Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Ястребов Олег Александрович
Должность: Ректор
Дата подписания: 28.05.2024 11:42:00
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

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

Diagnostics of oil and petroleum products main pipeline facilities / Диагностирование объектов магистральных трубопроводов нефти и нефтепродуктов

course title

Recommended by the Didactic Council for the Education Field of:

21.04.01 Oil and gas engineering

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

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

higher education programme profile/specialisation title

2024

1. COURSE GOALS

The goal of the course "Diagnostics of oil and petroleum products main pipeline facilities / Диагностирование объектов магистральных трубопроводов нефти и нефтепродуктов" is to equip students with theoretical and practical knowledge in the field of technical diagnostics of oil pipeline equipment for the formation of the required level of professional competencies in the field of technological processes of pipeline transportation of hydrocarbons.

The aims of the course are:

- the study of scientific foundations, terms and concepts, as well as the main methods of diagnosing and determining the technical condition of pipelines and equipment;
- study of the organization of work on the conduct of technical diagnostics;
- formation of the ability to study the properties of welded joints and metal of pipes and equipment during technical diagnostics;
- formation of skills for calculating the residual life of pipelines,
- use normative documents on technical diagnostics, compilation of technological maps.

2. REQUIREMENTS FOR LEARNING OUTCOMES

The course "Diagnostics of oil and petroleum products main pipeline facilities / Диагностирование объектов магистральных трубопроводов нефти и нефтепродуктов" is designed for students to acquire following competences (competences in part):

Table 2.1. List of competences that students acquire during the course

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
SPC-4	Able to manage the system for monitoring the technical condition and technical diagnostics at the facilities and plants of the oil and gas complex	SPC-4.1 Knows the principles, physical foundations, technical support of technical control and diagnostic methods, modern developments in the field of strength of materials, fracture mechanics, materials technology and materials science; design features, manufacturing technology, operation and repair of the control object, types and types of defects, probable zones of their formation, taking into account the loads acting on the object and other factors, principles, physical foundations, technical support for the types and methods of technical control and diagnostics; principles of construction, functional diagrams and rules for operating equipment for a given method of control, rules for selecting and checking the quality of used consumable flaw detection materials; control systems used to check objects (products) of a certain type; metrological support; standards, calculation methods and other applicable regulatory documents and rules for assessing the technical condition; harmful environmental factors of this control method and ways to prevent their impact on the environment and humans; principles of planning and organization of work of technical control and diagnostic units, current state and prospects for the development of technical control and diagnostic methods; rules for electrical safety and fire safety, rules for the construction and safe operation of facilities SPC-4.2 Can determine the methods, equipment, technologies and techniques to be used for specific types

Competence code	Competence descriptor	Competence formation indicators (within this course)
		of objects; perform control operations, evaluate and identify the results of control and testing, issue conclusions on the results of technical control and diagnostics; organize, conduct and manage calculations and experimental work to assess the technical condition SPC-4.3 Has the skills to perform verification calculations, taking into account the identified defects; assessment of the mutual influence of various defects on the technical condition of the control object; determining the need for additional research in order to clarify the determining parameters of the technical condition; development of measures to reduce operational risks based on risk analysis, minimization of operational risks
SPC-5	Able to draw up technical documentation for the implementation of the technological process (work schedules, instructions, plans, estimates, requests for materials, equipment, etc.), make an economic assessment of oil and gas fields in accordance with approved forms	SPC-5.1 Knows the requirements and GOSTs for the preparation of technical documentation, basic methods of geological and industrial assessment of oil and gas fields; methods of geological-industrial and geological-economic assessment (GEO) of new geological exploration projects, taking into account all the uncertainties and risks of their implementation SPC-5.2 Can draw up and draw up technical documentation for the implementation of technological processes in the field of oil and gas field development, transportation and processing of oil and oil products; apply new methods of geological and industrial evaluation of oil and gas fields; determine the geological resources and the probability of finding a deposit, its production potential; carry out planning and evaluation of infrastructure solutions; determination of costs for the discovery and development of a field SPC-5.3 Has the methodology for preparing primary reporting, including work schedules, instructions, plans, estimates, applications for materials, equipment according to approved forms
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 environmental safety SPC-8.2 Can:

Competence code	Competence descriptor	Competence formation indicators (within this course)
		Determine the scope and procedure for performing work on the diagnostic examination of the MOP and MOPP Assess the compliance of work performance with the requirements of the technological process for diagnosing objects of MOP and MOPP 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 Ensure the prevention and elimination of violations of the production process of diagnosing objects of MOP and MOPP by NDT methods 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 Analyze advanced domestic and foreign experience in the field of diagnosing MOP and MOPP objects Use specialized software products in the field of activity Comply with the requirements of industrial safety and labor protection at the facilities of MOP and MOPP SPC-8.3 Has: Skills in planning work on diagnosing MOP and MOPP objects Skills in managing work on processing the results of diagnosing objects of MOP and MOPP Skills for verification and approval of production documentation for the diagnosis and control of MOP and MOPP facilities Skills to control the regulatory and technical support of work on diagnosing objects of MOP and MOPP Skills to control data entry into specialized software systems, and their verification

3. ACADEMIC PROGRAMME STRUCTURE

The course refers to the elective component of (B1) block of the higher educational programme curriculum.

Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the course results

Competence code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
SPC-4	Able to manage the system for monitoring the technical condition and technical diagnostics at the facilities and plants of the oil and gas complex	*Advanced oil and gas processing equipment and product quality management***; Fundamentals of construction and operation of pipeline transport; Machinery and equipment	Pre-graduation Practical Training;

Competence code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
		for field development and transportation of hydrocarbons; Technological practice (educational) / Технологическая практика (учебная); Technological practice (industrial) / Технологическая практика (производственная);	
SPC-5	Able to draw up technical documentation for the implementation of the technological process (work schedules, instructions, plans, estimates, requests for materials, equipment, etc.), make an economic assessment of oil and gas fields in accordance with approved forms	*Advanced oil and gas processing equipment and product quality management**; *Modern aspects of geological and geophysical research in the oil and gas industry;* *Modern stream in oil and gas processing in Russia**; *Technologies for developing prospective hydrocarbon reserves;* *Technological practice (educational) / Технологическая практика (учебная);* *Technological practice (industrial) / Технологическая практика (производственная);*	Pre-graduation Practical Training;
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	*Fundamentals of construction and operation of pipeline transport;* *Machinery and equipment for field development and transportation of hydrocarbons;* *Technological processes of pipeline transport;*	Pre-graduation Practical Training;

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

4. COURSE WORKLOAD

The total workload of the course "Diagnostics of oil and petroleum products main pipeline facilities / Диагностирование объектов магистральных трубопроводов нефти и нефтепродуктов" is 5 credits.

Table 4.1 Types of academic activities during the period of the HE programme mastering

Type of study work		TOTAL, acc.hrs.	Semester(s)
			3
Contact academic hours, acc .		*54*	*54*
including:			
Lectures		18	18
Laboratory work			
Seminars (workshops/tutorials)		36	36
Self-study (ies), academic hours		*99*	*99*
Evaluation and assessment (exam or pass/fail grading)		*27*	*27*
The course total workload	acc.hrs.	**180**	**180**
	Credits	**5**	**5**

5. COURSE MODULE and CONTENTS

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

Name of the section (topic) of the discipline	Contents of the section (topic)	Type of study work
Section 1. Global trends in oil and gas processing, oil and gas chemistry	Topic 1.1. Use of associated petroleum gas and gas processing in general	Lecture, Lab work
	Topic 1.2. Trends in the development of the world petrochemical industry	Lecture, Lab work
Section 2 Oil and Gas Storage	Topic 2.1. Underground natural gas storage	Lecture, Lab work
	Topic 2.2. Stabilization and processing of gas condensates	Lecture, Lab work
Section 3. Delivery and acceptance points of commercial oil and gas to the system of main pipelines	Topic 3.1. Delivery and acceptance points of commercial oil and gas to the system of main pipelines	Lecture, Lab work

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 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	

Classroom for Academic Activity Type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
	NEC PLASMA MONITO MODEL PX-42XM1G; system block DEPO Neos 220	

7. RESOURCES RECOMMENDED FOR COURSE

Main reading(sources):

1. Prachev , Yu.N. Construction and repair of the linear part of the main pipelines: study guide / Yu.N. Prachev , V.V. Verzhbitsky; 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. - 238 p.
http://biblioclub.ru/index.php?page=book&id=457587
2. 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

Additional(optional) reading (sources):

1. Khrenov, N.N. Fundamentals of complex diagnostics of northern pipelines. Ground research / N.N. Fucking. - Moscow: Gasoil press, 2005. - 608 p.
http://biblioclub.ru/index.php?page=book&id=70345
2. Khrenov, N.N. Fundamentals of complex diagnostics of northern pipelines. Aerospace methods and processing of survey materials / N.N. Fucking. - Moscow: Gasoil press, 2002. - 352 p.
http :// biblioclub . ru / index . php ? page = book & id =70346

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:
- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/
- EL "Trinity Bridge"

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:
- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru

- EL "Lan" http://e.lanbook.com/
- EL "Trinity Bridge"

Learning toolkits for self- studies:

1. A course of lectures on the course "Diagnosing objects of main pipelines of oil and oil products".
2. Guidelines for students on the development of the course "Diagnosis of objects of oil and oil products trunk pipelines".

*The training toolkit and guidelines for the course are placed on the course page in the university telecommunication training and information system under the set procedure.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS COURSE RESULTS

The assessment toolkit and the grading system* to evaluate the level of competences (competences in part) formation as the course results are specified in the Appendix to the course syllabus.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPERS:

Associate Professor of the Department of Mineral Developing and Oil&Gas Engineering	Yushin E.S.
position, educational department	name and surname

Head of Department:

Head of the Department of Mineral Developing and Oil&Gas Engineering	Kotelnikov A.E.
position, educational department	name and surname

Head of Educational Programme:

Professor of the Department of Mineral Developing and Oil&Gas Engineering	Kapustin V.M.
position, educational department	name and surname