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:

note on the g	loup.					
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 Ková, Jan P ikryl Jan P ikryl 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 P ikryl	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

programu 15 v Er	Y		
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:

11MAI-E

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 Pikryl Jan Pikryl Jan Pikryl (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, Ond ej P ibyl 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 FN

Z,ZK

4

Series, Fourier Series.	Discrete Fourier Transform. Segmentation of signals, windows, localization. Short-term Fourier Transform. From Fourier Analy	sis to PDE. Funda	amentals of
Numerical Mathematic	s. 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 w	ith focus on its use and function in frame of ITS. User requirement analyses. Economic aspects. Process of constructions in a	concept phase, f	unctional
dependences and struc	cture of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy tra	nsformations lead	ling to kinetic
one. Propulsion system	s / traditional and alternative ones. Life-cycle analysis.		
20GINS-E	Geographical, information, localization and navigation systems	Z,ZK	6
The subject is specialize	ed in problems of work with applications of geographic information systems with special attention to the specialization in the field o	f transport and tele	ecommunication.
It introduces students t	o geographic data management practices and tools, real world modeling, geographic data storage models, data entry and dig	jitization methods	, and a number
of other GIS related ted	chologies such as problem mapping, webmap, etc.		
20TSJ-E	Telematic systems and their design	Z,ZK	6
Gradual detailed analy	sis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management,	traffic manageme	ent, 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-ele	ectric quantities, in	nterfaces for
sensor connection, cor	nmunication technology for sensor networks, SigFox, LoRa, NB-IoT, IoT technology and SmartCity. Trends in IoT and Smart C	City	

Code of the group: 1.S.NPIS VYBEN 21/22

ITS Mathematical Tools

Name of the group: 1.sem.nav.prez (od) 21/22 výb r p edm tu - 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 Rožd stvenský, 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 výb r p edm tu - program IS v EN

12TDP-E Traffic Flow Theory Z,ZK

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

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

Modern techniques of safety control of moving railway vehicles

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 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

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

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 ΚZ

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-F Safety and reliability of ITS Systems ΚZ

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 výb r p edm tu - 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 výb r p edm tu - 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 Ko árková, Josef Kocourek, Josef Filip, Ji í R ži ka, Tomáš Tichý Tomáš Tichý	Z,ZK	6	3P+3C	Z	Z
20SYIN-E	System Engineering Zuzana B linová Zuzana B linová	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

F14								
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 ma	inly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organi	zation of the publi	c space, concept					
of public space solutio	ns, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestria	an, MHD, cyclo, m	odes etc. New					
approaches to the dev	elopment of Smart and green approaches Promoting into Public.							
20SYIN-E	System Engineering	Z,ZK	6					
Enhanced system defi	ition in engineering tasks, specification of selected system types against related tools of system analysis and design, refiner	nent of selected ty	ypes of system					
engineering tasks, def	nition of system strategy, connection to science-based methodological basics of transport, strategic thinking processes, strate	egic 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 výb r p edm tu - 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 výb r p edm tu - program IS v EN

16KSD-E	Quality and reliability in area of transportation means and systems	Z,ZK	3
Quality methods used for	r design, manufacturing and operation. Methods QFD, DFM, DFA, DFS. Longtime testing. FMEA method. Operation reliabilit	y. Methods for pro	cess optimizing,
process design and qua	ality improvement (Six Sigma etc.). Certification and accreditation, quality management, tools and methods for quality stabiliz	ation and improve	ment. Students
will work on real probler	ns 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 m	anagement,
including the main princ	ciples applied in the management of railway traffic. The main part is devoted to detailed description of the individual compone	nts 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	n systems; foreinght experiences; vehicle technology; dispatching systems; Information Systems; data structures; clearing; Pu	blic Transport pre	ferences; vehicle
position monitoring; legi	slative 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:

12XN3S-E

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
	s. Discrete Fourier Transform. Segmentation of signals, windows, localization. Short-term Fourier Transform. From Fourier Analysical Mathematics. Numerical solutions to ODEs and PDEs. Continuous traffic flow models described by PDE. Car-following models		nentals of
11MMAD-E	Mathematical Methods for Data Analysis	Z,ZK	6
Stocastic mod	delling, estimation, prediction, filtration, control, methods of data analysis: k-means, DBSCAN, naive Bayes, decision trees, supp	ort vector machine	ė.
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 ar	nd applications of m	nathematica
models. Macroscopic, st	tatistical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Relation bet	ween traffic model	s 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

Master project 3 for study programme IS

	Master project 4 for study programme IS	Z	10
12XN4S-E	Master Thesis for study programme IS	Z 	
12XNDS-E	7.1 0	Z 	16
12XPXS-E	Training course for study programme IS		4
14CITS-E	C-ITS Systems n of C-ITS systems architecture, description of use-cases - urban and rural applications, principles of C-ITS funcionality with focus on a	Z,ZK	6
-	curity architecture. Status quo and modern trends of wireless telecommunication solutions ITS-G5 and LTE-V and description of its prowill also cover signal processing.		
14MIM-E	Microsimulation Models	KZ	3
	e of traffic modeling and simulation will be broaded by the application of traffic control algorithms to traffic microsimulation models used as a lof algorithms for actuated signal control, pedestrian preference, dynamic network routing, road line traffic control, crossing security experience. Algorithms will be designed, applied, and tested by students themselves.		
14PAM-E	Programming and modelling	Z,ZK	4
	ogramming, dynamic memory allocation, inheritage, generic programming, STL, abstract data types, programming techniques, recursic om in nature and in real systems, paralel computer systems, paralel programming, discrete simulation, models of processes, model typ of analytical sources for modelling, BPMN language, SW Bizagi, model creation and life cycle.	on, complexity, Li	
14PD-E	Data processing	Z.ZK	6
	about tools for data processing and analysis, using practical examples to try out the most common options used in data processing, ir	,	-
	ults of analyses. In advanced methods, students will also perform specific analysis using Bayesian networks. Students will then indeper on data from existing open systems.	-	
14PPRP-E	Computer Aided Project Management	KZ	2
What is the proj	ect? The basic terms a concepts of project management. Life cycle of the project and its phased approach. Analysis and specification	of the assignment	nt, activity
	es, objectives and measurability. Risk events and risk planning. Project change management during implementation. Preparation of the restrictions, assignments, calendars etc.) Project planning and optimization - time, resources.		activities,
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
Decise of the u	'	4,41	
_	ehicle with focus on its use and function in frame of ITS. User requirement analyses. Economic aspects. Process of constructions in a d structure of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy transf one. Propulsion systems / traditional and alternative ones. Life-cycle analysis.	concept phase, f	unctional
dependences and	d structure of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy transf one. Propulsion systems / traditional and alternative ones. Life-cycle analysis.	concept phase, formations leading	unctional
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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
	s mainly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organization	'	_
	olutions, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestrian,		
	approaches to the development of Smart and green approaches Promoting into Public.		
20BITS-E	Safety and reliability of ITS Systems	KZ	3
	ts of safety and reliability in the job and application. Basic schema and types of diagnostic systems including reliability diagnostics of		
Investigation of ac	ceptability and reliability prediction, traffic crity and sensitivity analysis. Neural Networks and other optimization algorithms and ETA,	FMEA failure anal	ysis. HMI
	traffic including operator testing on simulator and in real-world situatiation		
20GINS-E	Geographical, information, localization and navigation systems	Z,ZK	6
	ialized in problems of work with applications of geographic information systems with special attention to the specialization in the field of tra	-	
it introduces stude	nts to geographic data management practices and tools, real world modeling, geographic data storage models, data entry and digitiz of other GIS related technologies such as problem mapping, webmap, etc.	ation methods, ar	id a numb
20HEI-E	Evaluation and Economics of ITS	KZ	3
-	ect is devoted to the basics of system approach to development of ITS architecture and fundamentals in the field of economic attribute	l	-
	ntly, the basic principles of system and application creation in the technical field are discussed, defining the penetration of the technic		•
	The subject is terminated by a detailed breakdown of case studies.		
20ITSR-E	ITS - R	Z,ZK	3
	is devoted to description of the architecture and interface of the system with the ITS-R concept, the communication interface of the sy	'	of ensuring
unctional and secu	rity features are defined. The principles of ERTMS / ETCS application level 3, UGTMS, CBTC are discussed in detail. Current and future	e communication	technolog
	are described.		
20MZZ-E	Modern techniques of safety control of moving railway vehicles	Z,ZK	3
	concepts, ETCS architecture and interface descriptions, ERTMS system level, infrastructure and mobile part of the system, linking to	-	
perating and appl	ication modes of the system, infrastructure orientation, interface (DMI), integration of the ETCS mobile part into the driving vehicle, G	SSM-R functional s	pecificati
	testing and legislation.		
20PRZP-E	Computer aided railway traffic control	Z,ZK	3
	evoted to clarifying the reasons and basic principles of automation of the management of railway transport. It explains the structure of	-	-
ncluding the main	principles applied in the management of railway traffic. The main part is devoted to detailed description of the individual components included in the systems for automation of railway traffic control using computer technologies.	of the system, wh	iich must
20SYIN-E		Z.ZK	6
	System Engineering definition in engineering tasks, specification of selected system types against related tools of system analysis and design, refinemer	,	_
	definition of system strategy, connection to science-based methodological basics of transport, strategic thinking processes, strategic		-
might be might	of sustainable development.	aagooo,o	,
20TSJ-E	Telematic systems and their design	Z,ZK	6
	ed analysis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management	, ,	1
20TVHD-E	Telematics in Public Transport	Z,ZK	3
	nation systems; foreinght experiences; vehicle technology; dispatching systems; Information Systems; data structures; clearing; Public	'	nces; vehi
	position monitoring; legislative framework; standardization, certification and interoperability.		
20XN1S-E	Master project 1 for study programme IS	_	5
20XN2S-E		Z	6
	Master project 2 for study programme IS	Z	0
20XN3S-E			6
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