MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
LVIV POLYTECHNIC NATIONAL UNIVERSITY

«I CONFIRM»
Rector
of Lviv Polytechnic National University
_____ /Yu. Bobalo/
« 31 » 05 2021

EDUCATIONAL-SCIENTIFIC PROGRAMME

of the third (educational-scientific) level of higher education

by specialty "Transport technologies (by type)"

of field of knowledge 27 "Transport"

Qualification: Doctor of Philosophy by specialty "Transport technologies (by type)"

Adopted at the meeting
Academic Council of the University
(protocol № 74
from « 25 » 05 2021)

Lviv 2021

Developed by working group for ensuring the quality of the educational-scientific program by which training of applicants at the third (educational-scientific) level of higher education is carried out by specialty 275 "Transport technologies (by type)" consisting of:

Head of the working group (guarantor)	
Yurii Royko	CSc Tech, associate professor, associate professor of transport technologies department
Members:	
Yevhen Fornalchyk	DSc Tech, professor, head of transport technologies department
Oksana Kumanska-Nor	director of the Lviv Research Institute of Forensic Expertise of the Ministry of Justice of Ukraine
Ihor Vikovych	DSc Tech, professor, professor of transport technologies department
Mykola Zhuk	CSc Tech, associate professor, associate professor of transport technologies department
Volodymyr Kovalyshyn	CSc Tech, associate professor, associate professor of transport technologies department
Anna Sotnikova	postgraduate student of transport technologies department
Viktoriia Pavliv	head of the collegium and professional bureau of students of the Institute of Mechanical Engineering and Transport, student

Guarantor
candidate of technical sciences,
associate professor **Yu. Royko**

Approved and brought into force
By order of the Rector of Lviv Polytechnic National University
from «01» 06 2021 № 325-1-10.

LETTER OF CONFIRMATION
of educational-scientific programme

Level of higher education	Third (educational-scientific)
Field of knowledge	27 Transport
Specialty	275 «Transport technologies (by type)»
Qualification	Doctor of Philosophy

APPROVED
Scientific-methodological council of specialty 275 «Transport technologies (by type)»
Protocol № 3/20-21
from « 04 » 02 2021

Head of Scientific-methodological council of specialty 275 «Transport technologies (by type)»
_____ Ye. Fomalchyk
from « 04 » 02 2021 p.

Director of ESI of Mechanical Engineering and Transport
_____ O. Lanets
from « 18 » 02 2021

CONFIRMED
Head of Educational-methodological department of the university
_____ V. Sviridov
« 12 » 05 2021

Vice Rector for Scientific Research
_____ I. Demydov
« 15 » 04 2021

Vice Rector for Scientific-Pedagogical Work
_____ O. Davydchak
« 12 » 05 2021

RECOMMENDED
Scientific-methodological council of the university
Protocol № 56
from « 13 » 05 2021

Head of Scientific-methodological council
_____ A. Zahorodnii

I. EDUCATIONAL COMPONENT OF EDUCATIONAL-SCIENTIFIC PROGRAM

1. Profile of Doctor of Philosophy programme by specialty 275 "Transport technologies (by type)"

1 – General information	
1	2
Full name of higher education institution and structural subdivision	**Lviv Polytechnic National University**
The full title of the qualification in the original language	**Doctor of Philosophy in Transport by Specialty of Transport technologies (by type)**
The official name of the educational-scientific programme	Transport technologies (by type)
Type of diploma and scope of educational–scientific programme	Diploma of Doctor of Philosophy, single, 43 ECTS credits of the educational component of the educational-scientific programme, the term of the educational component of the educational-scientific programme is 2 years
Availability of accreditation	
Cycle/level	NFQ of Ukraine – 8 level, FQ-EHEA – third cycle, EQF-LLL – 8 level
Prerequisites	Level of higher education – second (master)
Language(s) of teaching	English
Main terms and their definitions	In the educational-scientific programme, the main terms and their definitions are used according to the Law of Ukraine "About higher education" from 01.07.2014 № 1556-VII with changes and additions, Law of Ukraine "About scientific and scientific-technical activity" from 26.11.2015 № 848-VIII with changes and additions, The Order of preparation of applicants of higher education of the degree of Doctor of Philosophy and Doctor of Sciences in higher educational institutions (scientific institutions), approved by the Resolution of the Cabinet of Ministers from 23.03.2016 № 261
2 – Aim of educational program	
	To deepen theoretical knowledge and practical skills and abilities in the field of *Transport* by specialty *Transport technologies (by type)*, to develop philosophical and linguistic competences, form universal skills of a researcher, sufficient for conducting and successfully completing scientific research and further professional and scientific activities
3 – Characteristic of educational program	
Subject area (field of knowledge, specialty)	Field of knowledge 27 *Transport*; specialty 275 *Transport technologies (by type)*
Orientation of the educational-scientific programme	The educational-scientific program is based on normative regulations and the results of modern scientific research on transport technologies, transport systems, systems of passenger and cargo transportation, peculiarities of traffic flow management, safety and directs the applicant to solving current problems and problems in the field of transport.

Table continuation

1	2
The main focus of the educational-scientific programme	The educational-scientific program provides linguistic competences and universal skills of the researcher, as well as in-depth knowledge in the chosen specialty. ***Key words:*** foreign language, philosophy, methodology, pedagogics, scientific basics, system analysis, transport, technological processes, traffic, transportation, project management.
Features of the programme	The educational component of the programme is implemented during 4 semesters, with a duration of 43 credits and has disciplines in the corresponding 2 cycles, which provide: language competences, universal skills of the researcher, knowledge in the chosen specialty, disciplines of the student's free choice, including from master's programmes
4 – Feasibility of graduates to employment and further education	
Feasibility to employment	Employment in higher education institutions and scientific institutions on positions of scientific-pedagogical workers, management positions in the field of transport (management of transportation, traffic, etc.).
Further education	Advanced training in research institutions, leading universities of Ukraine and abroad, scientific centers for the design and development of transport systems. Completion of the scientific programme of the fourth (scientific) level of higher education for obtaining the degree of Doctor of Science
5 – Teaching and evaluation	
Teaching and studying	A combination of lectures, practical classes, consultations, independent work on solving problems, consultations with teachers, preparation of the theoretical part of the dissertation of Doctor of Philosophy.
Evaluation	Exams, final tests, oral presentations, defense of the theoretical part of the PhD dissertation.
6 – Programme competencies	
Integral competency (INT)	Ability to solve complex scientific-applied tasks and make decisions about the use of results in practical activity of enterprises/institutions in the field of transport, or in study processes of higher education institutions and scientific programs of research institutions which provides the application of theories and methods of transport technologies and are characterized by complexity and uncertainty.
General competencies (GC)	1. Ability of written and oral communication in Ukrainian and English languages; 2. Ability to study, perceive acquired knowledge in the subject area and integrate them with existing ones; 3. Ability to be critical and self-critical for the understanding of factors that have a positive or negative impact on the communication, and ability to consider these factors in specific communication situations; 4. Ability to plan and manage the time; 5. Ability to show the awareness of equal opportunities and gender issues; 6. Ability to produce new scientific and scientific-applied ideas, show creativity, ability to think systematically; 7. Ability to search and analyze the information from different scientific domestic and foreign sources; 8. Focus on safety; 9. Acquisition of flexible way of thinking, which provides opportunity to understand and solve scientific-applied tasks, while maintaining a critical attitude to established scientific concepts;

Table continuation

1	2
	10. Ability of effective usage in scientific practice different theories in the field of scientific-applied research in the specialty "Transport technologies (by types)"; 11. Ability to solve scientific-applied tasks and make appropriate reasonable decisions; 12. Ability to carry out the research on the level of Philosophy Doctor, have research skills which are manifested in the ability to form (making presentations or presenting reports) new scientific ideas and current challenges in the field of transport, choose the right directions and appropriate methods for their implementation, taking into account existing resources; 13. Ability to work independently and in a team, ability to communicate with colleagues in the field of transport about scientific achievements both on a general level and on the level of scientist-professional; 14. Knowledge and understanding of the subject area and understanding the problems of the field of transport; 15. Ability to work in an international context; 16. Ability to act based on ethical considerations; 17. Ability to communicate effectively on the professional and social levels; 18. Ability to think abstractly, the ability of analysis and synthesis which allows drawing conclusions for different types of complex management tasks, make planning, analysis, control, and evaluation of one's work and the work of others; 19. Scientific-pedagogical spirit, an initiative through the ability of effectively using in practice different theories in the science management and in the field of business administration; 20. Interaction skills and interpersonal skills; 21. Have skills of development and project management for the provision of the high level of the effectiveness of the implementation of different types of projects in the field of transport; 22. Ability to act with social responsibility and civic consciousness; 23. Definiteness and persistence in the execution of received tasks and responsibility for the quality of work performed; 24. Proper understanding and respect for multiculturalism and diversity; 25. Skills in the use of information and communication technologies, development and implementation of computer programs and the use of existing in the field of transport; 26. Focus on the protection and preservation of the natural environment; 27. Ability to adapt and work in new situations; 28. Ability to assess and maintain the quality of work performed; 29. Ability to motivate people and move towards a common goal.
Professional competencies of the specialty (PC)	1. In-depth knowledge of fundamental sciences to the extent required for mastering the disciplines that provide knowledge in the chosen specialty and disciplines of free choice of postgraduate student; 2. In-depth knowledge in the field of transport, necessary for mastering disciplines that provide knowledge in the chosen specialty and disciplines of free choice of postgraduate student; 3. In-depth knowledge of scientific concepts, theories and methods, necessary for the understanding of principles of operation and functional purpose of the equipment and facilities in the field of transport;

Table continuation

1	2
	4. In-depth knowledge of the main normative acts and reference materials, current standards and specifications, instructions and other regulatory documents in the field of transport; 5. Ability to compile, design, and operate documentation in the field of transport during the formation and implementation of transport technologies; 6. Knowledge of the basics of labor protection, industrial sanitation and fire safety during the organization of transport technologies; 7. Ability to organize scientific-pedagogical activity and the process of creation and development of transport technologies; 8. Ability to understand and consider social, ecological, ethical, economic aspects which have an impact on the formation of current and perspective decisions; 9. Ability to find out the cause and effect, analyze and generalize external and internal management information for planning, organization, motivation of employees and control for the activities of subordinates in units of transport systems; 10. Ability to use scientific-pedagogical knowledge and practical skills for the solving of scientific-applied tasks of scientific specialty; 11. Ability to identify, classify, and describe the work, connected with scientific-pedagogical activity by the use of analytic methods and modelling methods; 12. Ability to conduct business communications, knowledge and understanding of scientific specialty for the determination of structure and building the architectonics of scientific research in the field of transport; 13. Ability to determine the motives of scientific-pedagogical activity.
7 – Program results of the study	
Knowledge (KN)	1. Possession of sufficient knowledge about the improvement of means, technologies, and conditions of transportation of goods and passengers, and also methods of operational management of loading and unloading processes which will provide an opportunity to analyze the situation in the sphere of transportation critically; 2. Acquiring of knowledge for the research and development of the complex of technical means of transport systems development, determination of regularities of their impact and the environment; 3. Understanding the instruments and strategies that have relation to the organization and technology of technical service, diagnosing and repair of vehicles, problems of traffic safety and regularities of the impact of human factor on transport processes; 4. Knowledge and understanding of scientific principles which are in the basics of formation of demand on transport services; 5. Knowledge of basis of national transport network formation, the interaction of it with transport systems of other countries; 6. In-depth knowledge of regularities of freight and passenger flows formation, organization of their control and the development of methods of transport processes organization based on the principles of logistics; 7. Knowledge and skills about the development and implementation of new rational systems of complex mechanization and automation of loading-unloading works on freight transport terminals and points;

Table continuation

1	2
	8. Knowledge and understanding of methodologies of design and modernization of methods, technologies and technical means of transportation for the organization of international, mixed, combined, intermodal transportation due to regulatory requirements of current standards and specifications; 9. Knowledge of current achievements of innovative technologies in the field of transport, traffic management, traffic flow control; 10. Understanding of the impact of technical progress in public, economic, social and ecologic contexts; 11. Knowledge of basis of economics and project management on transport; 12. Acquisition of in-depth knowledge and understandings that relate to the specialty 275 Transport technologies (by types), which will be sufficient to organize and conduct scientific research successfully and successfully publicly defend their results on scientific seminars and specialized scientific councils.
Skills (SC)	1. To use acquired knowledge and understanding for identification, formulation and solving the problems of development of transport complex with the use of modern scientific methods; 2. To use the knowledge for solving the tasks of analysis and synthesis in transport systems; 3. Systematically comprehend and use creativity to form principally new ideas in the field of transport; 4. To use the knowledge of technical characteristics, technological peculiarities of formation and sales of transport products; 5. To calculate, design, research the road network, traffic organization and regulation, transport processes of freight and passenger transportation, loading-unloading works, to carry out marketing analysis; 6. To carry out the search of information in different scientific-applied sources for solving the tasks in the field of transport; 7. To work effectively both individually and in a creative group; 8. To identify, classify and describe production activity in the field of transport; 9. To combine the theory and practice, and also to make decisions and develop a strategy of activity for solving scientific-applied tasks in the field of transport considering universal values, public, state and industrial interests; 10. To carry out current scientific research and use scientific skills in the field of transport; 11. To evaluate the obtained results of research critically and reasonably make and defend appropriate decisions; 12. To use in scientific-pedagogical practice the knowledge of transport technologies, apply the methodological tools of cognition, analyze obtained research results within existing theories, make reasonable conclusions.
Communication (COM)	1. Skills of communication, including oral and written communication in Ukrainian and foreign English language; 2. Ability to apply different methods, particularly current informational technologies, for effective communication on professional and social levels.

Table continuation

1	2
Autonomy and responsibility (AaR)	1. Ability to adapt to new situations and make appropriate decisions; 2. Ability to realize the need for learning during the whole life for deepening the acquired and acquisition of new knowledge; 3. Ability to be responsible for the work performed, make decisions independently, achieve the goal in compliance with the requirements of professional ethics; 4. Ability to demonstrate understanding of the leading environmental principles, labor protection and life safety, and their application.
8 – Resource support for programme implementation	
Specific characteristics of personnel support	100% of scientific and pedagogical workers engaged in teaching professionally oriented disciplines in the specialty 275 "Transport technologies (by types)" have relevant scientific degrees and academic titles.
Specific characteristics of material-technical support	Use of modern applied programs: Cardiosens and Neurocom software complexes for the study of psychophysiological properties of drivers; specialized software products Vissim, Visum produced by PTV Vision for researching traffic flow parameters and designing passenger correspondence and public transport routes; MatCad and Statistica for mathematical processing of research results
Specific characteristics of informational–methodological support	Use of the virtual learning environment of the Lviv Polytechnic National University and author's theoretical and scientific-applied developments of the scientific and pedagogical staff of the university and other universities and research institutes.
9 – Academic mobility (Regulated by the Resolution of the CMU №579 «On the approval of the Regulation on the procedure for realizing the right to academic mobility» from August, 12 2015)	
National credit mobility	On the basis of bilateral agreements between Lviv Polytechnic National University and higher education institutions of Ukraine.
International credit mobility	On the basis of bilateral agreements between Lviv Polytechnic National University and higher education institutions of foreign partner countries.
Education of foreign applicants of higher education	Possible after studying Ukrainian language course.

2. Distribution of content of educational-scientific program by component groups and training cycles

№	Training cycle	The scope of the educational load of the student of higher education (credits / %)		
		Compulsory educational components	Selective educational components	Total for the entire period of study
1.	*Cycle of disciplines that form general scientific competencies and universal skills of researcher*	21/49	3/7	30/56
2.	*Cycle of disciplines that form professional competencies*	10/23	6/14	27/37
3.	*Disciplines of free choice of postgraduate student*	-	3/7	3/7
Total for the entire period of study		31/72	12/28	43/100

3. List of components of the educational component of the educational-scientific programme

Code e/d	Components of educational component	Number of credits	Form of final control	Competencies that are provided by the Resolution 261 from 23.03.2016 (with changes from 03.04.2019)
1	2	3	4	5
Compulsory components of educational component				
Cycle of disciplines that form general scientific competencies and universal skills of researcher				
CC1.1.	Philosophy and methodology of science	3	exam	Mastering of general scientific (philosophical) competencies aimed at the formation of a systemic scientific worldview, professional ethics and general cultural outlook; implementation of modern informational technologies into scientific activity (working with scientometric databases, automatic formation of references to literary sources).
CC1.2.	Foreign language for academic purposes, part 1	4	final test	Acquiring of language competencies, sufficient for representation and discussion of the results of their scientific work in a foreign language in oral and written form, and complete understanding of foreign scientific texts in appropriate specialty, application of modern informational technologies (presentation of scientific results).
CC1.3.	Foreign language for academic purposes, part 2	4	exam	

Table continuation

1	2	3	4	5
CC1.4.	Professional pedagogics	3	final test	Acquiring of universal skills of the researcher, in particular, organization and conducting training sessions, application of modern informational technologies (working with Moodle, Microsoft Teams, Zoom, etc.)
CC1.5.	Academic entrepreneurship	4	final test	Acquiring of universal skills of the researcher, particularly oral and written presentation of results of one`s research in Ukrainian language, management of scientific projects and/or drafting proposals for research funding, registration of intellectual property rights, application of modern informational technologies.
CC1.6.	Pedagogical practice	3	final test	Acquiring of universal skills of the researcher, i.e., organization and conducting training sessions, application modern informational technologies (working with Moodle, Microsoft Teams, Zoom, etc.).
Totally per cycle:		**21**		
Cycle of disciplines that form professional competencies				
CC2.1. *	System analysis in transport	4	exam	Acquiring in-depth knowledge in the specialty, for which postgraduate student carries out the research, particularly mastering the basic concepts, understanding the theoretical and practical problems, history of the development and current state of scientific knowledge in a chosen specialty, possession of the terminology in the investigated scientific direction in the amount of ECTS credits due to a standard of higher education.
CC2.2. *	Research seminar in the field of transport	3	final test	
CC2.3.	Modeling in transport systems	3	final test	
Totally per cycle:		**10**		
Totally per CC		**31**		
Selective components of educational component				
Cycle of disciplines that form general scientific competencies and universal skills of researcher				
SB1.1	Business Foreign Language	3	final test	Acquiring of universal skills of the researcher, in particular oral and written presentation of results of one`s research in Ukrainian language, research project management and/or drafting proposals for research funding registration of intellectual property rights, application of modern informational technologies.
SB1.2	Psychology of creativity and invention	3	final test	
SB1.3	Management of research projects	3	final test	
SB1.4	Technology of registration of grant applications and patent rights	3	final test	

Table continuation

1	2	3	4	5
SB1.5	Rhetoric	3	final test	Acquiring of language competencies, sufficient for representation and discussion of results one`s scientific work in a foreign language in oral and written form, and for a complete understanding of foreign scientific texts in relevant specialty, application of modern informational technologies (presentation of scientific results). Mastering the general scientific (philosophical) competencies, aimed at forming a systemic scientific worldview, professional ethics and general cultural outlook; applying modern informational technologies in scientific activity (working with scientometric databases, automatic formation of references to literary sources). Acquiring universal researcher skills, particularly organization and conducting training sessions, application of informational technologies (working with Moodle, Microsoft Teams, Zoom, etc.).
SB1.6	Modern inventory in research activities	3	final test	
SB1.7	Open scientific practices	3	final test	
SB1.8	Academic integrity and quality of education	3	final test	
SB1.9	Methodology of preparation of scientific publications	3	final test	
SB1.10	Quality of higher education (formation of internal quality assurance systems)	3	final test	
Totally per cycle:		**3**		
*Cycle of disciplines that form professional competencies***				
SB2.1	Scientific bases of transport processes and systems	3	exam	Acquiring of in-depth knowledge in the specialty, for which postgraduate student carries out the research, particularly mastering the basic concepts, understanding the theoretical and practical problems, history of the development and current state of scientific knowledge in a chosen specialty, possession of the terminology in investigated scientific direction.
SB2.2	Methods of multidimensional analysis	3	exam	
SB2.3	Intelligent transport systems	3	exam	
SB2.4	Scientific research methods	3	exam	
SB2.5	Ergonomics in transport systems	3	exam	
SB2.6	Ecological transport	3	exam	
SB2.7	Systems of traffic organization and management	3	exam	

Table continuation

1	2	3	4	5
SB2.8	Technological processes of transportation	3	exam	
Totally per cycle:		**6**		
Disciplines of free choice of postgraduate student* **				
SB3.1	Discipline of free choice of postgraduate student	3	final test	
Totally per cycle:		**3**		
Totally per selective components		**12**		
Totally per educational component		**43**		

Note:

* - list of disciplines that form professional competencies is proposed mutual for ESP of related fields and specialties;

** - list of disciplines that form professional competencies should contain ten disciplines, from which postgraduate student chooses two;

*** - postgraduate student can select disciplines which are taught in Lviv Polytechnic National University or other domestic (foreign) HEI (scientific establishments) on all levels.

4. Matrix of correspondence of programme competencies to educational components

	CC 1.1	CC 1.2	CC 1.3	CC 1.4	CC 1.5	CC 1.6	CC 2.1	CC 2.2	CC 2.3	SB 1.1	SB 1.2	SB 1.3	SB 1.4	SB 1.5	SB 1.6	SB 1.7	SB 1.8	SB 1.9	SB 1.10	SB 2.1	SB 2.2	SB 2.3	SB 2.4	SB 2.5	SB 2.6	SB 2.7	SB 2.8	SB 3.1
INT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GC1	•	•	•	•	•	•	•		•	•	•	•	•	•	•			•		•	•	•	•		•	•	•	
GC2	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•		•	•	•	•		•	•	•	•
GC3		•	•	•	•	•	•		•	•	•	•		•			•		•	•	•	•	•		•	•	•	
GC4		•	•	•	•	•	•		•	•	•	•		•						•	•	•	•	•	•	•	•	
GC5	•					•					•	•					•		•									
GC6				•	•		•	•	•		•	•	•		•	•		•		•	•	•	•		•	•	•	•
GC7				•			•	•	•		•	•	•		•					•	•	•	•		•	•	•	•
GC8							•		•		•	•								•	•	•	•	•	•	•	•	
GC9				•	•		•		•		•	•	•		•			•		•	•	•	•		•	•	•	
GC10				•			•	•	•		•	•	•		•	•		•		•	•	•	•		•	•	•	
GC11				•			•	•	•		•	•						•		•	•	•	•		•	•	•	
GC12								•	•		•	•	•		•	•		•		•	•	•	•		•			•
GC13		•	•							•		•	•	•														
GC14							•	•	•			•				•		•		•	•	•	•		•	•	•	
GC15	•	•	•	•	•	•	•			•		•	•	•												•	•	•
GC16						•					•			•			•		•									
GC17		•	•			•				•	•																	
GC18				•		•	•				•		•								•					•	•	
GC19		•	•			•				•	•	•	•			•												
GC20		•	•							•	•	•																
GC21												•			•													
GC22		•	•			•				•	•			•			•		•									
GC23						•			•		•									•	•	•	•		•			
GC24		•	•			•				•	•						•		•									
GC25							•		•			•	•							•	•	•	•		•	•	•	
GC26							•					•												•	•			
GC27		•	•		•					•	•												•					
GC28		•	•							•	•	•					•		•				•					
GC29		•	•							•	•	•		•														
PC1							•		•											•	•	•	•		•	•	•	
PC2							•		•											•	•	•	•		•	•	•	
PC3							•	•	•			•						•		•	•	•	•		•	•	•	
PC4					•		•		•			•	•							•	•	•	•		•	•	•	
PC5					•		•					•	•										•			•	•	
PC6							•		•											•	•	•	•	•	•	•	•	
PC7		•	•							•	•	•					•		•							•		
PC8					•	•	•		•								•		•	•	•	•			•	•	•	
PC9				•		•	•									•												
PC10						•	•	•				•			•	•		•						•				
PC11				•	•	•		•				•	•		•													•
PC12	•	•	•	•	•			•		•		•	•	•	•			•					•					•
PC13				•		•	•				•	•					•		•									

5. Matrix of provision of programme results of the study to corresponding components of educational-scientific programme

	CC 1.1	CC 1.2	CC 1.3	CC 1.4	CC 1.5	CC 1.6	CC 2.1	CC 2.2	CC 2.3	SB 1.1	SB 1.2	SB 1.3	SB 1.4	SB 1.5	SB 1.6	SB 1.7	SB 1.8	SB 1.9	SB 1.10	SB 2.1	SB 2.2	SB 2.3	SB 2.4	SB 2.5	SB 2.6	SB 2.7	SB 2.8	SB 3.1
KN1							•													•							•	
KN2							•	•				•			•									•	•	•		
KN3								•																•	•	•	•	•
KN4					•		•		•											•	•	•	•		•	•	•	•
KN5							•					•										•				•		
KN6							•		•											•	•	•	•		•	•	•	
KN7							•									•											•	•
KN8							•		•											•	•	•	•		•	•	•	
KN9															•			•								•		
KN10					•							•			•	•									•		•	•
KN11					•							•									•							•
KN12	•	•	•	•		•		•	•	•	•	•	•	•			•	•	•	•	•	•	•		•	•	•	
SC1				•			•	•	•									•					•			•	•	
SC2				•			•	•	•									•		•			•					•
SC3	•						•	•							•		•		•			•		•				
SC4							•					•															•	
SC5																										•	•	
SC6								•			•		•			•		•										•
SC7		•	•					•	•	•		•		•			•		•				•					
SC8												•														•	•	
SC9	•					•	•	•								•						•				•		
SC10							•	•	•		•	•	•			•							•					•
SC11				•			•	•	•			•					•		•		•		•					
SC12		•	•	•		•	•			•							•		•	•						•	•	
COM1	•	•	•							•			•	•		•	•	•	•									•
COM2						•	•	•	•						•		•	•	•	•			•	•		•	•	•
AaR1	•	•	•	•	•					•							•		•	•				•				•
AaR2	•	•	•	•	•	•	•		•	•					•		•		•		•		•			•	•	•
AaR3	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•		•	•	•	•
AaR4						•												•						•	•			•

II. SCIENTIFIC COMPONENT OF EDUCATIONAL-SCIENTIFIC PROGRAM

Scientific component of educational-scientific program provides the conduction by postgraduate student his own scientific research under guidance of one or two scientific advisors and the preparation of the results in the form of a dissertation.

The dissertation for obtaining the scientific degree of Doctor of Philosophy is an independent study of a postgraduate student, which offers a solution to an actual scientific and applied task in the specialty *275 Transport technologies (by type)*, the results of which are characterized by scientific novelty and practical value and are published in relevant publications.

Scientific component of educational-scientific program is issued in the form of an individual plan of the postgraduate student's scientific work and is an integral part of the postgraduate school curriculum.

An integral part of the scientific component of the postgraduate educational-scientific program is the preparation and publication of scientific articles, speeches at scientific conferences, scientific professional seminars, round tables, and symposia.

According to the Regulations on academic integrity at Lviv Polytechnic National University, any scientist, including the applicant, is responsible for academic dishonesty, which can manifest itself in the following forms:

- academic plagiarism;
- academic fraud;
- execution to order and (or) sale of academic texts of dissertation studies;
- academic falsification and fabrication;
- publication of fictional research results, any data about the educational process;
- attribution of results of collective activity to one or specific persons without coordination with other members of author`s collective or inclusion in the list of authors of scientific or educational-methodological work of persons who did not participate in the creation of the product;
- academic deception;
- academic bribery;
- conflict of interest;
- private interest.

Topics of scientific research by specialty

275 Transport technologies (by type)

1. Improvement of means, technologies of goods, passenger and luggage transportation, and operational management methods of transhipping processes at nodes of the transport network.

2. Research and development the complex of technical means for the development and effective use of transport systems elements.

3. Determination of the regularities of mutual impact of transport systems and external environment.

4. Research on the regularities of formation of the demand on transport services at passenger and goods transportation. Development of decision-making models on deliveries of various freights in regional, interregional and international connections by subjects of transport markets.

5. Identification and justification of factors of traffic systems effectiveness, development of theory and methods of management of transport systems development.

6. Regularities of cargo flows formation, organization of their control and development of methods of transport process organization based on the principles of logistics, formation of appropriate systems of freight forwarding service.

7. Regularities of passenger flows formation, development of passenger systems of urban, rural areas and regions.

8. Justification of technological processes of passenger and cargo transportation, their organization and management in integrated systems and systems of particular types of transport: aviation, road, water, rail.

9. Development of rational systems and justification of means of complex mechanization and automation of loading and unloading operations at coincidence points of different modes of transport.

10. Regularities of traffic flow formation and development of their management's traffic organization systems and technology.

11. Transport safety problems. Regularities of the impact of human factor on transport processes.

12. Transport means functioning in different operational conditions and technical bases to ensure technological readiness. Methods of preventive maintenance of vehicles, development of means of diagnostics and forecasting of their technical condition.

13. Methods of increasing the fuel efficiency and improvement of environmental indicators of vehicles in operating conditions.

14. Environmental protection from the harmful impact of vehicles at all stages of the life cycle. Development of assessment methods and ways to increase the environmental safety of vehicles.

15. Development of new and improvement of existing scientifically justifies strategies, regimes and programs of maintenance and repair of vehicles, justification of operational requirements to transport equipment, determination of parameters of necessary repair and maintenance infrastructure.

16. Research on the effectiveness of functioning of ergatic vehicle control systems, development of measures, means and methods of improvement of the quality of operation, maintenance and repair of vehicles.

17. Research on the impact of operational factors on a vehicle's operation indicators.

III. Certification of postgraduate students

Certification of applicants of higher education for the scientific degree of Doctor of Philosophy is carried out by a specialized scientific council, formed for one-time defense, on the basis of public defense of scientific achievements in the form of a dissertation.

A compulsory condition for admission to the defense is the successful completion of the postgraduate student's individual educational plan.

Applicants of higher education of scientific degree of Doctor of Philosophy defend a dissertation in a one-time active specialized academic council for the relevant specialty, which functions in the higher educational institution where the postgraduate student was studied. The academic council of a higher education institution has the right to submit documents to the National Agency for Quality Assurance of Higher Education for the accreditation of a specialized scientific council formed to conduct a one-time defense or to apply to another higher education institution with a corresponding request.

The volume of the main text of the dissertation of applicants of higher education of the degree of Doctor of Philosophy by specialty 275 "Transport technologies (by type) should be established in the number of 4.0 - 5.0 author's sheets.

Structural–logical scheme of educational-scientific programme for preparation of Doctors of Philosophy in specialty 275 "Transport technologies (by type)"