Study plan

Name of study plan: Master Full-Time IS (CS) from 2022/23

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: Compulsory courses Minimal number of credits of the block: 93

The role of the block: Z

Code of the group: 1S-NP-IS-CS-20/21

Name of the group: 1st Sem. Master Full-Time IS (CS) from 2020/21

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

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	ITS Mathematical Tools Jan Pikryl Jan Pikryl Jan Pikryl (Gar.)	Z,ZK	4	2P+2C	Z	Z
16DITS	Vehicles within ITS Jan Leistner, Filip Kotas, David Lehet, Jaroslav Machan	Z,ZK	4	2P+2C	Z	Z
20GINS	Geographical, information, localization and navigation systems Pavel Hrubeš, Petr Bureš, Zuzana Purkrábková, František Kekula Pavel Hrubeš	Z,ZK	6	3P+3C	Z	Z
20TSJ	Telematic systems and their design Pavel Hrubeš, Martin Langr Martin Langr	Z,ZK	6	3P+2C	Z	Z
23TBSS	Technology and Security of Sensor Networks	KZ	2	2P+0C	Z	Z

Characteristics of the courses of this group of Study Plan: Code=1S-NP-IS-CS-20/21 Name=1st Sem. Master Full-Time IS (CS) from 2020/21

Z,ZK

		Z,ZK	-
esign 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
ependences and struc	cture of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy tra	nsformations lead	ing to kinetic
ne. Propulsion system	s / traditional and alternative ones. Life-cycle analysis.		
20GINS	Geographical, information, localization and navigation systems	Z,ZK	6
he subject is specialize	ed in problems of work with applications of geographic information systems with special attention to the specialization in the field of	f transport and tele	communicat
	o geographic data management practices and tools, real world modeling, geographic data storage models, data entry and dig	itization methods,	and a numb
f other GIS related ted	chologies such as problem mapping, webmap, etc.		
20TSJ	Telematic systems and their design	Z,ZK	6
No. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management,	traffic managemen	nt, etc.
radual detailed analy:	so of marvadar oxiding tolernation dystems in modes of transport, each action dystems, verilors weighing, neet management,		

Code of the group: 1S-NP-IS-CS-V-20/21

ITS Mathematical Tools

Name of the group: 1st Sem. Master Full-Time IS (CS) Alternative from 2020/21

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:

12TDP

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	Traffic Flow Theory Vladimír Faltus	Z,ZK	3	2P+1C	Z	Z
16ESDP	Electronic systems in modern vehicles Petr Bouchner, Dmitrij Rožd stvenský	Z,ZK	3	2P+1C	Z	Z
20MZZ	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=1S-NP-IS-CS-V-20/21 Name=1st Sem. Master Full-Time IS (CS) Alternative from 2020/21

Traffic Flow Theory 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 Z,ZK 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. 20MZZ Modern techniques of safety control of moving railway vehicles Z,ZK 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,

Code of the group: 2S-NP-IS-CS-20/21

Name of the group: 2nd Sem. Master Full-Time IS (CS) from 2020/21

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	C-ITS Systems Zden k Lokaj, Tomáš Zelinka, Miroslav Vaniš Zden k Lokaj Zden k Lokaj (Gar.)	Z,ZK	6	3P+3C	L	Z
14PAM	Programming and modelling Vít Fábera, Tomáš Brandejský, Marek Kalika, Martin Fiala Vít Fábera Vít Fábera (Gar.)	Z,ZK	4	2P+2C	L	Z
14PD	Data processing Miroslav Vaniš, Martin Šrotý, Michal Je ábek Martin Šrotý Martin Šrotý (Gar.)	Z,ZK	6	2P+4C	L	Z
14PPRP	Computer Aided Project Management Marek Kalika Marek Kalika (Gar.)	KZ	2	0P+2C	L	Z
20BITS	Safety and reliability of ITS Systems Vladimír Faltus, Tomáš Tichý	KZ	3	2P+1C	L	Z

Characteristics of the courses of this group of Study Plan: Code=2S-NP-IS-CS-20/21 Name=2nd Sem. Master Full-Time IS (CS) from 2020/21

14CITS	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 pro	will also cover signal processing.									
14PAM	Programming and modelling	Z,ZK	4							
Object oriented program	ıming, dynamic memory allocation, inheritage, generic programming, STL, abstract data types, programming techniques, rec	ursion, complexity	y, 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	of analytical sources for modelling, BPMN language, SW Bizagi, model creation and life cycle.									
14PD	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 Computer Aided Project Management

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

Safety and reliability of ITS Systems

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: 2S-NP-IS-CS-V-20/21

Name of the group: 2nd Sem. Master Full-Time IS (CS) Alternative from 2020/21

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	Microsimulation Models Jan Kr ál Jan Kr ál Jan Kr ál (Gar.)	KZ	3	0P+3C	L	Z
16SHMI	Simulation and HMI Stanislav Novotný, Tereza Kunclová, Michal Cenkner	Z,ZK	3	2P+1C	L	Z
20ITSR	ITS - R Martin Leso Martin Leso (Gar.)	Z,ZK	3	2P+1C	L	Z

Characteristics of the courses of this group of Study Plan: Code=2S-NP-IS-CS-V-20/21 Name=2nd Sem. Master Full-Time IS (CS) Alternative from 2020/21

14MIM Microsimulation Models 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 Simulation and HMI

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

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: 3S-NP-IS-CS-21/22

Name of the group: 3rd Sem. Master Full-Time IS (CS) from 2021/22

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	Mathematical Methods for Data Analysis Pavla Pecherková, Tetiana Reznychenko, Evženie Uglickich, Ivan Nagy Pavla Pecherková Ivan Nagy (Gar.)	Z,ZK	6	3P+3C	Z	Z
20AIMI	Application of ITS in Urban Engineering Tomáš Tichý, Josef Kocourek, Dagmar Ko árková, Ji í R ži ka, Josef Filip Tomáš Tichý	Z,ZK	6	3P+3C	Z	Z
20SYIN	System Engineering Zuzana B linová, Veronika VI ková Zuzana B linová	Z,ZK	6	4P+2C	Z	Z
20HEI	Evaluation and Economics of ITS František Kopecký František Kopecký	KZ	3	2P+1C	Z	Z

Characteristics of the courses of this group of Study Plan: Code=3S-NP-IS-CS-21/22 Name=3rd Sem. Master Full-Time IS (CS) from 2021/22

11MMAD	Mathematical Methods for Data Analysis	Z,ZK	6
Stocastic modelling, es	timation, prediction, filtration, control, methods of data analysis; k-means, DBSCAN, naive Bayes, decision trees, support year	tor machine.	

20AIMI Application of ITS in Urban Engineering

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 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.

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 Evaluation and Economics of ITS
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: 3S-NP-IS-CS-V-21/22

Name of the group: 3rd Sem. Master Full-Time IS (CS) Alternative from 2021/22

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	Quality and reliability in area of transportation means and systems Jan Leistner, Filip Kotas, David Lehet, Jaroslav Machan	Z,ZK	3	2P+1C	Z	Z
20PRZP	Computer aided railway traffic control Dušan Kamenický Dušan Kamenický	Z,ZK	3	2P+1C	Z	Z
20TVHD	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=3S-NP-IS-CS-V-21/22 Name=3rd Sem. Master Full-Time IS (CS) Alternative from 2021/22

- 1	IONSD	Quality and reliability in area of transportation means and systems	∠,∠r\	ا S							
	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 probler	ns in the QFD laboratory.									
ſ	20PRZP	20PRZP Computer aided railway traffic control Z,ZK 3									
İ	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 princ	inles applied in the management of railway traffic. The main part is devoted to detailed description of the individual compone	nte of the evetem	which must be							

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 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: XD-NP-IS-CS-21/22

Name of the group: Thesis Master Full-Time IS (CS) from 2021/22

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	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
12XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
14XNDS	Master Thesis for study programme IS Zden k Lokaj, Tomáš Zelinka, Vít Fábera, Martin Šrotý, Jan Kr ál, Jana Kaliková, Jan Zelenka	Z	16	0P+16C	L	Z
15XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
16XNDS	Master Thesis for study programme IS Petr Bouchner, Stanislav Novotný, Tereza Kunclová, Josef Mík	Z	16	0P+16C	L	Z
17XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
18XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z

20XNDS	Master Thesis for study programme IS Martin Leso, Milan Sliacky	Z	16	0P+16C	L	Z
21XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
22XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z
23XNDS	Master Thesis for study programme IS	Z	16	0P+16C	L	Z

Characteristics of the courses of this group of Study Plan: Code=XD-NP-IS-CS-21/22 Name=Thesis Master Full-Time IS (CS) from 2021/22

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

Code of the group: XP-NP-IS-CS-21/22

Name of the group: Praxis Master Full-Time IS (CS) from 2021/22

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	Training course for study programme IS	Z	4	0P+4C	L	Z
12XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
14XPXS	Training course for study programme IS Vít Fábera, Jana Kaliková	Z	4	0P+4C	L	Z
15XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
16XPXS	Training course for study programme IS Josef Mík	Z	4	0P+4C	L	Z
17XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
18XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
20XPXS	Training course for study programme IS Ji í R ži ka	Z	4	0P+4C	L	Z
21XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
22XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z
23XPXS	Training course for study programme IS	Z	4	0P+4C	L	Z

Characteristics of the courses of this group of Study Plan: Code=XP-NP-IS-CS-21/22 Name=Praxis Master Full-Time IS (CS) from 2021/22

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

Name of the block: Semestrální projekt Minimal number of credits of the block: 27

The role of the block: ZP

Code of the group: X2-NP-IS-CS-20/21

Name of the group: Research Groups Master Full-Time IS (CS) from 2020/21 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	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
12XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
14XN1S	Master project 1 for study programme IS Zden k Lokaj, Tomáš Zelinka, Martin Srotý	Z	5	0P+4C	Z	ZP
15XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
16XN1S	Master project 1 for study programme IS Milan Sliacky, Josef Mik	Z	5	0P+4C	Z	ZP
17XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
18XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
20XN1S	Master project 1 for study programme IS Pavel Hrubeš, Martin Leso, Ji í R ži ka, Ji í Brož	Z	5	0P+4C	Z	ZP
21XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
22XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
23XN1S	Master project 1 for study programme IS	Z	5	0P+4C	Z	ZP
11XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
12XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
14XN2S	Master project 2 for study programme IS Vít Fábera Vít Fábera (Gar.)	Z	6	0P+4C	L	ZP
15XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
16XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
17XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
18XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
20XN2S	Master project 2 for study programme IS Martin Leso, Ji í R ži ka	Z	6	0P+4C	L	ZP
21XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
22XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
23XN2S	Master project 2 for study programme IS	Z	6	0P+4C	L	ZP
11XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
12XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
14XN3S	Master project 3 for study programme IS Zden k Lokaj, Tomáš Zelinka, Vít Fábera, Martin Šrotý	Z	6	0P+4C	Z	ZP
15XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
16XN3S	Master project 3 for study programme IS Petr Bouchner, Josef Mík, Dmitry Rozhdestvenskiy	Z	6	0P+4C	Z	ZP
17XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
18XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
20XN3S	Master project 3 for study programme IS Martin Leso, Ji í R ži ka, Milan Sliacky	Z	6	0P+4C	Z	ZP
21XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
22XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
23XN3S	Master project 3 for study programme IS	Z	6	0P+4C	Z	ZP
11XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP
12XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP
14XN4S	Master project 4 for study programme IS Zden k Lokaj, Tomáš Zelinka, Vít Fábera, Martin Šrotý, Jan Zelenka	Z	10	0P+8C	L	ZP
15XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP
16XN4S	Master project 4 for study programme IS Petr Bouchner, Stanislav Novotný, Josef Mík	Z	10	0P+8C	L	ZP
17XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP

18XN4S	Master project 4 for study programme IS Nela Kr má ová	Z	10	0P+8C	L	ZP
20XN4S	Master project 4 for study programme IS Martin Leso, Ji í R ži ka, Milan Sliacky	Z	10	0P+8C	L	ZP
21XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP
22XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP
23XN4S	Master project 4 for study programme IS	Z	10	0P+8C	L	ZP

Characteristics of the courses of this group of Study Plan: Code=X2-NP-IS-CS-20/21 Name=Research Groups Master Full-Time IS (CS) from 2020/21

from 2020/21			
11XN1S	Master project 1 for study programme IS	Z	5
12XN1S	Master project 1 for study programme IS	Z	5
14XN1S	Master project 1 for study programme IS	Z	5
15XN1S	Master project 1 for study programme IS	Z	5
16XN1S	Master project 1 for study programme IS	Z	5
17XN1S	Master project 1 for study programme IS	Z	5
18XN1S	Master project 1 for study programme IS	Z	5
20XN1S	Master project 1 for study programme IS	Z	5
21XN1S	Master project 1 for study programme IS	Z	5
22XN1S	Master project 1 for study programme IS	Z	5
23XN1S	Master project 1 for study programme IS	Z	5
11XN2S	Master project 2 for study programme IS	Z	6
12XN2S	Master project 2 for study programme IS	Z	6
14XN2S	Master project 2 for study programme IS	Z	6
15XN2S	Master project 2 for study programme IS	Z	6
16XN2S	Master project 2 for study programme IS	Z	6
17XN2S	Master project 2 for study programme IS	Z	6
18XN2S	Master project 2 for study programme IS	Z	6
20XN2S	Master project 2 for study programme IS	Z	6
21XN2S	Master project 2 for study programme IS	Z	6
22XN2S	Master project 2 for study programme IS	Z	6
23XN2S	Master project 2 for study programme IS	Z	6
11XN3S	Master project 3 for study programme IS	Z	6
12XN3S	Master project 3 for study programme IS	Z	6
14XN3S	Master project 3 for study programme IS	Z	6
15XN3S	Master project 3 for study programme IS	Z	6
16XN3S	Master project 3 for study programme IS	Z	6
17XN3S	Master project 3 for study programme IS	Z	6
18XN3S	Master project 3 for study programme IS	Z	6
20XN3S	Master project 3 for study programme IS	Z	6
21XN3S	Master project 3 for study programme IS	Z	6
22XN3S	Master project 3 for study programme IS	Z	6
23XN3S	Master project 3 for study programme IS	Z	6
11XN4S	Master project 4 for study programme IS	Z	10
12XN4S	Master project 4 for study programme IS	Z	10
14XN4S	Master project 4 for study programme IS	Z	10
15XN4S	Master project 4 for study programme IS	Z	10
16XN4S	Master project 4 for study programme IS	Z	10
17XN4S	Master project 4 for study programme IS	Z	10
18XN4S	Master project 4 for study programme IS	Z	10
20XN4S	Master project 4 for study programme IS	Z	10
21XN4S	Master project 4 for study programme IS	Z	10
22XN4S	Master project 4 for study programme IS	Z	10
23XN4S	Master project 4 for study programme IS	Z	10

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-IS-CS

Name of the group: Master Full-Time IS (CS) 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) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
15JIA1	Foreign Language - English 1 Markéta Musilová, Dana Boušová, Jitka He manová, Marie Michlová, Lenka Monková, Peter Morpuss, Eva Rezlerová	Z	0	0P+2C	Z	V
15JIF1	Foreign Language - French 1 Irena Veselková	Z	0	0P+2C	Z	V
15JIN1	Foreign Language - German 1 Eva Rezlerová, Martina Navrátilová, Jana Štikarová	Z	0	0P+2C	Z	V
15JIR1	Foreign Language - Russian 1 Marie Michlová	Z	0	0P+2C	Z	V
15JIS1	Foreign Language - Spanish 1 Nina Hricsina Puškinová	Z	0	0P+2C	Z	V
15JIA2	Foreign Language - English 2 Eva Rezlerová	Z	0	0P+2C	L	V
15JIF2	Foreign Language - French 2 Irena Veselková	Z	0	0P+2C	L	V
15JIN2	Foreign Language - German 2 Eva Rezlerová, Martina Navrátilová, Jana Štikarová	Z	0	0P+2C	L	V
15JIR2	Foreign Language - Russian 2 Marie Michlová	Z	0	0P+2C	L	V
15JIS2	Foreign Language - Spanish 2 Nina Hricsina Puškinová	Z	0	0P+2C	L	V
15JIA3	Foreign Language - English 3 Markéta Musilová, Dana Boušová, Jitka He manová, Marie Michlová, Lenka Monková, Peter Morpuss, Eva Rezlerová, Markéta Vojanová	Z	0	0P+2C	Z	V
15JIF3	Foreign Language - French 3 Irena Veselková	Z	0	0P+2C	Z	V
15JIN3	Foreign Language - German 3 Eva Rezlerová, Martina Navrátilová, Jana Štikarová	Z	0	0P+2C	Z	V
15JIR3	Foreign Language - Russian 3 Marie Michlová	Z	0	0P+2C	Z	V
15JIS3	Foreign Language - Spanish 3 Nina Hricsina Puškinová	Z	0	0P+2C	Z	V
15JIA4	Foreign Language - English 4 Eva Rezlerová	Z	0	0P+2C	L	V
15JIF4	Foreign Language - French 4 Irena Veselková	Z	0	0P+2C	L	V
15JIN4	Foreign Language - German 4 Eva Rezlerová, Martina Navrátilová, Jana Štikarová	Z	0	0P+2C	L	V
15JIR4	Foreign Language - Russian 4 Marie Michlová	Z	0	0P+2C	L	V
15JIS4	Foreign Language - Spanish 4 Nina Hricsina Puškinová	Z	0	0P+2C	L	V

	Nina Hricsina Puškinová					
15JIA4	Foreign Language - English 4 Eva Rezlerová	Z	0	0P+2C	L	V
15JIF4	Foreign Language - French 4 Irena Veselková	Z	0	0P+2C	L	V
15JIN4	Foreign Language - German 4 Eva Rezlerová, Martina Navrátilová, Jana Štikarová	Z	0	0P+2C	L	V
15JIR4	Foreign Language - Russian 4 Marie Michlová	Z	0	0P+2C	L	V
15JIS4	Foreign Language - Spanish 4 Nina Hricsina Puškinová	Z	0	0P+2C	L	V
haracteristics of th	he courses of this group of Study Plan: Code=VP-NP-IS-CS Nam	e=Master Fu	II-Time I	S (CS) vo	luntary	
5JIA1 F	Foreign Language - English 1				Z	0
	and technical terminology. Lexical-grammatical structures of higher command. Formal la	nguago Improvo	mont of cor	nmunication (ekille Activo	use of forci
•	· · · · · · · · · · · · · · · · · · ·					•
	s within students' specialization field both in verbal and written forms. Language laborator	ry environment us	sed alterna	lively as a too	or active i	earning
Programmes - English Co	onnections, English Library, the Internet).					
15JIF1 F	Foreign Language - French 1				7	0
	n language, communication in everyday life, study, work, leiser time activities, introducing	mysalf phonetics	of foreign	language wr	riting ekille i	n advanced
acic etructures of foreign					mung akma, i	ii auvanceu
		, , ,		3 - 3 - 7		
groups texts with profession	onal topics.	7 /				
groups texts with profession		7,			Z	0
roups texts with profession F	onal topics.				Z	-
groups texts with profession 15JIN1 Fasic structures of foreign	onal topics. Foreign Language - German 1 n language, communication in everyday life, study, work, leiser time activities, introducing				Z	-
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession	onal topics. Foreign Language - German 1 n language, communication in everyday life, study, work, leiser time activities, introducing onal topics.				Z riting skills, i	n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign groups texts with profession	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics.	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced 0 In advanced 0
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing	myself, phonetics	s of foreign	language, wr	Z riting skills, i	0 n advanced
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics.	myself, phonetics	s of foreign	language, wr	Z riting skills, i	n advanced 0 n advanced 0 n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing	myself, phonetics	s of foreign	language, wr	Z riting skills, i	0 n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession 15JIA2 F	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics.	myself, phonetics myself, phonetics myself, phonetics	s of foreign s of foreign s of foreign	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i	n advanced 0 n advanced 0 n advanced 0 n advanced
groups texts with profession 15JIN1 F Basic structures of foreign groups texts with profession 15JIR1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession 15JIS1 F Basic structures of foreign groups texts with profession 15JIA2 F Work on specialised texts	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 In and technical terminology. Lexical-grammatical structures of higher command. Formal la	myself, phonetics myself, phonetics myself, phonetics	s of foreign s of foreign s of foreign ment of cor	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i Z skills, i	n advanced 0 n advanced 0 n advanced 0 n advanced 0 use of foreign
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 In and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory env	myself, phonetics myself, phonetics myself, phonetics	s of foreign s of foreign s of foreign ment of cor	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i Z skills, i	n advanced 0 n advanced 0 n advanced 0 n advanced 0 use of forei
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 Is and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory english Library, the Internet).	myself, phonetics myself, phonetics myself, phonetics	s of foreign s of foreign s of foreign ment of cor	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i	n advanced 0 n advanced 0 n advanced 0 suse of foreig (Programm
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 Is and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory english Library, the Internet). Foreign Language - French 2	myself, phonetics myself, phonetics myself, phonetics nguage. Improve	s of foreign s of foreign ment of corternatively a	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i Z skills. Active	n advanced 0 n advanced 0 n advanced 0 suse of forei g (Programm
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 Is and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory english Library, the Internet).	myself, phonetics myself, phonetics myself, phonetics nguage. Improve	s of foreign s of foreign ment of corternatively a	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i Z skills. Active	n advanced 0 n advanced 0 n advanced 0 suse of forei g (Programm
groups texts with profession of the profession o	onal topics. Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 In and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory english Library, the Internet). Foreign Language - French 2 In language, communication in everyday life, study, work, leiser time activities, introducing	myself, phonetics myself, phonetics myself, phonetics nguage. Improve	s of foreign s of foreign ment of corternatively a	language, wr	Z riting skills, i Z riting skills, i Z riting skills, i Z skills. Active	n advanced 0 n advanced 0 n advanced 0 suse of forei g (Programm
groups texts with profession in the profession i	Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 In and technical terminology. Lexical-grammatical structures of higher command. Formal lat within students' specialization field both in verbal and written form. Language laboratory envirglish Library, the Internet). Foreign Language - French 2 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics.	myself, phonetics myself, phonetics myself, phonetics nguage. Improve	s of foreign s of foreign ment of corternatively a	language, wr	Z riting skills, i Z riting skills, i Z skills. Active ctive learning Z riting skills, i	n advanced 0 n advanced 0 n advanced 0 use of forei g (Programm 0 n advanced
groups texts with profession of the profession o	Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 Is and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory envirolish Library, the Internet). Foreign Language - French 2 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - German 2	myself, phonetics myself, phonetics myself, phonetics nguage. Improver	s of foreign s of foreign ment of cor ternatively a	language, wi	Z riting skills, i Z riting skills, i Z skills. Active crive learning Z riting skills, i	n advanced 0 n advanced 0 n advanced 0 use of foreig (Programm 0 n advanced
groups texts with profession of the profession o	Foreign Language - German 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Russian 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - Spanish 1 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - English 2 Is and technical terminology. Lexical-grammatical structures of higher command. Formal la within students' specialization field both in verbal and written form. Language laboratory envirolish Library, the Internet). Foreign Language - French 2 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics. Foreign Language - German 2 In language, communication in everyday life, study, work, leiser time activities, introducing onal topics.	myself, phonetics myself, phonetics myself, phonetics nguage. Improver	s of foreign s of foreign ment of cor ternatively a	language, wi	Z riting skills, i Z riting skills, i Z skills. Active crive learning Z riting skills, i	n advanced 0 n advanced 0 n advanced 0 use of foreig (Programm 0 n advanced

15JIR2	Foreign Language - Russian 2	Z	0
Basic structures of	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p	professional topics.		
15JIS2	Foreign Language - Spanish 2	Z	0
Basic structures of	Spanish language, communication in everyday life, study, work, leisere time activities, introducing myself, phonetics of Spanish	sh language, writing s	kills.
15JIA3	Foreign Language - English 3	Z	0
Presentation skills	- expert technical discourse and style. Analysis of expert texts and their production. Preparation for overseas work engageme	nt. Optional courses f	or certificates
FCE, CAE.			
15JIF3	Foreign Language - French 3	Z	0
Basic structures of	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p	vrofessional topics.		
15JIN3	Foreign Language - German 3	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p	rofessional topics.		
15JIR3	Foreign Language - Russian 3	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p	rofessional topics.		
15JIS3	Foreign Language - Spanish 3	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
	rofessional topics.		
15JIA4	Foreign Language - English 4	Z	0
	- expert technical discourse and style. Analysis of expert texts and their production. Preparation for overseas work engageme	ent. Optional courses f	for certificates
FCE, CAE.			
15JIF4	Foreign Language - French 4	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
<u> </u>	rofessional topics.		
I5JIN4	Foreign Language - German 4	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
<u> </u>	rofessional topics.		
15JIR4	Foreign Language - Russian 4	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p			
15JIS4	Foreign Language - Spanish 4	Z	0
	foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign la	anguage, writing skills	, in advanced
groups texts with p	professional topics.		

List of courses of this pass:

Code	Name of the course	Completion	Credits
11MAI	ITS Mathematical Tools	Z,ZK	4
Series, Fourier Series. Di	crete Fourier Transform. Segmentation of signals, windows, localization. Short-term Fourier Transform. From Fourier	er Analysis to PDE. Fundan	nentals of
Numerical	Mathematics. Numerical solutions to ODEs and PDEs. Continuous traffic flow models described by PDE. Car-follow	ving models as ODEs.	
11MMAD	Mathematical Methods for Data Analysis	Z,ZK	6
Stocastic modellii	ng, estimation, prediction, filtration, control, methods of data analysis: k-means, DBSCAN, naive Bayes, decision tre	ees, support vector machine	е.
11XN1S	Master project 1 for study programme IS	Z	5
11XN2S	Master project 2 for study programme IS	Z	6
11XN3S	Master project 3 for study programme IS	Z	6
11XN4S	Master project 4 for study programme IS	Z	10
11XNDS	Master Thesis for study programme IS	Z	16
11XPXS	Training course for study programme IS	Z	4
12TDP	Traffic Flow Theory	Z,ZK	3
Mobility and associated hum	an problems. Basic traffic parameters and their measurement. Estimation of quality of services. Theoretical fundament	entals and applications of m	athematical
models. Macroscopic, statis	tical and microscopic models. Theory of shock waves, queuing theory and special theory of traffic phenomena. Rel	ation between traffic models	s and traffic
	flow management.		1
12XN1S	Master project 1 for study programme IS	Z	5
12XN2S	Master project 2 for study programme IS	Z	6
12XN3S	Master project 3 for study programme IS	Z	6
12XN4S	Master project 4 for study programme IS	Z	10
12XNDS	Master Thesis for study programme IS	Z	16
12XPXS	Training course for study programme IS	Z	4
14CITS	C-ITS Systems	Z,ZK	6
•	s systems architecture, description of use-cases - urban and rural applications, principles of C-ITS funcionality with itecture. Status quo and modern trends of wireless telecommunication solutions ITS-G5 and LTE-V and description	• ,	

will also cover signal processing.

14MIM	Microsimulation Models	KZ	3
Basic knowledge	e of traffic modeling and simulation will be broaded by the application of traffic control algorithms to traffic microsimulation models use	d in ITS. These i	nclude, for
example, the propo	osal of algorithms for actuated signal control, pedestrian preference, dynamic network routing, road line traffic control, crossing security e	quipment, and P	T preference.
4.45044	Algorithms will be designed, applied, and tested by students themselves.	7.71/	
14PAM	Programming and modelling	Z,ZK	4
	ogramming, dynamic memory allocation, inheritage, generic programming, STL, abstract data types, programming techniques, recursion The in nature and in real systems, paralel computer systems, paralel programming, discrete simulation, models of processes, model type		-
grammars, parans	of analytical sources for modelling, BPMN language, SW Bizagi, model creation and life cycle.	es As-15 a 10-be	, acquisition
14PD	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 independent of the students will also perform specific analysis using Bayesian networks. Students will then independent of the students will also perform specific analysis using Bayesian networks.	-	-
	on data from existing open systems.	,,	,
14PPRP	Computer Aided Project Management	KZ	2
	ect? The basic terms a concepts of project management. Life cycle of the project and its phased approach. Analysis and specification	of the assignme	nt, activity
definition, stage	es, 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	Master project 1 for study programme IS	Z	5
14XN2S	Master project 2 for study programme IS	Z	6
14XN3S	Master project 3 for study programme IS	Z	6
14XN4S	Master project 4 for study programme IS	Z	10
14XNDS	Master Thesis for study programme IS	Z	16
14XPXS	Training course for study programme IS	<u></u> Z	4
15JIA1	Foreign Language - English 1	<u></u> Z	0
	ed texts and technical terminology. Lexical-grammatical structures of higher command. Formal language. Improvement of communication		
•	esentations within students' specialization field both in verbal and written forms. Language laboratory environment used alternatively a		_
	(Programmes - English Connections, English Library, the Internet).		ŭ
15JIA2	Foreign Language - English 2	Z	0
Work on specialise	ed texts and technical terminology. Lexical-grammatical structures of higher command. Formal language. Improvement of communication	on skills. Active u	se of foreign
language in presen	tations within students' specialization field both in verbal and written form. Language laboratory environment used alternatively as a tool fo	active learning	Programmes
	- English Connections, English Library, the Internet).		•
15JIA3	Foreign Language - English 3	Z	0
Presentation skill	s - expert technical discourse and style. Analysis of expert texts and their production. Preparation for overseas work engagement. Opti	onal courses for	certificates
	FCE, CAE.		
15JIA4	Foreign Language - English 4	Z	0
Presentation Skill	ls - expert technical discourse and style. Analysis of expert texts and their production. Preparation for overseas work engagement. Opt	onal courses for	certificates
45 1154	FCE, CAE.		
15JIF1	Foreign Language - French 1 of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language.	Z writing skills i	0
basic structures t	groups texts with professional topics.	e, writing skills, i	ii auvanceu
15JIF2	Foreign Language - French 2	Z	0
	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language		I
	groups texts with professional topics.	3,	
15JIF3	Foreign Language - French 3	Z	0
	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
	groups texts with professional topics.		
15JIF4	Foreign Language - French 4	Z	0
Basic structures of	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
	groups texts with professional topics.		
15JIN1	Foreign Language - German 1	Z	0
Basic structures of	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
	groups texts with professional topics.		
15JIN2	Foreign Language - German 2	Z	0
Basic structures of	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign languag	e, writing skills, i	n advanced
	groups texts with professional topics.		
15JIN3	Foreign Language - German 3	Z	0
Basic structures of	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
	groups texts with professional topics.		
15JIN4	Foreign Language - German 4	Z	0
Basic structures	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
45 115 4	groups texts with professional topics.		
15JIR1	Foreign Language - Russian 1	Z	0
Basic structures (of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
45 1100	groups texts with professional topics.		
15JIR2	Foreign Language - Russian 2	Z 	0
Basic structures (of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, i	n advanced
1 <i>E</i> IIDO	groups texts with professional topics.	7	
15JIR3	Foreign Language - Russian 3	Z	0
Basic structures	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	writina ekille i	n advanced
Basic structures of	of foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign languag groups texts with professional topics.	e, writing skills, i	n advanced

15JIR4	Foreign Language - Russian 4	Z	0
II.	f foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language		_
	groups texts with professional topics.		
15JIS1	Foreign Language - Spanish 1	Z	0
Basic structures of	f foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language	e, writing skills, in	advanced
45 1100	groups texts with professional topics.	Z	
15JIS2	Foreign Language - Spanish 2 es of Spanish language, communication in everyday life, study, work, leisere time activities, introducing myself, phonetics of Spanish	-	skills
15JIS3	Foreign Language - Spanish 3	7	0
	f foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language groups texts with professional topics.	e, writing skills, in	_
15JIS4	Foreign Language - Spanish 4	Z	0
Basic structures of	f foreign language, communication in everyday life, study, work, leiser time activities, introducing myself, phonetics of foreign language groups texts with professional topics.	e, writing skills, in	advanced
15XN1S	Master project 1 for study programme IS	Z	5
15XN2S	Master project 2 for study programme IS	Z	6
15XN3S	Master project 3 for study programme IS	Z	6
15XN4S	Master project 4 for study programme IS	Z	10
15XNDS	Master Thesis for study programme IS	Z	16
15XPXS	Training course for study programme IS	Z	4
16DITS	Vehicles within ITS	Z,ZK	4
	hicle with focus on its use and function in frame of ITS. User requirement analyses. Economic aspects. Process of constructions in a		
dependences and	structure of the designed object. Creation of functional models. Energy management and storages for ground vehicles, energy transfer one. Propulsion systems / traditional and alternative ones. Life-cycle analysis.	ormations leading	g to kinetic
16ESDP	Electronic systems in modern vehicles	Z.ZK	3
I .	e systems, electromobility, V2I and V2V, autonomous driving. Combustion engine control and electronic control units. Electric propulsi	,	
	nd control. Management of hybrid propulsion for attaining its optimal efficiency. Vehicle communication bus (CAN, LIN, FlexRay etc.). S comfort electronic vehicle systems. Practical exercises with real and simulated systems.	•	
16KSD	Quality and reliability in area of transportation means and systems	Z,ZK	3
Quality methods use	ed for design, manufacturing and operation. Methods QFD, DFM, DFA, DFS. Longtime testing. FMEA method. Operation reliability. Me	thods for process	optimizin
process design and	I quality improvement (Six Sigma etc.). Certification and accreditation, quality management, tools and methods for quality stabilizatior	and improvemen	nt. Student
· ·			
_	will work on real problems in the QFD laboratory.		
16SHMI	Simulation and HMI	Z,ZK	3
16SHMI Simulation for the sy	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for	or ITS. Simulation	theory wit
16SHMI Simulation for the sy	Simulation and HMI	or ITS. Simulation	theory wit
16SHMI Simulation for the sy application of compl	Simulation and HMI /stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems.	or ITS. Simulation	theory wit
16SHMI Simulation for the sy	Simulation and HMI /stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS	or ITS. Simulation lynamics, on-land	theory wit
16SHMI Simulation for the sy application of compo	Simulation and HMI //stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS	or ITS. Simulation dynamics, on-land Z Z	theory with carriage in
16SHMI Simulation for the sy application of compute 16XN1S 16XN2S	Simulation and HMI vstems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS	or ITS. Simulation dynamics, on-land Z	theory with carriage if
16SHMI Simulation for the sy application of computation of computa	Simulation and HMI //stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS	or ITS. Simulation or ITS. Simulation lynamics, on-land	theory with a carriage in the
16SHMI Simulation for the sy application of composition 16XN1S 16XN2S 16XN3S 16XN4S 16XNDS	Simulation and HMI vstems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS	or ITS. Simulation or ITS. Simulation dynamics, on-land ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	theory with discarriage in the carriage in the
16SHMI Simulation for the sy application of composition of the sy 16XN1S 16XN2S 16XN3S 16XN4S 16XNDS 16XPXS	Simulation and HMI //stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its ITS. Simulation of ITS. S	5 6 6 10 16 4
16SHMI Simulation for the sy application of composition of the sy application of composition of the sy application of composition of the sy application of composition of the sy application of the sy	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS	or ITS. Simulation or ITS. Simulation of ITS. Simul	5 6 6 10 16 4
16SHMI Simulation for the sy application of composition of composition of the sy application of composition of the sy application of composition of the sy application of the s	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its Simulation of ITS. Simula	5 6 6 10 16 4 5 6
16SHMI Simulation for the symptosic properties of the symp	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 3 for study programme IS Master project 3 for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its ITS. Simulation of ITS. S	5 6 6 10 16 4 5 6
16SHMI simulation for the symplication of computation of computati	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its ITS. Simulation of ITS. S	5 6 6 10 16 4 5 6 6
16SHMI Simulation for the syapplication of composition of composition of the syapplication of composition of composition of the syapplication of composition of the syapplication of composition of the syapplication of composition of the syapplication of the syap	Simulation and HMI vstems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its ITS. Simulation of Its ITS. Simulation of IT	5 6 6 10 16 4 5 6 6 10
16SHMI Simulation for the sy application of composition 16XN1S 16XN2S 16XN3S 16XN4S 16XNDS 16XPXS 17XN1S 17XN2S 17XN2S 17XN3S 17XN4S 17XNDS 17XNDS 17XPXS	Simulation and HMI vstems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master Thesis for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master Thesis for study programme IS Training course for study programme IS	or ITS. Simulation of ITS. Simulation of ITS. Simulation of Its Simulation of ITS. Simula	5 6 6 10 16 4 5 6 6 10 16 4 5 6 6
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16SHMI Simulation for the sympolication of composition of composit	Simulation and HMI /stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Desis for study programme IS Master Thesis for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 3 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS	or ITS. Simulation of Itynamics, on-land or ITS. Simulation of Itynamics, on-land or Ity	5 6 6 10 16 4 5 6 10 16 4 5 6 6 10 16 4 5 6
16SHMI imulation for the sypplication of composition of compositio	Simulation and HMI //stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master Thesis for study programme IS Master project 4 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master project 9 for study programme IS Master pr	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 5 6 6 10 16 4 5 6 6 10 16 4 5 6 6 10 16 4 16 16 16 16 16 16 16 16 16 16 16 16 16
16SHMI Simulation for the sympolication of composition of composition of the sympolication of composition of composition of the sympolication of composition of the sympolication of composition of the sympolication of th	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master Desis for study programme IS Master Thesis for study programme IS Master Thesis for study programme IS Master Thesis for study programme IS Application of ITS in Urban Engineering mainly on the issue of the installation of engineering networks in the area, coordination of transport modes - automobil, pedestrian, in the area, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestrian, in the area, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestrian, in the area, coordination of transport modes - automobil, pedestrian, in the area, coordination of transport modes - automobil, pedestrian, in	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
16SHMI Simulation for the sympolication of composite public small simulation for the sympolication of composite small simulation of composite small simulati	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle or particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Training course for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master Project 7 for study programme IS Master Project 8 for study programme IS Master Project 9 for study programme IS Master Thesis for study programme IS Application of ITS in Urban Engineering mainly on the issue of the installation of engineering networks in the area, coordination of transport modes - automobil, pedestrian, in approaches to the development of Smart and green approaches Promoting into Public.	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 6 6 6 6 10 16 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
16SHMI simulation for the symplication of composition of compositi	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics in uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 8 for study programme IS Master project 9 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master p	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 6 6 6 10 16 4 6 6 6 8 etc. New
16SHMI Simulation for the syspication of composition of compositio	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 8 for study programme IS Master project 9 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 8 for study programme IS Master project 9 for study programme IS Master Preject 9 for study programme IS Master 9 for study Preject 9 for study Preject 9 for 9	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 5 6 6 6 10 16 4 5 6 6 6 10 16 4 6 6 6 6 10 16 4 6 6 6 6 7 10 16 7 16 7 16 7 16 7 16 7 1
16SHMI Simulation for the syspication of composition of accomposition of	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular, Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Training course for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master project 4 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 1 for study programme IS Master project 3 for study programme IS Maste	or ITS. Simulation dynamics, on-land dynamics, o	theory with a carriage in 5 6 6 6 10 16 4 5 6 6 10 16 4 5 6 6 6 10 16 4 6 6 6 6 10 16 4 6 6 6 6 10 16 4 6 6 6 6 10 16 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18
16SHMI Simulation for the sy application of composition of composition of the sy application of accuracy application of the sy appl	Simulation and HMI stems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics for uting equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle of particular. Virtual reality systems. Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master Thesis for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 4 for study programme IS Master project 5 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 8 for study programme IS Master project 9 for study programme IS Master project 1 for study programme IS Master project 1 for study programme IS Master project 2 for study programme IS Master project 3 for study programme IS Master project 6 for study programme IS Master project 7 for study programme IS Master project 8 for study programme IS Master project 9 for study programme IS Master Preject 9 for study programme IS Master 9 for study Preject 9 for study Preject 9 for 9	or ITS. Simulation dynamics, on-land dynamics, o	5 6 6 10 16 4 5 6 6 10 16 4 5 6 6 6 10 16 4 5 6 6 6 10 16 4 6 6 6 10 16 4 6 6 6 6 10 16 4 6 6 6 6 10 16 16 16 6 6 6 6 10 16 16 16 6 6 6

20HEI	Evaluation and Economics of ITS	KZ	3
	s devoted to the basics of system approach to development of ITS architecture and fundamentals in the field of economic attribute	s 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 technic	al solution into th	e economy.
	The subject is terminated by a detailed breakdown of case studies.		
20ITSR	ITS - R	Z,ZK	3
	evoted to description of the architecture and interface of the system with the ITS-R concept, the communication interface of the sy		•
functional and security f	features are defined. The principles of ERTMS / ETCS application level 3, UGTMS, CBTC are discussed in detail. Current and future	e communication	technologies
221.477	are described.	7 71/	
20MZZ	Modern techniques of safety control of moving railway vehicles	Z,ZK	3
	epts, ETCS architecture and interface descriptions, ERTMS system level, infrastructure and mobile part of the system, linking to on modes of the system, infrastructure orientation, interface (DMI), integration of the ETCS mobile part into the driving vehicle, G		
operating and application	testing and legislation.	Sivi-R Turictional :	specification,
20PRZP	Computer aided railway traffic control	Z,ZK	3
	ed to clarifying the reasons and basic principles of automation of the management of railway transport. It explains the structure of	•	
	ciples applied in the management of railway traffic. The main part is devoted to detailed description of the individual components	-	-
3	included in the systems for automation of railway traffic control using computer technologies.	, , , , , , , , , , , , , , , , , , ,	
20SYIN	System Engineering	Z,ZK	6
	inition in engineering tasks, specification of selected system types against related tools of system analysis and design, refinemen		1
engineering tasks, defir	nition of system strategy, connection to science-based methodological basics of transport, strategic thinking processes, strategic	management sys	stem, context
	of sustainable development.		
20TSJ	Telematic systems and their design	Z,ZK	6
Gradual detailed a	nalysis of individual existing telematics systems in modes of transport, such as toll systems, vehicle weighing, fleet management	traffic managem	ent, etc.
20TVHD	Telematics in Public Transport	Z,ZK	3
Ticketing and information	on systems; foreinght experiences; vehicle technology; dispatching systems; Information Systems; data structures; clearing; Public	Transport prefere	nces; vehicle
	position monitoring; legislative framework; standardization, certification and interoperability.		
20XN1S	Master project 1 for study programme IS	Z	5
20XN2S	Master project 2 for study programme IS	Z	6
20XN3S	Master project 3 for study programme IS	Z	6
20XN4S	Master project 4 for study programme IS	Z	10
20XNDS	Master Thesis for study programme IS	Z	16
20XPXS	Training course for study programme IS	Z	4
21XN1S	Master project 1 for study programme IS	Z	5
21XN2S	Master project 2 for study programme IS	Z	6
21XN3S	Master project 3 for study programme IS	Z	6
21XN4S	Master project 4 for study programme IS	Z	10
21XNDS	Master Thesis for study programme IS	 Z	16
21XPXS	Training course for study programme IS	<u></u> Z	4
22XN1S	Master project 1 for study programme IS	Z	5
22XN2S	Master project 2 for study programme IS	Z	6
22XN3S	· · · · · · · ·	Z	6
	Master project 3 for study programme IS		_
22XN4S	Master project 4 for study programme IS	Z	10
22XNDS	Master Thesis for study programme IS	Z	16
22XPXS	Training course for study programme IS	Z	4
23TBSS	Technology and Security of Sensor Networks	KZ	2
	on the safety of data collection in new areas of sensor networks. Principles of sensor networks, sensors of electrical and non-elec-		erfaces for
	connection, communication technology for sensor networks, SigFox, LoRa, NB-IoT, IoT technology and SmartCity. Trends in IoT		
23XN1S	Master project 1 for study programme IS	Z	5
23XN2S	Master project 2 for study programme IS	Z	6
23XN3S	Master project 3 for study programme IS	Z	6
	Master project 4 for study programme IS	Z	10
23XN4S			10
23XN4S 23XNDS 23XPXS	Master Thesis for study programme IS Training course for study programme IS	Z	16

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