



Co-funded by the
Erasmus+ Programme
of the European Union



University of Rome
Tor Vergata
Italy

Department of Enterprise Engineering

KA2 - Cooperation for innovation and the exchange of good practices

Capacity Building in Higher Education

Joint project

Master in Smart Transport and Logistics for Cities / SmaLog

Master Curricula

development and implementation

*at O. M. Beketov National University of Urban Economy
in Kharkiv – NUUE*

<http://smalog-2017.uniroma2.it/deliverables/>

Kateryna VAKULENKO



associate professor,
Transport systems and logistics Department
O. M. BEKETOV NATIONAL UNIVERSITY OF URBAN ECONOMY IN KHARKIV



Overview

- ✓ SmaLog project:
 - Master objectives and profile of the Master graduates
 - Master Curriculum
 - Programme structure
 - Basic concepts of smart transport and logistics for cities
 - Educational objectives/common and special parts
 - Employment opportunities
 - Admission procedure
 - Examination procedure for thesis defence
 - Support to students for learning and training
 - Tutor activity
 - Fees
 - Stages
- ✓ Equipment and material
- ✓ Accommodation and other activity (e.g. sports, etc.) offered



SMALOG PROJECT

O. M. BEKETOV NATIONAL UNIVERSITY OF URBAN ECONOMY IN KHARKIV

Master objectives



to obtain competences sufficient to solve complex problems in the field of transport systems of urbanized territories based on best practices and technologies developed in European countries in the field of intelligent urban transport and logistics.

Graduates will have the competencies:

- for increasing the efficiency of city logistics, traffic and passenger transportation within the city using based on a systematic way and exploiting the opportunities of intelligent transport systems (ITS);
- for analyzing city transport systems, in particular using smart transport systems and information communication technologies;
- for research, assessment and management of the operation of integrated transport systems in the cities;
- for the management of freight, passenger transportation, traffic control within the city;
- for the implementation of Information Communication Technologies and Intelligent Transport Systems in the city contexts.



SMALOG

O. M. BEKETOV NATIONAL UNIVERSITY OF URBAN ECONOMY IN KHARKIV

Programme structure

Basic concepts of smart transport and logistics for cities

- The National Qualifications Framework – Level 8;
- The Framework for Qualifications for the European Higher Education Area FQ-EHEA – Second cycle;
- The European Qualifications Framework for lifelong learning in the EQF-LLL – Level 7.

The Master programme lasts 1 year 9 months for 120 ECTS:

- 10 ECTS for modules that characterise general competence;
- 48 ECTS for modules that characterise professional and practical training;
- 32 ECTS for elective professional modules (students' free choice);
- 6 ECTS for Specialised Pre-diploma Training;
- 24 ECTS for Master thesis.

Professional modules are organized in four main study areas of transport:

- *passenger transportation*: methods and models for supporting the assessment and the implementation of new actions for the improvement of urban passenger transport
- *freight transportation*: methods and models for supporting the assessment and the implementation of new actions for the improvement of urban freight transport
- *traffic*: methods and models for simulating city traffic and related impacts
- *smart*: how telematics can drive and support improving city sustainability and liveability.



Module	Distribution per semestres								Numbers of hours							Distribution of hours per week by years and semesters																Distribution of classroom hours per week by semester				Department			
	exam	Course				Control work graphically calculated work	Credits ECTS	Total	class (auditory)				I year				II year				year		II year																
		tests	project work						total	including:			semestres		semestres		semestres		semestres																				
										lecture	practice	laboratory	individual work	1	2	3	4	1	2	3	4																		
		number of weeks in the semester																number of weeks in the semester																					
		17							17				17				17				17				17	17	17												
Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	1	2	3	4																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35					
1. COMPULSORY PART																																							
1.1. General training cycle																																							
1.1.1	Scientific Research Methodology	1d						3	90	34	17	17	56	17	17	56																			2			405	
1.1.2	Scientific and Business Foreign Language	1d						4	120	34		34	86		34	86																				2			608
1.1.3	Occupational Safety in the Field and Civil Protection	2						3	90	34	17	17	56			17	17	56																		2			305
Total		3						10.0	300	102	34	68	198	17	51	142	17	17	56															4	2				
1.2. Disciplines of professional and practical training																																							
1.2.1	Smart Transport and Logistics for Cities	1						5	150	68	34	34	82	34	34	82																			4			605	
1.2.2	City Passenger Transport	1				1		4	120	51	17	34	69	17	34	69																		3			605		
1.2.3	Efficiency of Cities Transport Systems	2						5	150	68	34	34	82			34	34	82																4			605		



Module	Distribution per semestres							Credits ECTS	Numbers of hours							Distribution of hours per week by years and semesters																Distribution of classroom hours per week by semester				Department
	exam	Course				Control work graphically calculated work	Total		class (auditory)				individual work	I year				II year				year		II year												
		tests	project work						total	including:				semestres				semestres				semestres		semestres												
										lecture	practice	laboratory		1	2	3	4	1	2	3	4															
																						number of weeks in the semester								number of weeks in the semester						
																						17				17				17				17		
Lo	Pr	Lab	Ind	Lo	Pr	Lab	Ind	Lo	Pr	Lab	Ind	Lo	Pr	Lab	Ind	Lo	Pr	Lab	Ind	1	2	3	4													
1	2							6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
1.2.4	Integrated Transport System in City Logistics							1	6	180	68	34	34	112	34	34		112																	605	
1.2.5	Traffic Control							1	5	150	51	17	34	99	17	34		99																	605	
1.2.6	Course project "Smart Transport and Logistics for Cities"								3	90				90				90																	605	
1.2.7	Traffic Flows Simulating and Management							3	6	180	68	34	34	112									34	34		112									605	
1.2.8	Freight Transportation Simulation							3	6	180	68	34	34	112									34	34		112									605	
1.2.9	Passenger Transport Systems Simulation							3	5	150	68	34	34	82									34	34		82									605	
1.2.10	Course project "Transport System Simulation"								3	90				90												90									605	
1.2.11	Specialised Pre-diploma Training							4d	6	180				180																					605	
1.2.12	Master Thesis								24	720				720																					605	



Module	Distribution per semestres					Credits ECTS	Numbers of hours					Distribution of hours per week by years and semesters												Distribution of classroom hours per week by semester				Department								
	exam	Course			Control work graphically calculated work		Total	class (auditory)				I year				II year				year		II year														
		tests	project	work				total	including:			semestres		semestres		semestres		semestres																		
							lecture		practice	laboratory	individual work	1	2	3	4	1	2	3	4	number of weeks in the semester																
								number of weeks in the semester				17				17				17				17												
											Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	1		2	3	4					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
Total		8	1	2		4	78.0	2340	510	238	272		1830	102	136		452	34	34		82	102	102		396				900	14	4	12				
Total for compulsory part		8	4	2		4	88.0	2640	612	272	340		2028	119	187		594	51	51		138	102	102		396				900	18	6	12				
2. ELECTIVE PART																																				
2.1. Informal specialization																																				
2.1. Professional disciplines 1																																				
2.1.1	Smart Transport	2					5	150	51	17	34		99						17	34		99											3			605
2.1.2	Traffic Flows Management in the City Center		2d				5	150	51	17	34		99						17	34		99											3			605
2.1.3	Human and Environmental Impacts, Safety and Sustainability	2				2	5	150	51	17	34		99						17	34		99										3			605	
2.1.4	Transportation Urban Planning	2					5	150	51	17	34		99						17	34		99										3			605	
2.1.5	Course work "Transportation urban planning"			2			2	60					60									60												605		



Module	Distribution per semestres					Credits ECTS	Numbers of hours					Distribution of hours per week by years and semesters												Distribution of classroom hours per week by semester				Department										
	exam	Course			Control work graphically calculated work		Total	class (auditory)				individual work	I year				II year				year		II year															
		tests	project	work				total	lecture	practice	laboratory		semestres				semestres				semestres		semestres															
																1		2		3		4		1		2			3		4							
																number of weeks in the semester													number of weeks in the semester									
																17			17			17			17				17			17						
															Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	1	2	3	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35				
2.1.6	Supply Chain Management	3d							5	150	51	17	34	99									17	34	99										605			
2.1.7	Logistics Systems Designing	3d							5	150	51	17	34	99									17	34	99											605		
Total 2.1		3	3	1	1	32.0	960	306	102	204	654							68	136	456	34	68	198															
2.2. Professional disciplines 2																																						
2.1.8	Financial Flows in Logistics Systems	2							5	150	51	17	34	99					17	34	99														605			
2.1.9	Logistics Consulting	2d							5	150	51	17	34	99					17	34	99															605		
2.1.10	Urban and Regional Logistics Systems	2				2			5	150	51	17	34	99					17	34	99															605		
2.1.11	Integrated Material Flows	2							5	150	51	17	34	99					17	34	99															605		
2.1.12	Course work "Integrated material flows"			2					2	60				60							60															605		
2.1.13	Theory of Stocks	3d							5	150	51	17	34	99								17	34	99												605		
2.1.14	Logistics Process Optimisation	3d							5	150	51	17	34	99								17	34	99												605		
Total 2.2		3	3	1	1	32	960	306	102	204	654							68	136	456	34	68	198															
Total for curriculum		11	7	2	1	5	120.0	3600	918	374	544	2682	119	187	594	119	187	594	136	170	594																	



Module	Distribution per semestres					Credits ECTS	Numbers of hours					Distribution of hours per week by years and semesters												Distribution of classroom hours per week by semester				Department												
	exam	tests	Course		Control work graphically calculated work		Total	class (auditory)				individual work	I year				II year				I year		II year																	
			project	work				total	including:	lecture	practice		laboratory	1	2	3	4	1	2	3	4																			
	number of weeks in the semester	number of weeks in the semester	semestres				semestres																																	
			17				17				17				17				17																					
	Lc	Pr	Lab	Ind	Lc		Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	Lc	Pr	Lab	Ind	1	2	3	4															
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35																					
1	2					6	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
	Number of ECTS credits per semester																																							
	Number of tests																																							
	Number of exams																																							
	Number of course projects																																							
	Number of course works																																							
	Number of control works																																							
	Number of graphically calculated works																																							



Educational objectives/common and special parts

Learner must satisfy the programme requirements in the programme specification, which includes:

- ✓ theoretical classroom instruction on subjects (lectures, seminars and practical studies), consultations and student independent work, including fulfilment of a course project and paper on speciality;
- ✓ pre-diploma training and defence thesis.

Level of qualification

Ability to solve complex problems and tasks in a given professional activity field either while supposes researching and/or innovations implementation under ambiguous conditions and requirements.

Expected learning outcomes defined with the five Dublin descriptors



Educational objectives/common and special parts

<i>Knowledge and understanding:</i>	<i>Applying knowledge and understanding:</i>
<ul style="list-style-type: none">➤ parameters modelling of transport processes and systems in the cities with particular attention to smart technologies;➤ planning, organization, control of transport processes in the cities taking into account environmental impact and sustainability;➤ the economic, environmental substantiation of decisions on the organization of transportation in the cities, namely city logistics measures;➤ conditions of efficient integration of international transport systems in the cities including intelligence transportation system;➤ design of warehousing by cargo delivery, system planning of logistics transport systems;➤ organization of professional safety management.	<ul style="list-style-type: none">➤ to be able to formalize and determine the parameters of the transport processes models and systems to form a strategy for transport processes management with particular attention to ITS;➤ to be able to choose models, types and the number of vehicles for technical support transportation, form of transportation routes, schedule vehicle movements at cargo transportation, develop the technology of transporting in main communication, choose the forms and methods of control over the implementation process due to achieving sustainable transportation system in the cities;➤ to be able to analyse the existing situation, to choose the strategic directions of the city passenger transport development based on transit oriented methods and ICT;➤ to be able to implement modern approaches to traffic management, to assess the effectiveness of the implementation of measures of improving road safety in the cities.➤ to be able to justify and consult on the economic expediency of transport efficiency in the cities, city logistics applications;➤ to perform design of warehousing system of cargo delivery, city logistics systems;➤ to assess, monitor and formulate a system of professional safety management.



Educational objectives/common and special parts

<p><i>Making judgments:</i> <i>Ability to perform scientific and research and design works dealing with the problems of traffic, passenger transportation and city logistics with particular attention to smart cities.</i></p>	<p><i>Learning skills</i></p>
<p><i>Communication skills:</i> <i>The ability to relate and work in groups, in a professional context both nationally and internationally, are taken into account throughout the course of study.</i></p>	<p>The structure of the teachings and of the other formative activities, foreseeing in most cases seminary components, of bibliographic research and planning, makes the master's degree able to:</p> <ol style="list-style-type: none">1. Read, understand and use a scientific text (also not applicable to specific areas of mathematics, physics and industrial engineering) at university and post-university level;2. Use reference manuals for the practices in use in the different industrial realities concerning specific problems;3. Autonomously use manuals for the use of software of different types and applications;4. Proceed autonomously to your professional and cultural updating;5. Undertake post-graduate studies. The learning ability of the graduating student is verified through the specific tests for the courses which, in their different modalities, therefore remain the essential tool for the measurement of this capacity.



Educational objectives/common and special parts

Master programme includes the following modules, which characterises more in depth the graduates in SmaLog

Professional modules of Master programme

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



Module	Type	Innovation	State	Teaching
MODULE 1. Smart Transport and Logistics for Cities /5 ECTS	new	Content, teaching methods, blended learning, + distance course	<i>Developed Implemented</i>	1 Semester
MODULE 2. Traffic Flows Simulating and Management /5 ECTS	updated		Developing	3 Semester
MODULE 3. Traffic Control /5 ECTS	updated	Blended learning, + distance course	<i>Developed Implemented</i>	1 Semester
MODULE 4. City Passenger Transport /4 ECTS	updated	Content, blended learning, + distance course	<i>Developed Implemented</i>	1 Semester
MODULE 5. Freight Transportation Simulation /6 ECTS	updated		Developing	3 Semester
MODULE 6. Smart Transport /5 ECTS	new	Content, teaching methods, blended learning	Developing <i>Implemented</i>	2 Semester
MODULE 7. Integrated Transport Systems in City Logistics /5 ECTS	new	Content, blended learning, + distance course	<i>Developed Implemented</i>	1 Semester
MODULE 8. Smart Transport and Logistics for Cities Project /3 ECTS	updated	Content, teaching methods, blended learning, + distance course	<i>Developed Implemented</i>	1 Semester
MODULE 9. Human and Environmental Impacts, Safety and Sustainability /5 ECTS	new	Content, teaching methods, blended learning,	Developing <i>Implemented</i>	2 Semester
MODULE 10. Traffic Flows Management in the City Center / 5 ECTS	new	Content, teaching methods, blended learning,	Developing <i>Implemented</i>	2 Semester
MODULE 11. Efficiency of Cities Transport Systems / 5 ECTS	new	Content, teaching methods, blended learning	Developing <i>Implemented</i>	2 Semester
MODULE 12. Master Thesis (24 ECTS)				

Number of modules developed and implemented: NUUE – 9 (75%)

Number of modules developing: NUUE – 6 (25 %)



Employment opportunities

Working places could universities or scientific organizations, scientific positions in communication, transportation, management, state institutions, private companies, consulting etc. Teachers' positions in the institutions of higher education could be a work opportunity

Areas of activity: the implementation of organizational and management activities in the state transport administration, transport departments of local governments and in transport enterprises of various forms of ownership.

Tasks that can perform: city logistics measures of optimisation, road traffic measures of optimisation, passenger measures of optimisation, possession of the regulatory framework for the functioning of the transport management system, the economy and the principles of conducting commercial work in transport, organizing the interaction of different types of transport, the basics of foreign economic relations.



Admission procedure

In accordance with the Enrolment Conditions approved by Ministry of Education and Science of Ukraine, to be admitted to a master's degree course, students must have at least a Bachelor degree.

The procedure for admission to Master degree based on:

- ❖ the students rating (*average grade according to Bachelor diploma*)
- ❖ examination.

Examination procedure includes two exams:

- ❖ professional entrance examination in a specialty
- ❖ foreign language.

The dates of admission procedure from July to August



Examination procedure for thesis defence

The achievement of the master's degree involves defence of the thesis.

Students begin to write thesis and defend **in 4th semester. Date of defence thesis is May 2020.**

Master thesis includes **24 ECTS.**

Before starting to develop a thesis, student has to pass:

- ❖ all modules of Master programme
- ❖ Specialised Pre-diploma Training.

For defence of the thesis student develops thesis on a topic proposed by a professor of Transport Systems and Logistics Department.

The Master's degree sessions are set by Head of Educational and Methodological Department within the time intervals set in the curriculum.

Examination Commission for thesis defence consists of 5 representatives – at least one external expert from industry, others are professors of Department.

Examination Commission process are public and open for all stakeholders.



<p style="text-align: center;"><i>Support to students for learning and training</i></p>	<p>Department of Transport Systems and Logistics owns Laboratory “Ergonomic and Transport Problems” and “Information Technologies” that students use during studying. The classes are also held in the laboratory of “Automated Control Systems on Transport” of NUUE. NUUE gives possibility for students to live in dorm rooms with accommodations. For cultural development and leisure students have opportunity to visit Students Club, library, gym, canteens.</p>
<p style="text-align: center;"><i>Tutor activity</i></p>	<p>The tutoring activity is one of the institutional tasks of professors and researchers, as an integral part of their teaching commitment aimed at guiding students' cultural education and studying support. The tutoring activities are scheduled by the Faculty at the beginning of each academic year. Each student has a tutor, who can be consulted for evaluations and general suggestions regarding the progress of the student's study activities.</p>
<p style="text-align: center;"><i>Fees</i></p>	<p>There are two option to finance students studying: government payment (budgetary) and own student payment (contract). For budgetary payment Ministry of Education and Science of Ukraine offers different number of places each year. Number of contracts from student are limited by number of licences from Ministry of Education and Science of Ukraine.</p>



Stages

Internships for student have a duration of 4 weeks.

The student can request to perform training activities such as:

- curricular internship activities (or internships) in companies, public administrations, public or private bodies, including those in the third sector, professional orders and colleges;
- project or experimental activities approved by the Head of Department;
- introductory training activities for the preparation of the final examination to obtain the qualification.

These requests must be approved by the supervisor / tutor.

At the end of the training activities, the teacher will have to assess training and fill in the exam certificate, on the training activity carried out, which must be delivered in the Faculty of Department.



Equipment and material

#	Group of Equipment	Elements	System Parameters	Quantity	Condition
1.	Computers	1.System Boxes	Impression P+	12	Have already purchased
		2. Computer Monitors	21.5" LG 22M38A-B	14	
		3. Keyboards	Genius KB-110X Black ps/2	12	
		4. Mice	Genius NetScroll 120	14	
		5. Laptops	ASUS X510UF-BQ003 15.6F	2	
2.	Peripherals	Printers	A4 HP LaserJet Pro M227sdn	2	
3.	Multimedia equipment	Video projector	OPTOMA X308ST	2	
		Interactive whiteboard	Newline R3-800	1	
		Projection screen	Walfix 100" SNM-3 (152*203, 4:3)	1	
		Wall fix for display	CMPR-3-M	2	
		Cable	HDMI 10m	2	
4.	Technical training	Pupil world camera	Moto Z3 Play (blue), World camera	1	Future purchase
		Traffic statistics collection complex	CITILOG XCam-P	1	Have already purchased
		Sound level meter	Volcraft SL-541	1	
5.	Books	Urban Transportation and Logistics: Health, Safety, and Security Concerns		1	Future purchase
		Public Transit Planning and Operation: Modeling, Practice and Behavior, Second Edition		1	
		Modelling Intelligent Multi-Modal Transit Systems		1	
		Transportation Systems Analysis		1	
6.	Software	STATGRAPHICS XVIII		1	Future purchase
		Vizum Commercial Licence		1	
		AnyLogic University Researcher		1	



Implementation of SmaLog Master programme

- ❖ update methods of courses for students with the most recent international experiences;
- ❖ update research topics in the field of smart transport and logistics for cities with the most recent international experiences;
- ❖ involve teachers in the international research networks.

Curriculum of SmaLog Master programme:

- ❖ basic Master programme at the Transport Systems and Logistics Department,
- ❖ replace existing Master programme in Transport Systems.

Students enrolled in SmaLog curricula can besides benefit from the international agreements that are in course of developed which allow them to study and developing training activities in some European countries (submission of proposals for E+/KA1 call).

