GIS related technologies such as problem mapping, webmap, etc.			
20TSJ-E	Telematic systems and their design	Z,ZK	6
Gradual detailed analysis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management, traffic management, etc.			
23TBSS-E	Technology and Security of Sensor Networks	KZ	2
The course focuses on the safety of data collection in new areas of sensor networks. Principles of sensor networks, sensors of electrical and non-electric quantities, interfaces for sensor connection, communication technology for sensor networks, SigFox, LoRa, NB-IoT, IoT technology and SmartCity. Trends in IoT and Smart City			

Code of the group: 1.S.NPIS VYBEN 21/22
Name of the group: 1.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN
Requirement credits in the group: In this group you have to gain 3 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 3
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
12TDP-E	**Traffic Flow Theory** *Vladimír Faltus*	Z,ZK	3	2P+1C	Z	z
16ESDP-E	**Electronic systems in modern vehicles** *Dmitrij Rožděstvenský, Petr Bouchner*	Z,ZK	3	2P+1C	Z	z
20MZZ-E	**Modern techniques of safety control of moving railway vehicles** *Martin Leso* ***Martin Leso***	Z,ZK	3	2P+1C	Z	z

Characteristics of the courses of this group of Study Plan: Code=1.S.NPIS VYBEN 21/22 Name=1.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN

12TDP-E	Traffic Flow Theory	Z,ZK	3

Mobility and associated human problems. Basic traffic parameters and their measurement. Estimation of quality of services. Theoretical fundamentals and applications of mathematical models. Macroscopic, statistical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Relation between traffic models and traffic flow management.

16ESDP-E	Electronic systems in modern vehicles	Z,ZK	3

Advanced vehicle systems, electromobility, V2I and V2V, autonomous driving. Combustion engine control and electronic control units. Electric propulsion, its components, basic characteristics and control. Management of hybrid propulsion for attaining its optimal efficiency. Vehicle communication bus (CAN, LIN, FlexRay etc.). Safety, communication and comfort electronic vehicle systems. Practical exercises with real and simulated systems.

20MZZ-E	Modern techniques of safety control of moving railway vehicles	Z,ZK	3

ERTMS / ETCS concepts, ETCS architecture and interface descriptions, ERTMS system level, infrastructure and mobile part of the system, linking to stationary security systems, operating and application modes of the system, infrastructure orientation, interface (DMI), integration of the ETCS mobile part into the driving vehicle, GSM-R functional specification, testing and legislation.

Code of the group: 2.S.NPIS EN 21/22
Name of the group: 2.sem.nav.prez (od) 21/22 - program IS v EN
Requirement credits in the group: In this group you have to gain 21 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 21
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
14CITS-E	**C-ITS Systems**	Z,ZK	6	3P+3C	L	z
14PAM-E	**Programming and modelling**	Z,ZK	4	2P+2C	L	z
14PD-E	**Data processing**	Z,ZK	6	2P+4C	L	z
14PPRP-E	**Computer Aided Project Management**	KZ	2	0P+2C	L	z
20BITS-E	**Safety and reliability of ITS Systems**	KZ	3	2P+1C	L	z

Characteristics of the courses of this group of Study Plan: Code=2.S.NPIS EN 21/22 Name=2.sem.nav.prez (od) 21/22 - program IS v EN

14CITS-E	C-ITS Systems	Z,ZK	6

Detailed description of C-ITS systems architecture, description of use-cases - urban and rural applications, principles of C-ITS funcionality with focus on data exchange (CAM, DENM, IVI) and C-ITS security architecture. Status quo and modern trends of wireless telecommunication solutions ITS-G5 and LTE-V and description of its properties and specifics. Course will also cover signal processing.

14PAM-E	Programming and modelling	Z,ZK	4

Object oriented programming, dynamic memory allocation, inheritage, generic programming, STL, abstract data types, programming techniques, recursion, complexity, Lindenmeyer's grammars, paralism in nature and in real systems, paralel computer systems, paralel programming, discrete simulation, models of processes, model types As-Is a To-Be, acquisition of analytical sources for modelling, BPMN language, SW Bizagi, model creation and life cycle.

14PD-E	Data processing	Z,ZK	6

Students will learn about tools for data processing and analysis, using practical examples to try out the most common options used in data processing, including advanced options for presenting the results of analyses. In advanced methods, students will also perform specific analysis using Bayesian networks. Students will then independently perform data analysis on data from existing open systems.

14PPRP-E	Computer Aided Project Management	KZ	2

What is the project? The basic terms a concepts of project management. Life cycle of the project and its phased approach. Analysis and specification of the assignment, activity definition, stages, objectives and measurability. Risk events and risk planning. Project change management during implementation. Preparation of the project outline (activities, restrictions, assignments, calendars etc.) Project planning and optimization - time, resources.

20BITS-E	Safety and reliability of ITS Systems	KZ	3

The basic concepts of safety and reliability in the job and application. Basic schema and types of diagnostic systems including reliability diagnostics of technical equipment and ITS. Investigation of acceptability and reliability prediction, traffic crity and sensitivity analysis. Neural Networks and other optimization algorithms and ETA, FMEA failure analysis. HMI in traffic including operator testing on simulator and in real-world situatiation

Code of the group: 2.S.NPIS VYBEN 21/22
Name of the group: 2.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN

Requirement credits in the group: In this group you have to gain 3 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 3
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
14MIM-E	**Microsimulation Models**	KZ	3	0P+3C	L	z
16SHMI-E	**Simulation and HMI**	Z,ZK	3	2P+1C	L	z
20ITSR-E	**ITS - R**	Z,ZK	3	2P+1C	L	z

Characteristics of the courses of this group of Study Plan: Code=2.S.NPIS VYBEN 21/22 Name=2.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN

14MIM-E	Microsimulation Models	KZ	3
Basic knowledge of traffic modeling and simulation will be broaded by the application of traffic control algorithms to traffic microsimulation models used in ITS. These include, for example, the proposal of algorithms for actuated signal control, pedestrian preference, dynamic network routing, road line traffic control, crossing security equipment, and PT preference. Algorithms will be designed, applied, and tested by students themselves.			
16SHMI-E	Simulation and HMI	Z,ZK	3
Simulation for the systems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for ITS. Simulation theory with application of computing equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle dynamics, on-land carriage in particular. Virtual reality systems.			
20ITSR-E	ITS - R	Z,ZK	3
The introduction is devoted to description of the architecture and interface of the system with the ITS-R concept, the communication interface of the system, principles of ensuring functional and security features are defined. The principles of ERTMS / ETCS application level 3, UGTMS, CBTC are discussed in detail. Current and future communication technologies are described.			

Code of the group: 3.S.NPIS EN 21/22
Name of the group: 3.sem.nav.prez (od) 21/22 - program IS v EN
Requirement credits in the group: In this group you have to gain 21 credits
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 21
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
11MMAD-E	**Mathematical Methods for Data Analysis** *Magdalena Hykšová, Ivan Nagy* ***Magdalena Hykšová*** *Magdalena Hykšová (Gar.)*	Z,ZK	6	3P+3C	Z	z
20AIMI-E	**Application of ITS in Urban Engineering** *Dagmar Kočárková, Josef Kocourek, Josef Filip, Jiří Růžička, Tomáš Tichý* ***Tomáš Tichý***	Z,ZK	6	3P+3C	Z	z
20SYIN-E	**System Engineering** *Zuzana Bělinová* ***Zuzana Bělinová***	Z,ZK	6	4P+2C	Z	z
20HEI-E	**Evaluation and Economics of ITS** *Jakub Rajnoch* ***Jakub Rajnoch***	KZ	3	2P+1C	Z	z

Characteristics of the courses of this group of Study Plan: Code=3.S.NPIS EN 21/22 Name=3.sem.nav.prez (od) 21/22 - program IS v EN

11MMAD-E	Mathematical Methods for Data Analysis	Z,ZK	6
Stocastic modelling, estimation, prediction, filtration, control, methods of data analysis: k-means, DBSCAN, naive Bayes, decision trees, support vector machine.			
20AIMI-E	Application of ITS in Urban Engineering	Z,ZK	6
The course focuses mainly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organization of the public space, concept of public space solutions, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestrian, MHD, cyclo, modes etc. New approaches to the development of Smart and green approaches Promoting into Public.			
20SYIN-E	System Engineering	Z,ZK	6
Enhanced system definition in engineering tasks, specification of selected system types against related tools of system analysis and design, refinement of selected types of system engineering tasks, definition of system strategy, connection to science-based methodological basics of transport, strategic thinking processes, strategic management system, context of sustainable development.			
20HEI-E	Evaluation and Economics of ITS	KZ	3
Introduction of subject is devoted to the basics of system approach to development of ITS architecture and fundamentals in the field of economic attributes connected with development of ITS. Subsequently, the basic principles of system and application creation in the technical field are discussed, defining the penetration of the technical solution into the economy. The subject is terminated by a detailed breakdown of case studies.			

Code of the group: 3.S.NPIS VYBEN 21/22
Name of the group: 3.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN

Requirement credits in the group: In this group you have to gain 3 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 3
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
16KSD-E	**Quality and reliability in area of transportation means and systems** *David Lehet, Jan Leistner, Filip Kotas, Jaroslav Machan*	Z,ZK	3	2P+1C	Z	z
20PRZP-E	**Computer aided railway traffic control** *Dušan Kamenický* ***Dušan Kamenický***	Z,ZK	3	2P+1C	Z	z
20TVHD-E	**Telematics in Public Transport** *Milan Sliacky* ***Milan Sliacky***	Z,ZK	3	2P+1C	Z	z

Characteristics of the courses of this group of Study Plan: Code=3.S.NPIS VYBEN 21/22 Name=3.sem.nav.prez (od) 21/22 výběr předmětu - program IS v EN

16KSD-E	Quality and reliability in area of transportation means and systems	Z,ZK	3
Quality methods used for design, manufacturing and operation. Methods QFD, DFM, DFA, DFS. Longtime testing. FMEA method. Operation reliability. Methods for process optimizing, process design and quality improvement (Six Sigma etc.). Certification and accreditation, quality management, tools and methods for quality stabilization and improvement. Students will work on real problems in the QFD laboratory.			
20PRZP-E	Computer aided railway traffic control	Z,ZK	3
Introduction is devoted to clarifying the reasons and basic principles of automation of the management of railway transport. It explains the structure of railway traffic management, including the main principles applied in the management of railway traffic. The main part is devoted to detailed description of the individual components of the system, which must be included in the systems for automation of railway traffic control using computer technologies.			
20TVHD-E	Telematics in Public Transport	Z,ZK	3
Ticketing and information systems; foreinght experiences; vehicle technology; dispatching systems; Information Systems; data structures; clearing; Public Transport preferences; vehicle position monitoring; legislative framework; standardization, certification and interoperability.			

Code of the group: XNDP IS 21/22 EN
Name of the group: Diplomová práce program IS EN (od) 21/22
Requirement credits in the group: In this group you have to gain 16 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 16
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
11XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
12XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
14XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
15XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
16XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
17XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
18XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
20XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
21XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
22XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z
23XNDS-E	**Master Thesis for study programme IS**	Z	16	0P+16C	L	z

Characteristics of the courses of this group of Study Plan: Code=XNDP IS 21/22 EN Name=Diplomová práce program IS EN (od) 21/22

11XNDS-E	Master Thesis for study programme IS	Z	16
12XNDS-E	Master Thesis for study programme IS	Z	16
14XNDS-E	Master Thesis for study programme IS	Z	16
15XNDS-E	Master Thesis for study programme IS	Z	16
16XNDS-E	Master Thesis for study programme IS	Z	16
17XNDS-E	Master Thesis for study programme IS	Z	16
18XNDS-E	Master Thesis for study programme IS	Z	16
20XNDS-E	Master Thesis for study programme IS	Z	16
21XNDS-E	Master Thesis for study programme IS	Z	16
22XNDS-E	Master Thesis for study programme IS	Z	16
23XNDS-E	Master Thesis for study programme IS	Z	16

Code of the group: XPXS IS 21/22 EN
Name of the group: Praxe pro program IS EN (od) 21/22
Requirement credits in the group: In this group you have to gain 4 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 4
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
11XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
12XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
14XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
15XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
16XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
17XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
18XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
20XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
21XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
22XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z
23XPXS-E	**Training course for study programme IS**	Z	4	0P+4C	L	z

Characteristics of the courses of this group of Study Plan: Code=XPXS IS 21/22 EN Name=Praxe pro program IS EN (od) 21/22

11XPXS-E	Training course for study programme IS	Z	4
12XPXS-E	Training course for study programme IS	Z	4
14XPXS-E	Training course for study programme IS	Z	4
15XPXS-E	Training course for study programme IS	Z	4
16XPXS-E	Training course for study programme IS	Z	4
17XPXS-E	Training course for study programme IS	Z	4
18XPXS-E	Training course for study programme IS	Z	4
20XPXS-E	Training course for study programme IS	Z	4
21XPXS-E	Training course for study programme IS	Z	4
22XPXS-E	Training course for study programme IS	Z	4
23XPXS-E	Training course for study programme IS	Z	4

List of courses of this pass:

Code	Name of the course	Completion	Credits
11MAI-E	ITS Mathematical Tools	Z,ZK	4
Series, Fourier Series. Discrete Fourier Transform. Segmentation of signals, windows, localization. Short-term Fourier Transform. From Fourier Analysis to PDE. Fundamentals of Numerical Mathematics. Numerical solutions to ODEs and PDEs. Continuous traffic flow models described by PDE. Car-following models as ODEs.			
11MMAD-E	Mathematical Methods for Data Analysis	Z,ZK	6
Stocastic modelling, estimation, prediction, filtration, control, methods of data analysis: k-means, DBSCAN, naive Bayes, decision trees, support vector machine.			
11XN1S-E	Master project 1 for study programme IS	Z	5
11XN2S-E	Master project 2 for study programme IS	Z	6
11XN3S-E	Master project 3 for study programme IS	Z	6
11XN4S-E	Master project 4 for study programme IS	Z	10
11XNDS-E	Master Thesis for study programme IS	Z	16
11XPXS-E	Training course for study programme IS	Z	4
12TDP-E	Traffic Flow Theory	Z,ZK	3
Mobility and associated human problems. Basic traffic parameters and their measurement. Estimation of quality of services. Theoretical fundamentals and applications of mathematical models. Macroscopic, statistical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Relation between traffic models and traffic flow management.			
12XN1S-E	Master project 1 for study programme IS	Z	5
12XN2S-E	Master project 2 for study programme IS	Z	6
12XN3S-E	Master project 3 for study programme IS	Z	6

12XN4S-E	Master project 4 for study programme IS	Z	10
12XNDS-E	Master Thesis for study programme IS	Z	16
12XPXS-E	Training course for study programme IS	Z	4
14CITS-E	C-ITS Systems	Z,ZK	6
Detailed description of C-ITS systems architecture, description of use-cases - urban and rural applications, principles of C-ITS funcionality with focus on data exchange (CAM, DENM, IVI) and C-ITS security architecture. Status quo and modern trends of wireless telecommunication solutions ITS-G5 and LTE-V and description of its properties and specifics. Course will also cover signal processing.			
14MIM-E	Microsimulation Models	KZ	3
Basic knowledge of traffic modeling and simulation will be broaded by the application of traffic control algorithms to traffic microsimulation models used in ITS. These include, for example, the proposal of algorithms for actuated signal control, pedestrian preference, dynamic network routing, road line traffic control, crossing security equipment, and PT preference. Algorithms will be designed, applied, and tested by students themselves.			
14PAM-E	Programming and modelling	Z,ZK	4
Object oriented programming, dynamic memory allocation, inheritage, generic programming, STL, abstract data types, programming techniques, recursion, complexity, Lindenmeyer's grammars, paralism in nature and in real systems, paralel computer systems, paralel programming, discrete simulation, models of processes, model types As-Is a To-Be, acquisition of analytical sources for modelling, BPMN language, SW Bizagi, model creation and life cycle.			
14PD-E	Data processing	Z,ZK	6
Students will learn about tools for data processing and analysis, using practical examples to try out the most common options used in data processing, including advanced options for presenting the results of analyses. In advanced methods, students will also perform specific analysis using Bayesian networks. Students will then independently perform data analysis on data from existing open systems.			
14PPRP-E	Computer Aided Project Management	KZ	2
What is the project? The basic terms a concepts of project management. Life cycle of the project and its phased approach. Analysis and specification of the assignment, activity definition, stages, objectives and measurability. Risk events and risk planning. Project change management during implementation. Preparation of the project outline (activities, restrictions, assignments, calendars etc.) Project planning and optimization - time, resources.			
14XN1S-E	Master project 1 for study programme IS	Z	5
14XN2S-E	Master project 2 for study programme IS	Z	6
14XN3S-E	Master project 3 for study programme IS	Z	6
14XN4S-E	Master project 4 for study programme IS	Z	10
14XNDS-E	Master Thesis for study programme IS	Z	16
14XPXS-E	Training course for study programme IS	Z	4
15XN1S-E	Master project 1 for study programme IS	Z	5
15XN2S-E	Master project 2 for study programme IS	Z	6
15XN3S-E	Master project 3 for study programme IS	Z	6
15XN4S-E	Master project 4 for study programme IS	Z	10
15XNDS-E	Master Thesis for study programme IS	Z	16
15XPXS-E	Training course for study programme IS	Z	4
16DITS-E	Vehicles within ITS	Z,ZK	4
Design of the vehicle with focus on its use and function in frame of ITS. User requirement analyses. Economic aspects. Process of constructions in a concept phase, functional dependences and structure of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy transformations leading to kinetic one. Propulsion systems / traditional and alternative ones. Life-cycle analysis.			
16ESDP-E	Electronic systems in modern vehicles	Z,ZK	3
Advanced vehicle systems, electromobility, V2I and V2V, autonomous driving. Combustion engine control and electronic control units. Electric propulsion, its components, basic characteristics and control. Management of hybrid propulsion for attaining its optimal efficiency. Vehicle communication bus (CAN, LIN, FlexRay etc.). Safety, communication and comfort electronic vehicle systems. Practical exercises with real and simulated systems.			
16KSD-E	Quality and reliability in area of transportation means and systems	Z,ZK	3
Quality methods used for design, manufacturing and operation. Methods QFD, DFM, DFA, DFS. Longtime testing. FMEA method. Operation reliability. Methods for process optimizing, process design and quality improvement (Six Sigma etc.). Certification and accreditation, quality management, tools and methods for quality stabilization and improvement. Students will work on real problems in the QFD laboratory.			
16SHMI-E	Simulation and HMI	Z,ZK	3
Simulation for the systems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for ITS. Simulation theory with application of computing equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle dynamics, on-land carriage in particular. Virtual reality systems.			
16XN1S-E	Master project 1 for study programme IS	Z	5
16XN2S-E	Master project 2 for study programme IS	Z	6
16XN3S-E	Master project 3 for study programme IS	Z	6
16XN4S-E	Master project 4 for study programme IS	Z	10
16XNDS-E	Master Thesis for study programme IS	Z	16
16XPXS-E	Training course for study programme IS	Z	4
17XN1S-E	Master project 1 for study programme IS	Z	5
17XN2S-E	Master project 2 for study programme IS	Z	6
17XN3S-E	Master project 3 for study programme IS	Z	6
17XN4S-E	Master project 4 for study programme IS	Z	10
17XNDS-E	Master Thesis for study programme IS	Z	16
17XPXS-E	Training course for study programme IS	Z	4
18XN1S-E	Master project 1 for study programme IS	Z	5
18XN2S-E	Master project 2 for study programme IS	Z	6
18XN3S-E	Master project 3 for study programme IS	Z	6
18XN4S-E	Master project 4 for study programme IS	Z	10

18XNDS-E	Master Thesis for study programme IS	Z	16
18XPXS-E	Training course for study programme IS	Z	4
20AIMI-E	Application of ITS in Urban Engineering	Z,ZK	6
The course focuses mainly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organization of the public space, concept of public space solutions, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestrian, MHD, cyclo, modes etc. New approaches to the development of Smart and green approaches Promoting into Public.			
20BITS-E	Safety and reliability of ITS Systems	KZ	3
The basic concepts of safety and reliability in the job and application. Basic schema and types of diagnostic systems including reliability diagnostics of technical equipment and ITS. Investigation of acceptability and reliability prediction, traffic crity and sensitivity analysis. Neural Networks and other optimization algorithms and ETA, FMEA failure analysis. HMI in traffic including operator testing on simulator and in real-world situatiation			
20GINS-E	Geographical, information, localization and navigation systems	Z,ZK	6
The subject is specialized in problems of work with applications of geographic information systems with special attention to the specialization in the field of transport and telecommunication. It introduces students to geographic data management practices and tools, real world modeling, geographic data storage models, data entry and digitization methods, and a number of other GIS related technologies such as problem mapping, webmap, etc.			
20HEI-E	Evaluation and Economics of ITS	KZ	3
Introduction of subject is devoted to the basics of system approach to development of ITS architecture and fundamentals in the field of economic attributes connected with development of ITS. Subsequently, the basic principles of system and application creation in the technical field are discussed, defining the penetration of the technical solution into the economy. The subject is terminated by a detailed breakdown of case studies.			
20ITSR-E	ITS - R	Z,ZK	3
The introduction is devoted to description of the architecture and interface of the system with the ITS-R concept, the communication interface of the system, principles of ensuring functional and security features are defined. The principles of ERTMS / ETCS application level 3, UGTMS, CBTC are discussed in detail. Current and future communication technologies are described.			
20MZZ-E	Modern techniques of safety control of moving railway vehicles	Z,ZK	3
ERTMS / ETCS concepts, ETCS architecture and interface descriptions, ERTMS system level, infrastructure and mobile part of the system, linking to stationary security systems, operating and application modes of the system, infrastructure orientation, interface (DMI), integration of the ETCS mobile part into the driving vehicle, GSM-R functional specification, testing and legislation.			
20PRZP-E	Computer aided railway traffic control	Z,ZK	3
Introduction is devoted to clarifying the reasons and basic principles of automation of the management of railway transport. It explains the structure of railway traffic management, including the main principles applied in the management of railway traffic. The main part is devoted to detailed description of the individual components of the system, which must be included in the systems for automation of railway traffic control using computer technologies.			
20SYIN-E	System Engineering	Z,ZK	6
Enhanced system definition in engineering tasks, specification of selected system types against related tools of system analysis and design, refinement of selected types of system engineering tasks, definition of system strategy, connection to science-based methodological basics of transport, strategic thinking processes, strategic management system, context of sustainable development.			
20TSJ-E	Telematic systems and their design	Z,ZK	6
Gradual detailed analysis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management, traffic management, etc.			
20TVHD-E	Telematics in Public Transport	Z,ZK	3
Ticketing and information systems; foreinght experiences; vehicle technology; dispatching systems; Information Systems; data structures; clearing; Public Transport preferences; vehicle position monitoring; legislative framework; standardization, certification and interoperability.			
20XN1S-E	Master project 1 for study programme IS	Z	5
20XN2S-E	Master project 2 for study programme IS	Z	6
20XN3S-E	Master project 3 for study programme IS	Z	6
20XN4S-E	Master project 4 for study programme IS	Z	10
20XNDS-E	Master Thesis for study programme IS	Z	16
20XPXS-E	Training course for study programme IS	Z	4
21XN1S-E	Master project 1 for study programme IS	Z	5
21XN2S-E	Master project 2 for study programme IS	Z	6
21XN3S-E	Master project 3 for study programme IS	Z	6
21XN4S-E	Master project 4 for study programme IS	Z	10
21XNDS-E	Master Thesis for study programme IS	Z	16
21XPXS-E	Training course for study programme IS	Z	4
22XN1S-E	Master project 1 for study programme IS	Z	5
22XN2S-E	Master project 2 for study programme IS	Z	6
22XN3S-E	Master project 3 for study programme IS	Z	6
22XN4S-E	Master project 4 for study programme IS	Z	10
22XNDS-E	Master Thesis for study programme IS	Z	16
22XPXS-E	Training course for study programme IS	Z	4
23TBSS-E	Technology and Security of Sensor Networks	KZ	2
The course focuses on the safety of data collection in new areas of sensor networks. Principles of sensor networks, sensors of electrical and non-electric quantities, interfaces for sensor connection, communication technology for sensor networks, SigFox, LoRa, NB-IoT, IoT technology and SmartCity. Trends in IoT and Smart City			
23XN1S-E	Master project 1 for study programme IS	Z	5
23XN2S-E	Master project 2 for study programme IS	Z	6
23XN3S-E	Master project 3 for study programme IS	Z	6
23XN4S-E	Master project 4 for study programme IS	Z	10
23XNDS-E	Master Thesis for study programme IS	Z	16
23XPXS-E	Training course for study programme IS	Z	4

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

Generated: day 2024-09-25, time 05:41.