Study plan

Name of study plan: Master Full-Time SC from 2025/26

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch: Program of study: Smart Cities

Type of study: Follow-up master full-time

Required credits: 60 Elective courses credits: 0 Sum of credits in the plan: 60

Note on the plan:

Name of the block: Semestrální projekt Minimal number of credits of the block: 8

The role of the block: ZP

Code of the group: XD-NP-SC-21/22

Name of the group: Thesis Master Full-Time SC from 2021/22

Requirement credits in the group: In this group you have to gain 8 credits

Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 8 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
11XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
12XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
14XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
15XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
16XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
17XN1C-E	Thesis 1 Tomáš Horák, Miroslav Svítek	Z	4	0P+4C	Z	ZP
18XN1C-E	Thesis 1 Afdhal Afdhal	Z	4	0P+4C	Z	ZP
20XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
21XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
22XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
23XN1C-E	Thesis 1	Z	4	0P+4C	Z	ZP
11XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
12XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
14XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
15XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
16XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
17XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
18XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
20XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
21XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
22XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP
23XN2C-E	Thesis 2	Z	4	0P+4C	L	ZP

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

11XN1C-E	Thesis 1	Z	4	l
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12XN1C-E	Thesis 1	Z	4
14XN1C-E	Thesis 1	Z	4
15XN1C-E	Thesis 1	Z	4
16XN1C-E	Thesis 1	Z	4
17XN1C-E	Thesis 1	Z	4
18XN1C-E	Thesis 1	Z	4
20XN1C-E	Thesis 1	Z	4
21XN1C-E	Thesis 1	Z	4
22XN1C-E	Thesis 1	Z	4
23XN1C-E	Thesis 1	Z	4
11XN2C-E	Thesis 2	Z	4
12XN2C-E	Thesis 2	Z	4
14XN2C-E	Thesis 2	Z	4
15XN2C-E	Thesis 2	Z	4
16XN2C-E	Thesis 2	Z	4
17XN2C-E	Thesis 2	Z	4
18XN2C-E	Thesis 2	Z	4
20XN2C-E	Thesis 2	Z	4
21XN2C-E	Thesis 2	Z	4
22XN2C-E	Thesis 2	Z	4
23XN2C-E	Thesis 2	Z	4

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 50

The role of the block: P

Code of the group: 1S-NP-SC-21/22

Name of the group: 1st Sem. Master Full-Time SC from 2021/22

Requirement credits in the group: In this group you have to gain 24 credits

Requirement courses in the group: In this group you have to complete 4 courses

Credits in the group: 24 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
17SCF-E	Smart Cities Fundamentals Tomáš Horák, Miroslav Svítek	Z,ZK	6	3P+2C	Z	Р
17TSC-E	Technologies for Smart Cities Tomáš Horák, Miroslav Svítek Tomáš Horák (Gar.)	Z,ZK	6	3P+2C	Z	Р
20AIMI-E	Application of ITS in Urban Engineering Ji í Brož, Zuzana arská, Dagmar Ko árková, Josef Kocourek, Josef Filip, Ji í R ži ka, Tomáš Tichý Tomáš Tichý	Z,ZK	6	3P+3C	Z	Р
20GINS-E	Geographical, information, localization and navigation systems Petr Bureš, František Kekula, Pavel Hrubeš, Zuzana Purkrábková Pavel	Z,ZK	6	3P+3C	Z	Р

Characteristics of the courses of this group of Study Plan: Code=1S-NP-SC-21/22 Name=1st Sem. Master Full-Time SC from 2021/22

Characteristics of the courses of this group of Study Flan. Code=15-NF-5C-21/22 Name=15t Sem. Master Fun-Time 5C from 2021/22							
17SCF-E	Smart Cities Fundamentals	Z,ZK	6				
The main smart city com	The main smart city components will be described (intelligent transport systems, smart grids, smart buildings, smart lighting, e-governance, etc.) together with their integration methods						
by using existing interna	tional standards to achieve the synergies among different sectors. The quality of life for different city residents is understood	as the main crite	rial function.				
17TSC-E	Technologies for Smart Cities	Z,ZK	6				
Each presented technol	ogy will be described through performance parameters like safety, reliability, integrity, continuity, etc. New business models o	f technologies' im	plementation				
and operation will be int	roduced to provide advanced deployment decision-making. Legal aspects of technologies' assessment (e.g. GDPR) will be p	resented for sele	cted application				
areas.							
20AIMI-E	Application of ITS in Urban Engineering	Z,ZK	6				
The course focuses main	nly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organi.	zation of the public	space, concept				
of public space solutions	s, design of systems for traffic and transport telematics management, coordination of transport modes - automobil, pedestria	n, MHD, cyclo, m	odes etc. New				
approaches to the devel	opment of Smart and green approaches Promoting into Public.						
20GINS-E	Geographical, information, localization and navigation systems	Z,ZK	6				
The subject is specialized in problems of work with applications of geographic information systems with special attention to the specialization in the field of transport and telecommunication.							
It introduces students to geographic data management practices and tools, real world modeling, geographic data storage models, data entry and digitization methods, and a number							

Code of the group: 2S-NP-SC-25/26

of other GIS related technologies such as problem mapping, webmap, etc.

Name of the group: 2nd Sem. Master Full-Time SC from 2025/26

Requirement credits in the group: In this group you have to gain 23 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 23

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
11SMCD-E	Smart Cities Design	Z,ZK	6	3P+2C	L	Р
14CISC-E	Cyber Infrastructure for Smart Cities	Z,ZK	3	2P+1C	L	Р
17SCAR-E	Sustainable Cities and Regions	Z,ZK	3	2P+1C	L	Р
17SU-E	Smart Urbanism	Z,ZK	6	2P+3C	L	Р
17FCL-E	Future Cities Laboratory Miroslav Svítek Miroslav Svítek (Gar.)	KZ	3	0P+3C	L	Р
17PJMG-E	Project Management	KZ	2	2P+0C	L	Р

Characteristics o	f the courses of this group of Study Plan: Code=2S-NP-SC-25/26 Name=2nd Sem. Master Fr	ull-Time SC f	rom 2025/26
11SMCD-E	Smart Cities Design	Z,ZK	6
Introduction to smart c	ties, systém analysis and design fundamentals, usage of UML for system design, principles of complex systems, modeling us	ing multiagent sy	stems in the SW
environment AnyLogic,	application on a small scale real world problem.		
14CISC-E	Cyber Infrastructure for Smart Cities	Z,ZK	3
Status quo and trends	in telecommunications systems applied in cyber infrastructure, technical, economical and legal aspects of telecommunication	s networks desigr	and services
provisioning, identificat	ion and quantification of hiererchical telecommunications networks and services performance, telecommunication services dedi	cated for transpor	t and specifically
Smart Cities solutions.			
17SCAR-E	Sustainable Cities and Regions	Z,ZK	3
Cities in antiquity and i	n the middle ages, renaissance ideal of a perfect city, 19. and 20. century cities, modern city planning, sustainability as a conc	cept, historical dev	elopment of
transportation in cities,	modern transportation systems, logistics as a concept, supply chain, logistics center, city logistics.		
17SU-E	Smart Urbanism	Z,ZK	6
Urban metabolism and	ecology, urban morphology and land use, urban society: demography, mobility, social transtition, urban space and places, urban space and places are urban space and urban spac	oan flows, urban n	nodeling, impact
of technology innovation	ons on urban transition.		
17FCL-E	Future Cities Laboratory	KZ	3
Future cities system ar	chitecture (with focus on C-ITS) and reference projects, functional and technology solutions description and principles, wirele	ss telco solutions	dedicated for
C-ITS systems (ITS-G5	i, LTE-V, etc.), security architecture, data security and personal data protection, testing of the systems and functional parameters	s assessment, tec	hnical properties
evaluaiton, methods of	data collection and processing.		
17PJMG-E	Project Management	KZ	2
Basic terms of the proj	ect management, project management standards, organizational structures and processess in the project management, life-c	ycle of the projec	t, risk analysis,
projects in transport ar	d transport infrastructure and their specifics, feasibility study and CBA, project evaluation, PPP projects.		

Code of the group: 2S-NP-SC-V-21/22

Name of the group: 2st Sem. Master Full-Time Alternative SC 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
16SHMI-E	Simulation and HMI	Z,ZK	3	2P+1C	L	Р
17AMOL-E	Application of Operations Research Methods in Logistics	Z,ZK	3	2P+1C	L	Р

Characteristics of the courses of this group of Study Plan: Code=2S-NP-SC-V-21/22 Name=2st Sem. Master Full-Time Alternative SC from 2021/22

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 wit							
application of computin	g equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of veh	icle dynamics, on-	-land carriage in				
particular. Virtual reality	systems.						
17AMOL-E	Application of Operations Research Methods in Logistics	Z,ZK	3				
Exact, heuristic, metaheuristic methods. Static and dynamic shortest path problem. Location analysis, P&R/K&R facilities location. Travelling salesman problem with constraints.							
Assignment problem ar	Assignment problem and matching algorithms. Decision making in urban transport. Design of urban transport lines. Scheduling in public transport.						

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 2

The role of the block: PV

Code of the group: 1S-NP-SC-FA-20/21

Ecology III - Social Ecology

Name of the group: 1st Sem. Master Full-Time Alternative SC from 2020/21

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 7)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 3)

Credits in the group: 2 Note on the group:

500EKL3

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
500EKL3	Ecology III - Social Ecology Petr Klápšt Petr Klápšt Petr Klápšt (Gar.)	KZ	2	2P+0C	Z	PV
500U3	Urbanism III - Theory	ZK	2	1P+1C	Z	PV
555UP1	Planning 1 - Urban Planning Petr Klápšt , Jakub Vorel, Vít ezá , Veronika Šindlerová Veronika Šindlerová Jakub Vorel (Gar.)	ZK	3	2P+1C	Z	PV

Characteristics of the courses of this group of Study Plan: Code=1S-NP-SC-FA-20/21 Name=1st Sem. Master Full-Time Alternative SC from 2020/21

ΚZ

2

Social Ecology: The sub	ject deals with the relationship of man and the environment in landscape and settlements. It acquaints students with selecte	d methods of soci	io-ecological
research and participati	on of citizens in the formation of the rural environment, the city and its socio-spatial structure. The theoretical part of the subj	ect is based on co	oncrete practical
examples, which are pro	ocessed by the students and present them during the semester.		
500U3	Urbanism III - Theory	ZK	2
Sustainable developme	nt is the governing paradigm of the 21st century. It has long been at the heart of most urban development debates. We are in	creasingly aware	that providing a
good quality of life is the	right of even the most vulnerable social groups, as the environment directly affects their health. This paradigm shift requires	a more holistic ap	proach to urban
development. The quest	ion remains, how can it be successfully implemented in practice? What kind of urban theories can we use to ensure this dev	elopment? The su	ubject introduces
the student to the most	important urban theories of the 20th and 21st centuries. It shows the emergence and transformation of urban development d	ebates, theories a	and experiments
against the background	of their social and economic development. Students are guided to develop their critical thinking: to recognise, analyse, evalu	ate and understar	nd the impact of
urban theories on the ci	ty through concrete case studies.		
555UP1	Planning 1 - Urban Planning	ZK	3
In the course of Urban I	Planning I, we teach students on how the cities were planned from ancient times to the present and how discipline itself have	evolved in the co	urse of time. By
using the real examples	, we describe urban planning as a complex process with numerous feedbacks that evolves in time and involves various actors	with different valu	les and interests
and resources. The cou	rse presents general principles and concepts of European spatial planning and planning system in the Czech Republic provic	ling students with	practical insight
into relevant planning do	ocuments, legislation and institutions. Special lectures focus on actual topics: planning of urban ecosystems and participatory pl	anning. At the end	d of the semester
students will be evaluate	ed based on the presentation and discussion of their seminar work via TEAMS or in classroom. In their seminar works students	will analyse and o	critically evaluate
selected case of planning	ng process in one of the following domains: Urban mobility, Housing, Public services, Ecosystems, Economic activities, Cultu	ral heritage.	

List of courses of this pass:

Code	Name of the course	Completion	Credits
11SMCD-E	Smart Cities Design	Z,ZK	6
Introduction to smar	rt cities, systém analysis and design fundamentals, usage of UML for system design, principles of complex systems, modeling using	multiagent system	ns in the SW
	environment AnyLogic, application on a small scale real world problem.		
11XN1C-E	Thesis 1	Z	4
11XN2C-E	Thesis 2	Z	4
12XN1C-E	Thesis 1	Z	4
12XN2C-E	Thesis 2	Z	4
14CISC-E	Cyber Infrastructure for Smart Cities	Z,ZK	3
Status quo and tre	ends in telecommunications systems applied in cyber infrastructure, technical, economical and legal aspects of telecommunications	networks design ar	nd services
provisioning, identifi	ication and quantification of hiererchical telecommunications networks and services performance, telecommunication services dedicat	ted for transport and	d specifically
	Smart Cities solutions.	•	
14XN1C-E	Thesis 1	Z	4
14XN2C-E	Thesis 2	Z	4
15XN1C-E	Thesis 1	Z	4
15XN2C-E	Thesis 2	Z	4
16SHMI-E	Simulation and HMI	Z,ZK	3
Simulation for the sy	ystems in transportation and vehicle systems. User interface, HMI (human-machine interaction), virtual reality and computer graphics	for ITS. Simulation	n theory with
application of comp	outing equipment. Creating computing models. Mechanic and dynamic systems and their mathematical models. Simulation of vehicle	e dynamics, on-land	d carriage in
	particular. Virtual reality systems.		
16XN1C-E	Thesis 1	Z	4
16XN2C-E	Thesis 2	7	4

17AMOL-E	Application of Operations Research Methods in Logistics	Z,ZK	3	
	etaheuristic methods. Static and dynamic shortest path problem. Location analysis, P&R/K&R facilities location. Travelling sales		constraints.	
Assignment problem and matching algorithms. Decision making in urban transport. Design of urban transport lines. Scheduling in public transport.				
17FCL-E	Future Cities Laboratory	KZ	3	
Future cities system architecture (with focus on C-ITS) and reference projects, functional and technology solutions description and principles, wireless telco solutions dedicated for				
C-ITS systems (ITS-G5, LTE-V, etc.), security architecture, data security and personal data protection, testing of the systems and functional parameters assessment, technical properties evaluaiton, methods of data collection and processing.				
17PJMG-E		KZ	2	
	Project Management project management, project management standards, organizational structures and processess in the project management, life-cycl			
projects in transport and transport infrastructure and their specifics, feasibility study and CBA, project evaluation, PPP projects.				
17SCAR-E	Sustainable Cities and Regions	Z,ZK	3	
	r and in the middle ages, renaissance ideal of a perfect city, 19. and 20. century cities, modern city planning, sustainability as a conce			
transportation in cities, modern transportation systems, logistics as a concept, supply chain, logistics center, city logistics.				
17SCF-E	Smart Cities Fundamentals	Z,ZK	6	
	y components will be described (intelligent transport systems, smart grids, smart buildings, smart lighting, e-governance, etc.) together		on methods	
by using existing	international standards to achieve the synergies among different sectors. The quality of life for different city residents is understood a	s the main criterial	function.	
17SU-E Smart Urbanism Z,ZK 6				
Urban metabolism and ecology, urban morphology and land use, urban society: demography, mobility, social transtition, urban space and places, urban flows, urban modeling, impact				
of technology innovations on urban transition.				
17TSC-E	Technologies for Smart Cities	Z,ZK	6	
•	echnology will be described through performance parameters like safety, reliability, integrity, continuity, etc. New business models of the	-		
and operation will be introduced to provide advanced deployment decision-making. Legal aspects of technologies' assessment (e.g. GDPR) will be presented for selected application areas.				
17VN10 F		7		
17XN1C-E	Thesis 1	Z	4	
17XN2C-E	Thesis 2	Z	4	
18XN1C-E	Thesis 1	Z	4	
18XN2C-E	Thesis 2	Z	4	
20AIMI-E	Application of ITS in Urban Engineering	Z,ZK	6	
The course focuses mainly on the issue of the installation of engineering networks in the area, coordination of engineering activities in the area, organization of the public space, concept				
or public space so	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.	MHD, cyclo, modes	s etc. New	
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 students to geographic data management practices and tools, real world modeling, geographic data storage models, data entry and digitization methods, and a number				
	of other GIS related technologies such as problem mapping, webmap, etc.			
20XN1C-E	Thesis 1	Z	4	
20XN2C-E	Thesis 2	Z	4	
21XN1C-E	Thesis 1	Z	4	
21XN2C-E	Thesis 2	Z	4	
22XN1C-E	Thesis 1	Z	4	
22XN2C-E	Thesis 2	Z	4	
23XN1C-E	Thesis 1	Z	4	
23XN2C-E	Thesis 2	Z	4	
	Ecology III - Social Ecology	KZ	2	
500EKL3	ECOIOGY III - SOCIAL ECOIOGY The subject deals with the relationship of man and the environment in landscape and settlements. It acquaints students with selected			
research and participation of citizens in the formation of the rural environment, the city and its socio-spatial structure. The theoretical part of the subject is based on concrete practical				
,	examples, which are processed by the students and present them during the semester.			
500U3	Urbanism III - Theory	ZK	2	
Sustainable development is the governing paradigm of the 21st century. It has long been at the heart of most urban development debates. We are increasingly aware that providing a				
good quality of life is the right of even the most vulnerable social groups, as the environment directly affects their health. This paradigm shift requires a more holistic approach to urban				
development. The question remains, how can it be successfully implemented in practice? What kind of urban theories can we use to ensure this development? The subject introduces				
the student to the most important urban theories of the 20th and 21st centuries. It shows the emergence and transformation of urban development debates, theories and experiments				
against the background of their social and economic development. Students are guided to develop their critical thinking: to recognise, analyse, evaluate and understand the impact of				
urban theories on the city through concrete case studies.				
555UP1 Planning 1 - Urban Planning ZK 3 In the course of Urban Planning I, we teach students on how the cities were planned from ancient times to the present and how discipline itself have evolved in the course of time. By				
using the real examples, we describe urban planning as a complex process with numerous feedbacks that evolves in time and involves various actors with different values and interests				
and resources. The course presents general principles and concepts of European spatial planning and planning system in the Czech Republic providing students with practical insight				
	ng documents, legislation and institutions. Special lectures focus on actual topics: planning of urban ecosystems and participatory plann	-	- 1	
students will be evaluated based on the presentation and discussion of their seminar work via TEAMS or in classroom. In their seminar works students will analyse and critically evaluate				
selected	selected case of planning process in one of the following domains: Urban mobility, Housing, Public services, Ecosystems, Economic activities, Cultural heritage.			

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