

DEPARTMENT OF EDUCATION AND SCIENCE OF UKRAINE

**NATIONAL TECHNICAL UNIVERSITY
«KHARKIV POLYTECHNIC INSTITUTE»**

ASSERT

Chancellor NTU «KhPI»

_____ E.I.Sokol
«__»_____ 2019 y.

EDUCATIONALLY-PROFESSIONAL PROGRAM

«RAILWAY TRANSPORT»

Second level of higher education

speciality 273 «the Railway transport»

area of knowledge 27 «Transport»

Qualification: Master's degree of a railway transport

RATIFIED

BY SCIENTIFIC ADVICE OF NTU «KhPI»

Chairman of scientific advice

_____ /L.L. Tovazhnianskyi/

protocol № from

«__»_____ 2019 y.

Kharkiv 2019

SHEET OF CONCORDANCE
educationally-scientific program «Transport»

Level of higher education Second (master's degree)

Area of knowledge **27 « Transport »**

Speciality **273 «Railway transport»**

Specializations 273-01 «Locomotives and locomotive establishment»

Qualification **A master's degree is from a railway transport**

APPROVED

By a Scientifically-methodical commission
on speciality 273
Chairman of group

_____ B. H. Liubarskyi

« ____ » _____ 2018

RECOMMENDED

By methodical advice of NTU «KhPI»
Vice-chairman of methodical advice

_____ P. Mihushchenko

« ____ » _____ 2018

RATIFIED AND GIVEN TO ACTION

By the order of chancellor of the National technical university the «Kharkiv polytechnic institute» from « ____ » _____ 20__ № _____.

This educationally-professional program can not be fully or partly recreated, circulated and widespread without permission of the National technical university the «Kharkiv polytechnic institute».

PREFACE

The «Kharkiv polytechnic institute» is worked out by the project group of department of electric transport and тепловозобудування of Educational-scientific institute of energy, electronics and electromechanics of the National technical university on the basis of project of standard of higher education of Ukraine from speciality 273 «the Railway transport» in composition:

1. **Liubarskyi Boris Grigorievich**, doctor of engineering sciences, professor, manager of department of electric transport and тепловозобудування of Educational-scientific institute of energy, electronics and electromechanics of the National technical university the «Kharkiv polytechnic institute»(guarantor of the educational program).

2. **Masliiev Viacheslav Heorhijovych**, doctor of engineering sciences, professor, professor of department of electric transport and тепловозобудування of Educational-scientific institute of energy, electronics and electromechanics of the National technical university the «Kharkiv polytechnic institute».

3. **Buriakovskiy Serhij Hennadijovych**, doctor of engineering sciences, professor, director NDPKI «Molniya» the National technical university the «Kharkiv polytechnic institute».

4. **Tyshchenko Anna Anatoliivna**, candidate of engineering sciences, associate professor of department of electric the stations of Educational-scientific institute of energy, electronics and electromechanics of the National technical university the «Kharkiv polytechnic institute».

5. **Iakunin Dmytro Ihorovych**, candidate of engineering sciences, associate professor, associate professor of department of electric transport and тепловозобудування of Educational-scientific institute of energy, electronics and electromechanics of the National technical university the «Kharkiv polytechnic institute».

Reviewers:

1. A doctor of engineering sciences, professor M. M. Babaiev, Ukrainian state university of railway transport, manager of department, is «Electroenergy, electrical engineering and electromechanics».
2. A doctor of engineering sciences, professor D. O. Volontsevych, National technical university, is the «Kharkiv polytechnic institute», manager of department «Information technologies and systems of the wheeled and caterpillar machines name of O.O. Morozov»

Reviews-reviews of external stakeholders:

1. A research department is «Infrastructure of railways and electric traction» of the Kharkiv separation of branch the « Design and survey institute of railway transport».
2. «Service of locomotive economy» of the Public joint-stock company is the »Ukrainian railway».
3. DP is «Plant » ELEKTROVAZhMASH».

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1. Educational program «Transport» profile from speciality № 273 « the Railway transport »

1 – General information	
Complete name of higher educational establishment and structural subdivision	A national technical university is the «Kharkiv polytechnic institute» Educational-scientific institute of energy, electronics and electromechanics Department of electric transport and locomotive construction
Degree of higher education and name of qualification of original a language	A degree of higher education - is a master's degree Educational qualification is a master's degree from a railway transport Qualification in a diploma is an engineer-researcher of railway transport
Official name of the educational program	Educational-professional program of the second (master's degree) level of higher education
Type of diploma and volume of the educational program	Diploma of master's degree, single, 120 credits of ECTS, term of studies 19 months
Presence of accreditation	- Certificate about accreditation: series of НД №of 2192151 від on September, 06 2017p. - Term of action : to July, 1, 2025
A cycle/is a level	HPK of Ukraine is a 7 level, FQ - EHEA is the second cycle, EQF - LLL is a 7 level
Pre-conditions	Diploma of bachelor Preliminary examinations are on a profession and foreign language. Other requirements determined by the rules of reception on the educationally-professional program of master's degree.
Teaching language(и)	Ukrainian
Term of action of the educational program	In accordance with the term of action of certificate about accreditation
Internet-address of the permanent placing of description of the educational program	http://www.kpi.kharkov.ua/rus/faculty/e
2 – Aim of the educational program	
Acquisition of theoretical knowledge, practical abilities, skills and competenses, sufficient for successful implementation professional duties after speciality 273 « the Railway transport » and to prepare students for further employment after select speciality in a subject domain «Transport», mastering of the programs of next levels (Ph.D.) for scientific researchers An achievement of the marked aim is base on principles of the following and individualization of studies, solidity and integrity of grant of knowledge, practical orientation and realization of place of got компетенцій, symbiosis of scientific and system approaches, and others like that.	
3 - Description of the educational program	
Subject domain (area of knowledge, speciality, specialization (at presence of))	Area of knowledge : a 27 « Transport » Speciality: 273 « the Railway transport » Specializations: A block is 01 «Locomotives and locomotive establishment»
Orientation of the educational program	The Educationally-scientific program of master's degree has the applied orientation, orients on actual specializations within the framework of that a further professional and scientific career is possible : locomotives and locomotive economy, logistic on a railway transport
Basic focus of the educa-	Universal, special education and professional preparation in area of

ditional program and specialization	transport with an acquisition of necessary research skills option for a scientific career. Keywords: railway; objects of railway transport; technological processes of production and repair of objects of railway transport.
Program features	A key aspect of the program is an orientation on research activity. For period of studies in a city council a student must take part in a scientific and technical conference and have scientific publications
4 – Fitness of graduating students before employment and further studies	
A fitness is to employment	Workplaces are in the research institutes of HAH of Ukraine, higher educational establishments METAL-OXIDE-SEMICONDUCTOR Ukraine, scientific centers and companies of railway profile, enterprises and establishments of industry of transport. Types of economic activity after ДК003:2010 of коди of КП from 2143.1 to 2144.1
Further studies	Graduating students have a right to continue studies at third (educationally-scientific) level of higher education of FQ - EHEA, 8 level of EQF - LLL and 8 level of HPK on competitive basis and to continue studies abroad for the receipt of scientific degree of Ph.D..
5 – Teaching and evaluation	
Teaching and studies	Lectures, practical and laboratory employments, computer practical works; individual employments, consultations, implementations of master's degree work. Use of technologies of the mixed studies : informatively-communication, студентоцентричні, module, technologies of research studies, technology of studies in a collaboration, проєктивні methodologies of education.
Evaluation	Rating system of evaluation, verbal and writing exams, тесту-вання. The evaluation system envisages application of the international system ECTS (with estimations And, B, C, D, E, F), national system (with estimations «perfectly», «well», «satisfactorily» and «unsatisfactorily»), and also 100-ball system INSTITUTION of higher learning with the set system of accordance.

6 – Programmatic to the competence	
Integral competence	Ability to decide intricate problems and problems in a railway transport during realization of professional activity or in the process of studies that envisages realization of researches та/або realization of innovations and characterized by a complexity and vagueness of terms.
General to the competence (ZK)	ZK1. A capacity is for realization of researches at corresponding level. ZK 2. A capacity is for a search, treatment and analysis of information from different sources. ZK 3. Ability to be critical and containing self-criticism. ZK 4. Skills of interpersonality co-operation. ZK 5. Ability to explain people and move to the general aim. ZK 6. Ability to communicate with the representatives of other professional groups of different level (with experts from other areas of knowledge/of types of economic activity). ZK 7. Value and respect of variety and multiculturalism. ZK 8. Ability to work in an international context. ZK 9. Ability to find out initiative and enterprise. ZK 10. Ability to operate on the basis of ethic considerations (rea-

	<p>sons).</p> <p>ZK 11. Definiteness and persistence are in relation to the put tasks and taken duties.</p> <p>ZK 12. Aspiring is to environmental preservation.</p> <p>ZK 13. Ability to operate socially responsibly and consciously.</p> <p>ZK 14. Ability to realize human possibilities and gender problems.</p> <p>ZK 15. A capacity is for implementation of research work with the elements of scientific novelty.</p>
<p>To the profession of competence of speciality (FK)</p>	<p>FK 1. Ability to work in a group above large projects in industry of railway transport.</p> <p>FK 2. Ability to apply approach of the systems to the decision of engineering problems on the basis of researches within the framework of specialization.</p> <p>FK 3. Ability to understand the necessities of users and clients and importance of such questions as aesthetics in the process of planning in the field of railway transport.</p> <p>FK 4. Ability to understand and take into account social, ecological, ethic, economic and commercial considerations that influence on realization of technical decisions on a railway transport.</p> <p>FK 5. Ability to demonstrate understanding of more wide interdisciplinary engineering context and him basic principles at the decision of scientific and productive problems in the field of railway transport.</p> <p>FK 6. Ability to demonstrate understanding of necessity of observance of professional and ethic standards of high level at the decision of the put tasks.</p> <p>FK 7. Ability to demonstrate understanding of legal frameworks that relate to functioning of objects of railway transport of Ukraine, in particular question of personnel, health, safety and risk (including ecological risk).</p> <p>FK 8. Ability to demonstrate the wide understanding of problems of quality of processes and objects of railway transport.</p> <p>FK 9. Ability to show understanding of requirements to activity after speciality, predefined by the necessity of providing of steady development of Ukraine, her strengthening as the democratic, social and legal state.</p> <p>FK 10. Ability to investigate, to analyse and perfect the technological processes of railway transport in accordance with specialization.</p> <p>FK 11. Ability to find out the objects of railway transport for perfection of technique and technologies in accordance with specialization.</p> <p>FK 12. Ability scientifically to ground the choice of materials, equipment and measures for realization of the newest technologies on a railway transport in accordance with specialization.</p> <p>FK 13. Ability to estimate risks at planning or introduction of new technological processes in the field of railway transport.</p> <p>FK 14. Ability correctly to carry out an analysis and synthesis at the study of the technical systems of objects of railway transport.</p> <p>FK 15. Ability to choose and apply in practice the methods of research, planning and to conduct necessary experiments, interpret results and draw conclusion in relation to the optimality of decisions, that is accepted in the field of production, exploitation and repair of objects of railway transport.</p> <p>FK 16. Ability to use the laws and principles of engineering in</p>

	<p>specialization, high-level mathematical apparatus for the design, construction, manufacture, installation, operation, maintenance and utilization of objects, phenomena and processes in the field of rail transport according to specialization.</p>
<p>7 – Programmatic results of studies</p>	
	<p>PRN 1. To recreate processes in the systems of railway транспортупри their design on the personal computer.</p> <p>PRN 2. To analyse processes in the equipment of railway transport and corresponding complexes and systems.</p> <p>PRN 3. To find the variants of increase of energy efficiency of equipment of railway transport and corresponding complexes and systems.</p> <p>PRN 4. To determine the plan of measures on the increase of reliability, safety of exploitation and continuation of resource of equipment of railway transport and corresponding complexes and systems.</p> <p>PRN 5. To develop and inculcate system measures on the increase of reliability, efficiency of exploitation and continuation of resource of equipment and objects of railway transport.</p> <p>PRN 6. To own the methods of mathematical and physical design of objects and processes in the systems of railway transport.</p> <p>PRN 7. To seize update versions or new software intended for the computer design of objects and processes in the systems of railway transport.</p> <p>PRN 8. To estimate general charges on scientific research-and-developments.</p> <p>PRN 9. To secure own rights for intellectual property and respect analogical rights other, to apply the system of legal safeguard and property intellectual ownership rights.</p> <p>PRN 10. To find information on resources for the search of the educational programs, underbacks and grants of European Union and states-members of European Union.</p> <p>PRN 11. To elect direction of scientific research and take part in him taking into account modern problems in industry of transport.</p> <p>PRN 12. To participate in international scientific conferences and seminars sanctified to the modern problems in industry of transport.</p> <p>PRN 13. To decide professional tasks from planning, editing and exploitation of complexes and systems of railway transport.</p> <p>PRN 14. To seize the new methods of synthesis of options and systems of railway transport with the set indexes.</p> <p>PRN 15. To combine the methods of empiric and theoretical research for the search of increase of efficiency of the systems of railway transport.</p> <p>PRN 16. Ability to apply pedagogical and psychological receptions in professional and administrative activity.</p> <p>PRN 17. To know the methods of organization, technology and processes of transformation of energy in the systems of railway transport for the increase of ii efficiency.</p> <p>PRN 18. To know principles of organization of processes of transformation of energy in the systems of traction of railway transport.</p> <p>PRN 19. To know principles of organization of processes of management of motion of railway transport vehicles processes.</p>

	<p>PRN 20. To analyse the modern state and determine progress of technologies and methods of energy-savings, increase of power efficiency of the systems of railway transport trends.</p> <p>PRN 21. Able effectively to apply the modern methods of determination of terms and parameters of functioning of railway transport systems.</p> <p>PRN 22. Able to use modern scientific knowledge and effectively to apply in industry of transport.</p> <p>PRN 23. To own the modern methods of mathematical and physical design of objects and processes, planning of experiment, realization of treatment of his results and effectively to draw on results at researches in industry of transport.</p>
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8 – Resource providing of realization of the program	
Skilled providing	All scientifically-pedagogical workers, that provide the educationally-professional program after qualification answer a profile and direction of disciplines that is laid out, have necessary experience of pedagogical work and experience of practical work. In the process of organization of educational process professionals are attracted with experience of research/administrative/innovative/creative work та/або work on speciality.
Logistical support	Logistical support allows fully to provide an educational process during all cycle of preparation on the educational program. The state of apartments is witnessed by технічними passports that answer existent normative acts.
Informative and educational and methodical providing	The informative providing comes true by textbooks, by train aids and others like that and by electronic resources (material library well-being no less as a five by the name of home and foreign professional magazines of corresponding or family profile, including in an electronic kind). The methodical providing will be realized by obligatory accompaniment of educational activity by corresponding навчально-методичними materials from every educational discipline of curriculum.
9 – Academic mobility	
National credit mobility	On the basis of bilateral agreements between the National technical university the «Kharkiv polytechnic institute» and by higher educational establishments of Ukraine
International credit mobility	On the basis of bilateral agreements between the National technical university of «KhPI» and educational establishments of countries-partners.
Studies of foreign breadwinners of higher education	It is possible after the study of course of Ukrainian.

2. List of components of the educationally-professional program

2.1. List of components EP

Code	Components of the educational program (disciplines, projects / of work, practical worker, qualifying work)	Amount credits ECTS	Form of final control
1	2	3	4
OBLIGATORY COMPONENTS OF EDUCATIONAL PROGRAM			
1. Cycle of general preparation			
ZP 1	Organization of production and marketing	3	Diff. test (9)
ZP 2	Safety of labour and professional activity	3	Diff. test (9)
ZP 3	Intellectual property	3	Diff. test (9)
ZP 4	Philosophical problems of scientific cognition	3	Diff. test (11)
ZP 5	A foreign language is after professional aspiration	4	Diff. test (11)
ZP 6	Pre-diploma practice	11	Diff. test (12)
ZP 7	Attestation (diploma planning)	19	Diff. test (12)
2. Cycle of professional and practical preparation			
Professional preparation is after speciality			
PP 1	Bases of scientific researches	3	Diff. test (9)
PP 2	Dynamics of the system "a rolling stock is track"	6	Examination (9)
PP 3	Calculations and constructing of rolling stock of rail- way transport	6	Examination (10)
PP 4	Problems, technologies and prospects of development of industry	4	Examination (10)
PP 5	Reliability and diagnostics	5	Examination (10)
PP 6	Research work	5	Examination (11)
Total volume of obligatory components:		75	

SELECTIVE COMPONENTS OF EDUCATIONAL PROGRAM

Code	Components of the educational program (disciplines, projects/of work, practical worker, qualifying work)	Amount credits ECTS	Form of final control
1	2	3	4
3. Blocks of choice of professional preparation			
A block of disciplines is 01 «Locomotives and locomotive establishment»			
VB 1.1	Brake systems of railway transport. Special course	6	Examination (9)
VB 1.2	Ancillariess of rolling stock. Special course	6	Examination (9)
VB 1.3	Calculations are on durability of rolling stock	3	Examination (10)
VB 1.4	Systems of automatic control a rolling stock	3	Diff. test (10)
VB 1.5	Modern information technologies are on a railway transport	3	Examination (10)
VB 1.6	Modern computer systems of the design-engineering planning of railway transport	3	Diff. test (10)
VB 1.7	Accreditation, test and certification of facilities of railway transport	3	Diff. test (10)
	Total:	27	
Block of disciplines of free choice of student			
VS 1	Discipline of psychological aspiration	3	Diff. test (11)
VS 2	Discipline of legal aspiration	3	Diff. test (11)
VS 3	Discipline of scientifically-professional aspiration (NPS) 1	4	Examination (11)
VS 4	Discipline of NPS 2	4	Examination (11)
VS 5	Discipline of NPS 3	4	Diff. залік (11)
Total volume of selective components :		45	
TOTAL VOLUME OF EDUCATIONAL PROGRAM		120	

2.2 Structural-logical scheme EP

Semester	Table of contents of educational activity
1	ZP1, ZP2, ZP3, PP1, PP2, VB1.1, VB1.2
2	PP3, PP4, PP5, VB1.3, VB1.4, VB1.5, VB1.6, VB1.7
3	ZP4, ZP5, PP6, VS1, VS2, VS3, VS4, VS5
4	PP7, PP8

**DISTRIBUTION OF MAINTENANCE OF EDUCATIONALLY-SCIENTIFIC PROGRAM
IS AFTER GROUPS OF COMPONENTS AND CYCLES OF PREPARATION**

Cycle of preparation	Volume of the educational loading of bread-winner higher education (credits of ECTS / %)		
	General components EPP	Selective components EPP	All after all term studies
Cycle of general preparations	16 /13,3	-	16 /13,3
Cycle of professional preparations	29 /24,2	75 /62,5	104 /86,7
All for all term studies	45/37,5	75/62,5	120 /100

3. Form of attestation of bread-winners of higher education

Attestation of graduating students of the educational program of speciality **273 «Transports»** are conducted in form defence of qualifying master's degree work and completed to the видачою document of standard pattern about awarding of master's degree with the appropriation of qualification: **master's «Degree from a railway transport»** after corresponding specialization of pit. Attestation comes true openly and publicly.

Qualifying work must envisage the decision of the difficult specialized task or practical problem in industry of transport that envisages realization of researches та/або realization of innovations and characterized by the vagueness of terms and requirements.

Qualifying work must be checked for plagiarism with the use of програмно-технічних facilities.

Qualifying work must be placed in the depositary of higher educational establishment or corresponding structural subdivision.

Other requirements must be certain and legitimized in the corresponding documents of higher educational establishment.

4. Matrix of accordance to the programmatic competencies components of the educational program

	ZP 1	ZP 2	ZP 3	ZP 4	ZP 5	ZP 6	ZP 7	PP 1	PP 2	PP 3	PP 4	PP 5	PP 6	VB 1.1	VB 1.2	VB 1.3	VB 1.4	VB 1.5	VB 1.6	VB 1.7
ZK 1	+						+	+					+				+			
ZK 2	+																	+	+	
ZK 3	+																			
ZK 4	+																			
ZK 5	+																			
ZK 6	+																			
ZK 7			+	+	+															
ZK 8	+																			
ZK 9	+																			
ZK 10	+			+																
ZK 11				+				+			+									
ZK 12		+					+													
ZK 13		+		+																
ZK 14		+		+																
ZK 15	+		+			+	+	+												
FK 1						+	+			+			+					+	+	
FK 2							+						+							
FK 3							+			+			+							
FK 4	+	+					+													

	ZP1	ZP2	ZP3	ZP4	ZP5	ZP6	ZP7	PP1	PP2	PP3	PP4	PP5	PP6	VB1.1	VB1.2	VB1.3	VB1.4	VB1.5	VB1.6	VB1.7
FK 5						+	+				+	+	+							
FK 6				+						+										
FK 7							+						+							+
FK 8							+	+			+		+							+
FK 9							+			+	+									
FK 10							+		+		+	+		+	+	+	+			
FK 11							+		+					+	+	+	+			
FK 12							+			+	+		+	+		+				
FK 13	+																			
FK 14							+	+					+						+	
FK 15						+														
FK 16							+		+	+								+	+	

5. Matrix of providing of programmatic results of studies (PRN) of the educational program corresponding components

	ZP 1	ZP 2	ZP 3	ZP 4	ZP 5	ZP 6	ZP 7	PP 1	PP 2	PP 3	PP 4	PP 5	PP 6	VB 1.1	VB 1.2	VB 1.3	VB 1.4	VB 1.5	VB 1.6	VB 1.7
PRN 1						+	+	+	+	+			+	+	+	+				
PRN 2	+	+	+		+			+	+	+	+	+	+	+	+	+				
PRN 3	+						+	+	+	+	+		+							
PRN 4							+					+	+							
PRN 5							+					+	+							
PRN 6	+						+	+	+	+			+							
PRN 7							+	+	+	+			+							
PRN 8	+						+	+												
PRN 9			+				+													+
PRN 10			+					+					+				+			+
PRN 11											+		+							
PRN 12											+		+							
PRN 13								+		+									+	
PRN 14									+			+		+					+	
PRN 15									+											
PRN 16				+				+	+											

	ZP 1	ZP 2	ZP 3	ZP 4	ZP 5	ZP 6	ZP 7	PP 1	PP 2	PP 3	PP 4	PP 5	PP 6	VB 1.1	VB 1.2	VB 1.3	VB 1.4	VB 1.5	VB 1.6	VB 1.7
PRN 17				+							+									
PRN 18										+										
PRN 19																	+			
PRN 20											+									
PRN 21																		+		
PRN 22							+	+					+							
PRN 23							+	+					+						+	