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**Federal State Autonomous Educational Institution of Higher Education
Peoples' Friendship University of Russia named after Patrice Lumumba
RUDN University
Academy of Engineering**

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS OF THE DISCIPLINE

**Technological processes of pipeline transport / Технологические процессы
трубопроводного транспорта**

(name of discipline/module)

Recommended Didactic Council for the Education Field:

21.04.01 Oil and gas engineering

(code and name of the Higher Education Field)

The development of the discipline is carried out within the framework of the implementation of the higher education program of higher education (Higher Education Program):

Oil and gas engineering / Технологии добычи и транспортировки нефти и газа

(name (profile/specialization) of the Higher Education Program)

1. COURSE GOALS

The purpose of mastering the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта" is to master the theoretical and practical knowledge for undergraduates to form the required level of professional competencies in the field of technological processes of pipeline transport.

The aims of the course are:

- training undergraduates in the technological processes of pipeline transport of hydrocarbons;
- development of skills and ability to use normative and technical documentation;
- development of skills and abilities to perform calculations related to the implementation of design solutions;
- assess risks and determine measures to ensure the safety of technological processes of pipeline transport of hydrocarbons.

2. LEARNING OUTCOMES

Mastering the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта" is aimed at developing the following competencies (parts of competencies):

Table 2.1. The list of competencies formed by students in the course of mastering the discipline (the results of mastering the discipline)

Competence code	Competence	Competence indicators (within this discipline)
GPC-3	GPC-3. Able to develop scientific and technical, design and service documentation, draw up scientific and technical reports, surveys, publications, reviews	GPC-3.1. Knows methods for evaluating the types of entrepreneurial activities used in the enterprise. GPC-3.2. Can use the basics of logistics, in relation to an oil and gas enterprise, when the main technological operations are performed in conditions of uncertainty; put into practice the elements of production management; use the opportunities for entrepreneurial activities at the entrusted facility and its legislative regulation; find the possibility of combining the performance of basic duties with elements of entrepreneurship. GPC-3.3. Has the skills of personnel management in a small production unit
SPC-8	Able to manage the work on the diagnostic examination of the main oil pipelines (MOP) and the main oil product pipelines (MOPP) facilities	SPC-8.1 Knows: Methods for organizing work on in-line diagnostic inspection of the MOP and MOPP using in-line inspection devices Organizational and administrative documents, regulatory and methodological materials in the field of quality control of work on the diagnostic examination of the MOP and MOPP List of scientific and technical documentation, the use of which is associated with the performance of work on the diagnosis of MOP and MOPP objects The procedure for the formation of long-term development plans in the field of diagnostic work at the facilities of MOP and MOPP The procedure for the development of design, executive and operational documentation for the direction of activity Rules for working with specialized software systems Requirements for labor protection, industrial, fire and

Competence code	Competence	Competence indicators (within this discipline)
		<p>environmental safety</p> <p>SPC-8.2 Can:</p> <p>Determine the scope and procedure for performing work on the diagnostic examination of the MOP and MOPP</p> <p>Assess the compliance of work performance with the requirements of the technological process for diagnosing objects of MOP and MOPP</p> <p>Determine the composition and sequence of preparatory work for non-destructive quality control of structural elements of objects and structures of MOP and MOPP, mechano - technological equipment and metal structures of MOP and MOPP tanks, technical devices, materials, products, parts, assemblies, welded joints</p> <p>Ensure the prevention and elimination of violations of the production process of diagnosing objects of MOP and MOPP by NDT methods</p> <p>Determine the procedure for performing work to identify defects based on the results of additional flaw detection control of MOP and MOPP objects, including internal ones, measurement and refinement of their parameters</p> <p>Analyze advanced domestic and foreign experience in the field of diagnosing MOP and MOPP objects</p> <p>Use specialized software products in the field of activity</p> <p>Comply with the requirements of industrial safety and labor protection at the facilities of MOP and MOPP</p> <p>SPC-8.3 Has:</p> <p>Skills in planning work on diagnosing MOP and MOPP objects</p> <p>Skills in managing work on processing the results of diagnosing objects of MOP and MOPP</p> <p>Skills for verification and approval of production documentation for the diagnosis and control of MOP and MOPP facilities</p> <p>Skills to control the regulatory and technical support of work on diagnosing objects of MOP and MOPP</p> <p>Skills to control data entry into specialized software systems, and their verification</p>
SPC-9	Able to organize the work of performers, find and make management decisions, rules for ensuring the safety of technological processes, as well as personnel when working in the field, in laboratories, in office processing	<p>SPC-9.1 Knows the safety rules and safety precautions when working in the field, in laboratories, during office processing</p> <p>SPC-9.2 Can justify and make management decisions in the field of organization and regulation of labor; conduct briefings on ensuring the safety of technological processes, as well as personnel when working in the field, in laboratories, during office processing</p> <p>SPC-9.3 Has the methodology for ensuring the safety of technological processes, as well as personnel when working in the field , in laboratories, during office processing</p>

3. ACADEMIC PROGRAM STRUCTURE

Discipline " Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта " refers to the Compulsory (Disciplines) Module of block B1 of the Higher Education Program.

As part of the Higher Education Program, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта".

Table 3.1. List of Higher Education Program components / disciplines that contribute to expected learning/training outcomes

Competence code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
GPC-3	GPC-3. Able to develop scientific and technical, design and service documentation, draw up scientific and technical reports, surveys, publications, reviews	Disciplines of the previous level of education	Information technologies in the oil and gas industry / Информационные технологии в нефтегазовом комплексе Technological practice (training) / Технологическая практика (учебная) Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы) Technological practice (production) / Технологическая практика (производственная) Pre-graduate practice / Преддипломная практика SFC
SPC-8	Able to manage the work on the diagnostic examination of the main oil pipelines (MOP) and the main oil product pipelines (MOPP) facilities	Disciplines of the previous level of education	Diagnostics of oil and petroleum products main pipeline facilities / Диагностирование объектов магистральных трубопроводов нефти и нефтепродуктов Fundamentals of construction and operation of pipeline transport / Основы строительства и эксплуатации трубопроводного транспорта Pre-graduate practice / Преддипломная практика SFC
SPC-9	Able to organize the work of performers, find and make management decisions, rules for ensuring the safety of technological processes, as well as personnel when working in the	Disciplines of the previous level of education	Modern stream in oil and gas processing in Russia / Современные направления нефтегазопереработки в России Economics and management of

Competence code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
	field, in laboratories, in office processing		oil and gas production / Экономика и управление нефтегазовым производством Project management in the oil and gas industry / Управление проектами в нефтегазовой отрасли Technological practice (production) / Технологическая практика (производственная) Pre-graduate practice / Преддипломная практика SFC

* - filled in in accordance with the matrix of competencies and the Higher Education Program.

4. COURSE WORKLOAD and ACADEMIC/TRAINING/LEARNING ACTIVITIES

The course total workload of the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта" is equal to 7 credits.

Table 4.1. Types of academic activities during the period of the HE program mastering

Type of study work	TOTAL, acc.	Semester(s)	
		1	2
Contact academic hours, acc.	70	36	34
including:			
Lectures	35	18	17
Laboratory work	-	-	-
Seminars (workshops/tutorials)	35	18	17
Self-study (ies), academic hours	155	117	38
Evaluation and assessment (exam or pass/fail grading)	27	27	
The course total workload	acc. hrs.	252	180
	credits	7	5

5. COURSE MODULE and CONTENTS

Table 5.1. The content of the discipline (module) by type of educational work

Name of the discipline section	Contents of the section (topic)	Type of study work
Section 1. Main gas pipeline	Topic 1.1. Main gas pipeline. General characteristics of main gas pipelines	Lecture, Seminar
	Topic 1.2. Energy-saving technologies for gas pipeline transport, advanced equipment and technologies	Lecture, Seminar
Section 2. Reliability and strength of MG	Topic 2.1. Estimation of constructive reliability of the pipeline. Loads and impacts on the main gas pipeline. throughput of the gas pipeline. Terms and definitions, nomenclature of the main characteristics	Lecture, Seminar
	Topic 2.2. Distribution of pressure along the length of the gas pipeline. Average pressure, the nature of its change. Change in temperature along the length of the gas pipeline. The effect of temperature change on the performance of the gas pipeline	Lecture, Seminar

Name of the discipline section	Contents of the section (topic)	Type of study work
Section 3. Joint operation of the gas pipeline and compressor station	Topic 3.1. The mode of operation of the gas pipeline when the compressor station or gas compressor unit is turned off. Influence of the number of CS and their number during shutdown on the performance of the main gas pipeline. Optimal parameters of the main gas pipeline	Lecture, Seminar
	Topic 3.2. Graphical method. Method for comparing competing options. Analytical method. The mode of operation of the gas pipeline during discharges and pumping. Location of compressor stations along the gas pipeline route	Lecture, Seminar
Section 4	Topic 4.1. Development and execution of a design assignment, preparation of initial data. Examination of the design task	Lecture, Seminar
	Topic 4.2. Design and survey procedure	Lecture, Seminar
Section 5. Design standards MN. Engineering design standards MN	Topic 5.1. The composition of the calculations. Initial data for hydraulic calculations. Choice of route MN. Determining the boundaries and length of technological sections, the number and capacity of tank farms	Lecture, Seminar
	Topic 5.2. Categories MN. Basic requirements for the route MN. Design requirements k.MN. Underground laying of MN Laying of MN in mountainous conditions. Laying MN in seismic areas. Laying MN in areas of permafrost soils. Laying MN in tunnels	Lecture, Seminar
Section 6. Oil pumping stations	Topic 6.1. Design standards Requirements for initial data for designing OPS classification	Lecture, Seminar
	Topic 6.2. Composition of the PS with a tank farm Composition of the PS facilities without a tank farm Requirements for the technological design and equipment of the PS	Lecture, Seminar
Section 7. Calculation of oil pipelines for strength and stability	Topic 7.1. Estimated characteristics of materials. Loads and influences Determination of wall thickness of MN. Checking the strength and stability of underground MPs	Lecture, Seminar
	Topic 7.2. Determination of the nominal wall thickness of pipes and bearing capacity diagrams. Ways to increase the throughput of MN. Main indicators of MN	Lecture, Seminar

6. CLASSROOM EQUIPMENT and TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom Equipment and Technology Support Requirements

Classroom for Academic Activity Type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	Training room for conducting lecture-type classes: room. No. 335 A set of specialized furniture; technical means: projection screen; multimedia projector SANYO	

Classroom for Academic Activity Type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
	PROxtraX; system block DEPO Neos 220	
Seminar	Classroom for conducting seminar-type classes: room. No. 356 A set of specialized furniture; chalk board; monitor NEC PLASMA MONITO MODEL PX-42XM1G; system block DEPO Neos 220	
For self-study	Classroom for conducting seminar-type classes: room. No. 356 A set of specialized furniture; chalk board; monitor NEC PLASMA MONITO MODEL PX-42XM1G; system block DEPO Neos 220	

7. Recommended Sources for Course Studies

Main reading(sources):

1. Oil and gas engineering . Full course [Electronic resource]: Textbook / V.V. Tetelmin, V.A. Yazev. - 2nd ed. ; Electronic text data. - Dolgoprudny: Publishing House "Intellect", 2014. - 800 p.

<http://lib.rudn.ru/ProtectedView/Book/ViewBook/6246>

2. Pipeline transport and storage of hydrocarbon resources: examples of solving typical problems: textbook: in 2 volumes / A.A. Gladenko, S.M. Chekardovsky, S.Yu. Podorozhnikov and others; Ministry of Education and Science of Russia, Omsk State Technical University, Tyumen Industrial University; ed. Yu.D. Zemenkov. - Omsk: OmGTU Publishing House, 2017. - T. 2. - 352 p.

<http://biblioclub.ru/index.php?page=book&id=493447>

Additional(optional) reading (sources):

1. Verzhbitsky, V.V. Fundamentals of the construction of oil and gas transport facilities: study guide / V.V. Verzhbitsky, Yu.N. Prachev; Ministry of Education and Science of the Russian Federation, Federal State Autonomous Educational Institution of Higher Professional Education "North Caucasian Federal University". - Stavropol: NCFU, 2014. - 154 p.

<http://biblioclub.ru/index.php?page=book&id=457777>

Internet-(based) sources:

1. Learning toolkits for self- studies in the RUDN LMS TUIS:

RUDN Electronic Library System - RUDN EBS <http://lib.rudn.ru/MegaPro/Web>

- ELS "University Library Online" <http://www.biblioclub.ru>

- EBS Yurayt <http://www.biblio-online.ru>

- ELS "Student Consultant" www.studentlibrary.ru

- EBS "Lan" <http://e.lanbook.com/>

- EBS "Trinity Bridge"

- Electronic fund of legal and regulatory documents
<https://docs.cntd.ru/document/1200124394> (quality management system)

2. Databases and search engines:

- electronic fund of legal and normative-technical documentation <http://docs.cntd.ru/>
- Yandex search engine [https:// www .yandex.ru/](https://www.yandex.ru/)
- Google search engine <https://www.google.ru/>
- abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

Learning toolkits for self- studies in the RUDN LMS TUIS:

1. A course of lectures on the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта".

2. Guidelines for independent work of students in the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта".

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of the discipline **in TUIS!**

8. ASSESSMENT AND EVALUATION TOOLKIT

Marking criteria (MC) and a 100-point (score) scale for assessing the level of competencies (part of competencies) based on the results of mastering the discipline "Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта" are presented in the Appendix to this Work Program of the discipline.

* - MC and the 100-point (score) scale are formed on the basis of the requirements of the relevant local normative act of the Peoples' Friendship University of Russia.

DEVELOPERS:

Senior lecturer of the Department of Mineral
Developing and Oil&Gas Engineering

Position, Department



Signature

Pivnov V.P.

Full name

Head of Department:

Director of the Department of Mineral
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Name of Department



Signature

Kotelnikov A.E.

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