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Master Curricula

**development and implementation
at National Transport University - NTU**



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ERASMUS+
KA 2 - Cooperation for innovation and the exchanges of good practices
Capacity Building in Higher Education
Joint Project



University of Rome
Tor Vergata
Department of Enterprise Engineering

Master in SMART transport and LOGistics for cities



SMA LOG

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Deliverables

Report on preliminary planning activities performed within SmaLog project (WP1)

Educational Systems in SmaLog countries and Partner Groups (WP1.1)

Material from the 1st Annual Training Seminar on SmaLog issues (WP4)

Training of UA&GE teachers in EU Universities (WP4.4)

CURRICULA DEVELOPMENT

SmaLog at NUUE

SmaLog at NTU

QUALITY INSURANCE PLAN

DISSEMINATION AND EXPLOITATION PLAN



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Master objectives and profile of the Master graduates



3 SmaLog at National Transport University

3.1 Master objectives and profile of the Master graduates

The master degree in “Smart transport and logistics for cities” is developed within the specialty 275 “Transport technology (in road transport)”.

3.2 Programme structure

The master course lasts two years for a total of 120 ECTS. According to the Law “On Higher Education” and the Order of Ministry of Education and Science of Ukraine, when developing curricula, the following rules are taken into consideration (Table 1):

- 1/3 hours – class work, 2/3 hours - independent study
- Max 75% - compulsory discipline, Min 25% - free student choice
- Discipline and practice - a minimum 3 ECTS credits. Optimal amount of credits per semester – 4 - 6 ECTS credits.

The curricula consists of two parts - Compulsory and Elective part.

The master degree in “Smart transport and logistics for cities” is developed within the specialty 275 “Transport technology (in road transport)”.



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The curriculum mainly focuses on education in the field of transport. The program includes disciplines of professional and practical, social and humanitarian, fundamental, natural science and economic training.

Disciplines are developed on the basis of an integrated and systematic approach and include both special mandatory disciplines and disciplines of free choice of students.



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Programme structure



3 SmaLog at National Transport University

3.1 Master objectives and profile of the Master graduates

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3.2 Programme structure

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The curricula consists of two parts - Compulsory and Elective part.

The master course lasts two years for a total of 120 ECTS. The curricula consists of two parts - Compulsory and Elective part.

Table 1 – Curriculum developed at NTU

Cipber	TITLE OF EDUCATIONAL DISCIPLINE	Distribution by semester				Number of ECTS credits	Number of hours					Distribution of hours per week by courses and semesters									
		Exams	Credit	Coursework	Work		Project	The total amount	Auditory			Independent study	I course		II course						
									Total	including:			Semesters								
										Lectures	Seminar		Laboratory	1	2	3	4				
														Number of weeks in the semester							
														15	15	15	15				
1. Compulsory part																					
1.1. General training cycle																					
1.01.	Labor protection in the industry and civil protection		1		3,00	90	30	15		15	60	2									
1.02.	Foreign language of scientific communication	1			4,00	120	30		30		90	2									
1.03.	Computer technology in transport		1		3,00	90	30	15		15	60	2									
	Total 1.1.				10,00	300	90	30	30	30	210	6									
1.2. Disciplines of professional and practical training																					
1.2.1.	Smart Transport and Logistics for Cities	3		3	5,00	150	45	15	15	15	105			3							
1.2.2.	Traffic Flows Simulating and Management	3		3	6,00	180	60	30	30		120			4							
1.2.3.	Traffic Control	1		1	6,00	180	60	30	15	15	120	4									
1.2.4.	Smart Transport	2		2	6,00	180	60	30	30		120		4								
Version 3.1 March 2019																					
11																					

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Cipber	TITLE OF EDUCATIONAL DISCIPLINE	Distribution by semester				Number of ECTS credits	Number of hours					Distribution of hours per week by courses and semesters									
		Exams	Credit	Coursework	Work		Project	The total amount	Auditory			Independent study	I course		II course						
									Total	including:			Semesters								
										Lectures	Seminar		Laboratory	Number of weeks in the semester							
														1	2	3	4				
														15	15	15	15				
1.2.5.	Freight Transportation Simulation	2			2	5,00	150	45	30	15		105		3							
1.2.6.	Integrated Transport System in City Logistics	3	2		3	5,00	150	45	30	15		105		2	1						
1.2.7.	Traffic Flows Management in the City Center	3				6,00	180	45	15		30	135			3						
1.2.8.	Efficiency of Cities Transport Systems		2			5,00	150	45	30	15		105		3							
1.2.9.	City Passenger Transport	1			1	5,00	150	45	30	15		105	3								
Practical training																					
3.03.	Internship		4			6,00	180														
3.04.	Scientific research practice		4			6,00	180														
State attestation																					
МП	Master Thesis					18,00	540														
	Total 1.2.					79,00	2370	450,00	240,00	150,00	60,00	1020,00	7,00	12,00	11,00						
	TOTAL 1					89,00	2670	540,00	270,00	180,00	90,00	1230,00	13,00	12,00	11,00						
2. Elective part																					
Version 3.1 March 2019																					
12																					

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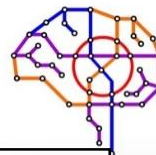
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									Total	including:				Semesters							
										Lectures	Seminar	Laboratory		1	2	3	4				
														Number of weeks in the semester							
														15	15	15	15				
2.1. Block of professional disciplines 1																					
3.01.	Supply Chain Management	2		2		4,00	120	45	30	15		75		3							
2.01.	Project analysis		1	1		4,00	120	30	15	15		90	2								
2.02.	Methods of scientific research		1			4,00	120	45	30	15		75	3								
2.03.	Economy of the organization of traffic		3			4,00	120	30	15	15		90			2						
4.02.	Transport planning of large and largest cities	2				5,00	150	45	30	15		105		3							
4.05.	Outsourcing of logistic services in transport		3			5,00	150	30	15	15		120		2							
2.04.	Human and Environmental Impacts, Safety and Sustainability		3			5,00	150	45	30	15		105		3							
	Total 2.1.1.					31,00	930	270,00	165,00	105,00		660,00	5,00	6,00	7,00						
2.2. Block of professional disciplines 2																					
2.01.	Project analysis		1	1		4,00	120	30	15	15		90	2								
4.02.	Transport planning of large and largest cities	2				4,00	120	45	15	30		75		3							



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		Exams	Credit	Coursework	Work		Project	The total amount	Auditory					Independent study	I course		II course					
									Total	including:					Semesters							
										Lectures	Seminar	Laboratory	1		2	3	4					
													Number of weeks in the semester									
													15		15	15	15					
4.06.	Telematics control of traffic.		1			4,00	120	45	15		30	75	3									
4.05.	Outsourcing of logistic services in transport		3			5,00	150	30	15	15		120			2							
4.04.	Organization of transport services and safety of the transport process		3			5,00	150	45	30	15		105			3							
4.06.	Supply Chain Management	2		2		4,00	120	45	30	15		75	3									
4.06.	Intermodal transport technologies		3			5,00	150	30	15	15		120			2							
	Total 2.1.2.					31,00	930	270	135	105,0	30,0	660,00	5,00	6,00	7,00							
TOTAL						120	360	810,0	435,0	285,0	90,0	1890,0	18,0	18,0	18,0							
Number of hours per week													18	18	18							
The number of exams													3	4	4							
Number of credits													4	2	3							
Number of course projects													2	2	2							
Number of course work													1	1	1							

(*) ECTS. For the determination of the ECTS it is agreed that 1 ECTS is equivalent to 30 hours of work.



3.2.1 Compulsory part

The compulsory part counts 88 ECTS and includes - General training professional and practical training, Practical training and State attestation. A list of the project are included to the compulsory part, namely:

- MODULE 1. Smart Transport and Logistics for Cities /5 ECTS
- MODULE 2. Traffic Flows Simulating and Management /6 ECTS
- MODULE 3. Traffic Control /6 ECTS
- MODULE 4. City Passenger Transport /5 ECTS
- MODULE 5. Freight Transportation Simulation /5 ECTS
- MODULE 6. Smart Transport /6 ECTS
- MODULE 7. Integrated Transport Systems in City Logistics /5 ECTS
- MODULE 8. Smart Transport and Logistics for Cities Project /3 ECTS
- MODULE 9. Human and Environmental Impacts, Safety and Sustainability /5 ECTS
- MODULE 10. Traffic Flows Management in the City Center / 6 ECTS
- MODULE 11. Efficiency of Cities Transport Systems / 5 ECTS

Compulsory part also includes Practical training (Internship and Scientific ECTS) and master thesis (18 ECTS)

3.2.2 Elective part

The elective part counts 31 ECTS and includes the following subjects:

- Project analysis,
- Methods of scientific research,
- Supply Chain Management,
- Transport planning of large and largest cities,
- Economy of the organization of traffic,
- Outsourcing of logistic services in transport

The compulsory part counts 88 ECTS and includes - General training cycle, Disciplines of professional and practical training, Practical training and State attestation.

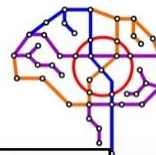
All disciplines from the list of the project are included to the compulsory part



- MODULE 1. Smart Transport and Logistics for Cities /5 ECTS
- MODULE 2. Traffic Flows Simulating and Management /6 ECTS
- MODULE 3. Traffic Control /6 ECTS
- MODULE 4. City Passenger Transport /5 ECTS
- MODULE 5. Freight Transportation Simulation /5 ECTS
- MODULE 6. Smart Transport /6 ECTS
- MODULE 7. Integrated Transport Systems in City Logistics /5 ECTS
- MODULE 8. Smart Transport and Logistics for Cities Project /3 ECTS
- MODULE 9. Human and Environmental Impacts, Safety and Sustainability /5 ECTS
- MODULE 10. Traffic Flows Management in the City Center / 6 ECTS
- MODULE 11. Efficiency of Cities Transport Systems / 5 ECTS



**Have already
finished**



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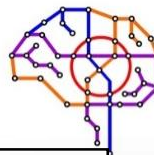
Compulsory part also includes Practical training (Internship and Scientific research practice; 12 ECTS) and master thesis (18 ECTS)

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- Outsourcing of logistic services in transport

Compulsory part also includes Practical training (Internship and Scientific research practice; 12 ECTS) and master thesis (18 ECTS)



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Compulsory part also includes Practical training (Internship and Scientific ECTS) and master thesis (18 ECTS)

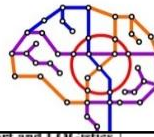
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- Outsourcing of logistic services in transport
- Human and Environmental Impacts, Safety and Sustainability



- Telematics control of traffic,
- Intermodal transport technologies
- Organization of transport services and safety of the transport

To obtain the master degree the student has to obtain 120 ECTS. M

<http://www.ntu.edu.ua/vstupnikam/specialnosti/>

3.3 Educational objectives

3.3.1 *Program competencies*

Integral competence

The ability to solve complex problems and problems in the field of cities or in the learning process, provides for research and / or innovation under uncertainty of conditions and requirements.

General competencies

- The ability to initiate, develop and implement individually improve production processes in transport.
- The ability to organize the work of the team, as well as to motivate.
- The ability to search, process and analyze information from various sources, information and communication technologies.
- The ability to determine economic performance and ensure the quality of the development and implementation of integrated actions and projects, in accordance with working conditions, the provisions of civil protection and environmental protection.
- The ability to communicate with a professional audience, to present information in oral, printed or another form in their native and foreign languages at a professional level.
- The ability to practice various theories in the field of education, effectively applying basic pedagogical concepts.
- The ability to conduct research in the framework of narrow specialization, identify problems,

Program competencies



Program competencies

Integral competence

The ability to solve complex problems and problems in the field of smart transport and logistics for cities or in the learning process, provides for research and / or innovation, and is characterized by the uncertainty of conditions and requirements.

General competencies

The ability to initiate, develop and implement individually or in the group the projects to improve production processes in transport.

The ability to organize the work of the team, as well as to motivate and manage its work.

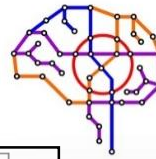
The ability to search, process and analyze information from various sources using modern information and communication technologies.

The ability to determine economic performance and ensure the quality of work in the development and implementation of integrated actions and projects in compliance with working conditions, the provisions of civil protection and environmental protection.

The ability to communicate with a professional audience, to present information in oral, printed or another form in their native and foreign languages at a professional level.

The ability to practice various theories in the field of education, effectively applying basic pedagogical concepts.

The ability to conduct research in the framework of narrow specialization, identify problems, set tasks and solve them using appropriate research methods.



- to carry out the development and study of theoretical and experimental models in the field of professional activity.

3.3.2 Modules

The tables below report the modules of SmaLog degree.

Table 2 – Professional modules of Master programme

Module
Smart Transport and Logistics for Cities // Smart Transport and Logistics for Cities Project
Traffic Flows Simulating and Management
Traffic Control
City Passenger Transport
Freight Transportation Simulation
Smart Transport
Integrated Transport Systems in City Logistics
Human and Environmental Impacts, Safety and Sustainability
Traffic Flows Management in the City Centre
Efficiency of Cities Transport Systems

Table 3 – Smart Transport and Logistics for Cities // Smart Transport and Logistics for Cities Project

Title	Smart Transport and Logistics for Cities // Smart Transport and Logistics for Cities Project
Number of ECTS	5 ECTS // 3 ECTS
Year and semester	2 nd year, 3 rd semester
Lecturer	Prof. Lidia Savchenko, Prof. Olexander Koshamiy
Teaching method	Classroom teaching
Examination procedure	Written and Oral
Project foreseen	Individual project
Aim	To obtain the knowledge and skills regarding smart transportation and logistics for cities. Objective: to define the challenges in urban transportation system namely passenger transportation, freight transportation, traffic taking into consideration intelligent transportation system and technologies. Competences: to analyze and justify modern techniques concerning transportation process in the cities etc Learning outcomes: improvement of approaches and methods for research and control of the efficiency of the integrated transport systems in the cities namely freight, passenger transportation etc
Contents of part 1	Stakeholder analysis and the role of the public sector: Differences between types of urban area. Road congestion. Conflict between UFT and pedestrians. Environmental pollution. Economic efficiency in urban distribution.
Transport Systems in Urban Infrastructure	

Description of the modules of SmaLog degree



Employment opportunities

Graduates who hold a Master degree in the field of Smart transport and logistics for cities (Transport Technology (in motor transport)) may have the following **professional titles** (according to Ukrainian encoding):

- 2149.1 - scientific staff;
- 2149.2 - engineers;
- 2149 - professionals in other fields of engineering;
- 2310 - teachers of universities and higher educational establishments;
- 2359 - other professionals in the field of education;
- 2359.1 - other academic staff in the field of training under the Classification of Occupations are valid from November 1, 2017.



Graduates will be able to hold the following positions:

- Engineer in management and organization of transportation (II category);
- Transport engineer at transport enterprises, in the management of public and passenger transport, transport and communications management of the region, district and city administration, in research laboratories of design institutes and institutes of forensic examinations, in transport and forwarding enterprises;
- Engineer in employee training and retraining departments;
- Teacher of higher education institution, assistant in higher educational establishments;
- Junior researcher at research and development institutions of transport, design organizations.



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Master in SMA

Evaluation

Assessment methods: exams, tests, practice, control, coursework and diploma papers, essays, presentations, etc

3.3.7 Evaluation

Assessment methods: exams, tests, practice, control, coursework and presentations, etc.

Format (incoming testing and current control): testing of knowledge or laboratory work reports; analysis of texts or data; practice reports; written part of the thesis: a review of the literature, a critical analysis of publication

Summarizing - final control:

- Exam (written with subsequent oral questioning);
- The score (based on the results of the formative control).

3.3.8 Personnel support

Training of masters of the speciality is provided by the leading departments and departments of other faculties of the university.

The implementation of the educational process is carried out by the faculty of NTU, as well as by persons involved in the implementation of the educational process.

Teachers working part-time - a significant part of the teaching staff is engaged in entrepreneurial and controlling activities.

The total number of teachers who are engaged in the implementation of the educational process is 100 people.

Personnel structure, the system of management and control in the composition of scientific and pedagogical staff.





3.3.7 Evaluation

Assessment methods: exams, tests, practice, control, coursework and presentations, etc.

Format (incoming testing and current control): testing of knowledge or laboratory work reports; analysis of texts or data; practice reports; written part of the thesis: a review of the literature, a critical analysis of publication

Summarizing - final control:

- Exam (written with subsequent oral questioning);
- The score (based on the results of the formative control).

3.3.8 Personnel support

Training of masters of the specialty SmaLog (275 Transport technologies) provide the leading departments of the Faculty of Transport and Information departments of other faculties of the National Transport University.

The implementation of the educational program is provided by the scientific pedagogical NTU, as well as by persons involved under the terms of an employment contract.

Teachers working part-time - are leading specialists, practical workers of the economic, entrepreneurial and controlling structures of the region.

The total number of teachers who conduct lectures, practical and laboratory classes is 31 persons.

Personnel structure, the system of recruitment, their use, advanced training, the dynamics of changes in the composition of scientific and pedagogical staff is sufficient for ensuring the qualitative training

Personnel support

Training of masters of the specialty SmaLog provide the leading departments of the Faculty of Transport and Information Technologies of the National Transport University.

The total number of teachers who conduct lectures, practical and laboratory classes is 31 persons.



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Equipment and material



Table 13 – Equipment available for SmaLog students

Computers	Quantity	SmaLog aims
Impression CoolPlay II216	10	The aim is providing the technical support of teachers and students involved in the SmaLog through the improvement and modernization of the technical base
20" Philips 203V5LSB26/10	10	
<u>Peripherals</u>		
A4 HP LaserJet Pro M227sdn (G3Q74A)	2	
Genius NetScroll 120 Optical Black ps/2	10	The goal is to improve the quality of SmaLog training in all modules included in the program.
Genius KB-110X Black ps/2	10	
<u>Software</u>		
NOD 32	10	
STATGRAPHICS 18 ACADEMIC LICENSES	3	Multimedia equipment which is going to be used for visualization and direct presentation
Vimmi Academic package for Education Use	1	
PTV Vissim 10 for Students		
PTV Vistro 5 for Students		
AnyLogic University Researcher	1	For practical work within the Environmental Management module
One Year of Maintenance and Technical Support Services for AnyLogic University Researcher (2 years)	1	
<u>Multimedia equipment</u>		For practical work within the Environmental Management module
BenQ MS527 (9HJFA77.13E) (Multimedia projector)	1	
VGA ATcom M/M 15m (9152) (cable)	1	
Walfix PB-14B (Bracket for projector)	1	
Intech RD80A (Interactive board)	1	For practical work within the Human and Environmental Impacts, Safety and Sustainability module
Walfix SNM-4 120" (Projection screen)	1	
<u>Technical training</u>		For practical work within Traffic Flows Management in the City Center module
Voltcraft SL-451 Sound Meter 30-130 Db	1	
OPTIMA7 NDIR	1	For practical work within Traffic Flows and Traffic Flows Simulating and Management
Pupil world camera	1	
Radars for TRAFFIC DATA COLLECTION	1	The teaching materials which is up-to-date and support Master/PhD students training
XIRO Xplorer Mini Black (16096)	1	
<u>Books</u>		
Urban Transportation and Logistics: Health, Safety, and Security Concerns		

Already purchased:

- Computers
- Multimedia equipment (Interactive board, projective)
- Technical training (Sound meter, Gas meter, Quadcopter)



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Group of students SmaLog



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SMA
LOG



8 students are studying in
Master programme SmaLog

