

Документ подписан
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Должность: Ректор
Дата подписания: 31.05.2023 23:30:22
Уникальный программный код:
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

INTERNSHIP SYLLABUS

Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)

internship title

Educational

internship type

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 student's internship 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

1. INTERNSHIP GOAL(s)

The goal of the Internship «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» is the preparation of the undergraduate both for independent research, the main result of which is the writing and successful defense of the master's thesis, and for conducting scientific research as part of a creative team; as well as the formation of a master's general cultural, personal and professional competencies aimed at developing the skills of planning and organizing scientific research and the ability to conduct R&D using various equipment and computer technologies.

The main objectives of the R&D work are:

- to process the results obtained, analyze, and present them in the form of completed research developments (research report, abstracts, scientific articles, term papers, master's thesis);
- to formalize the results of the work performed in accordance with the requirements;
- to be responsible for the quality of work performed;
- to develop other skills and abilities necessary for a master's student in a specific master's program.

2. REQUIREMENTS FOR LEARNING OUTCOMES

The internship «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» is aimed at the formation of the following competencies (parts of competencies) of students:

Table 2.1. List of competencies formed by students during the practice (learning outcomes of the practice)

Code	Competence	Competence achievement indicators (within this discipline)
GPC-1	Able to solve production and/or research tasks based on fundamental knowledge in the oil and gas field.	GPC-1.1. Knows the methods and technologies (including the innovative ones) of development in the field of oil and gas engineering, scientific and methodological support of professional activity, principles of professional ethics. GPC-1.2. Can carry out research activities for the development and implementation of innovative technologies in the field of oil and gas engineering; develop programs for monitoring and evaluating the results of the implementation of professional activities; develop information and methodological materials in the field of professional activity; use the fundamental knowledge of professional activity to overcome specific challenges of oil and gas production. GPC-1.3. Has the skills of physical and software modeling of separate fragments of the process of choosing the best option for specific conditions; skills in analyzing the causes for the quality reduction of technological processes and suggests effective methods to improve the quality of work in various technological operations; the skills in the use of modern tools and methods for planning and controlling projects related to the complications arising in the course of work.
GPC-3	Able to develop scientific and technical, design and service	GPC-3.1. Knows methods for assessing the types of entrepreneurial activities used in the enterprise.

Code	Competence	Competence achievement indicators (within this discipline)
	documentation, draw up scientific and technical reports, surveys, publications, reviews	<p>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.</p> <p>GPC-3.3. Has the skills of personnel management in a small production unit.</p>
GPC-5	Able to evaluate the results of scientific and technical developments, scientific research and justify their own choice, systematizing and summarizing achievements in the oil and gas industry and related fields	<p>GPC-5.1. Knows the complex of modern technological processes and productions in the field of oil and gas engineering; the modern innovative achievements and scientific research carried out at the present stage; methods and principles of systematization and generalization of achievements in the oil and gas industry and related fields; main technologies for search, exploration and organization of oil and gas production in Russia and abroad, the standards and specifications, sources of information, mass media and multimedia technologies.</p> <p>GPC-5.2. Can consciously perceive information, independently search, extract, systematize, analyze and select information necessary for solving problems, organize, transform, store and transmit it; interpret the results of laboratory and technological studies in respect to specific conditions.</p> <p>GPC-5.3. Has the methods of collecting, processing and interpreting information received, using modern information technologies and applied hardware and software, methods of protecting, storing and presenting information.</p>
GPC-6	Able to participate in the implementation of basic and additional professional educational programs, using special scientific and professional knowledge	<p>GPC-6.1. Knows the requirements of educational standards, the regulatory framework for organizing educational activities, the value bases of education and professional activities, the essence, structure, possibilities of using the educational environment to achieve personal, meta-substantial and substantial learning outcomes and ensure the quality of the educational subject being taught, safety requirements for the educational environment.</p> <p>GPC-6.2. Can communicate with the audience, interest listeners, independently plan educational work within the framework of the educational program in subjects based on his own developments.</p> <p>GPC-6.3. Has the skills of engineering communication, the basics of management in the organization of teamwork in the performance of a certain research task.</p>
SPC-1	Able to use theoretical knowledge when performing technological scientific research in the field of development, transportation and processing of oil and gas	<p>SPC-1.1 Knows the fundamental concepts in the field of geology of oil and gas fields, the methods of forecasting, prospecting and exploration of mineral deposits; the regulatory and methodological documents in the field of hydrocarbon production and development of oil and gas fields.</p> <p>SPC-1.2 Can use theoretical knowledge and mining and geological information to carry out technological scientific</p>

Code	Competence	Competence achievement indicators (within this discipline)
		<p>research, as well as apply knowledge of regulatory and methodological documents to assess oil and gas fields</p> <p>SPC-1.3 Has the theoretical knowledge, methods of sub-surface research in the field of oil and gas field development; skills to perform production, technological and engineering research in the field of hydrocarbon production, development of oil and gas fields.</p>
SPC-2	Able to develop and implement new advanced technologies in the field of geological exploration, evaluation and estimation of hydrocarbon raw materials	<p>SPC-2.1 Knows the methodological provisions, instructions and requirements for the geological study of the sub-soil and geological exploration; the reserve estimation and management policy of the organization; rules for compiling documentation in the field of reserves estimation and management; technologies for conducting, processing and interpreting geological and geophysical works; exploration technologies; national and global trends in the development of advanced technologies.</p> <p>SPC-2.2 Can manage the production activities of the entrusted structural unit; check the design documentation for compliance with the requirements of existing norms and rules; introduce advanced technologies in the process of prospecting and exploration of oil and gas fields; develop proposals and take prompt measures aimed at improving the quality of exploration activities.</p> <p>SPC-2.3 Has the skills for studying Russian and foreign experience in matters of assessing and managing reserves; skills for preparing proposals for new methods and technologies in the field of geological exploration and reserve estimation; skills for supervising the execution of case studies and R&D activities.</p>
SPC-3	Able to assess resources, estimate and re-estimate hydrocarbon reserves for scientific and technological projects planning.	<p>SPC-3.1 Knows the current legislative, regulatory legal acts of the Russian Federation, norms and rules in the field of assessing reserves and managing reserves; regulations, provisions, instructions and standards of the organization in reserve estimation and management; rules for compiling documentation for ongoing exploration programs; rules for compiling documentation for prospective exploration programs; rules for drawing up planning documentation; norms and rules for the development of project documentation; the quality policy of the organization in the field of geological exploration; technologies for conducting, processing and interpreting geological and geophysical works; features of geological exploration.</p> <p>SPC-3.2 Can develop recommendations for further study of the deposit to clarify the geological structure and reserves; apply the requirements of regulatory documents in the assessment of hydrocarbon resources and reserves; prepare materials used in the development of exploration programs for reserve estimation and management; draw up documentation for current and prospective exploration programs; analyze the quality of current exploration programs for reserve estimation and management; control the implementation and results of the development of current</p>

Code	Competence	Competence achievement indicators (within this discipline)
		and prospective work programs for reserve estimation and management. SPC-3.3 Has the skills to analyze and evaluate the organization's resource base; skills in the development of current and prospective programs of geological exploration in order to clarify hydrocarbon reserves in the territory of the organization; the skills for high-quality and timely estimation (re-estimation) of reserves for individual objects; the skills for preparation in the established order of operational reporting

3. INTERNSHIP IN HIGHER EDUCATION PROGRAMME STRUCTURE

The practice «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» refers to the compulsory (disciplines) part of module of block 2 of the curriculum.

As part of the HEP HE, students also master disciplines and/or other practices that contribute to the achievement of the planned learning outcomes of the practice "Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)".

Table 3.1. The list of the HEP HE's components that contribute to the achievement of the planned learning outcomes of the practice

Code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
GPC-1	Able to solve production and/or research problems based on fundamental knowledge in the oil and gas field.	Modern aspects of geological and geophysical research in the oil and gas industry / Современные аспекты геолого-промысловых и геофизических исследований в нефтегазовом деле Modern stream in oil and gas processing in Russia / Современные направления нефтегазопереработки в России Current development of the production of unconventional hydrocarbon resources in the world / Современное развитие добычи нетрадиционных ресурсов углеводородов в мире Technological practice (training) / Технологическая практика (учебная) Technological practice (production) / Технологическая практика (производственная)	SFC

Code	Name of competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
GPC-3	Able to develop scientific and technical, design and service documentation, draw up scientific and technical reports, surveys, publications, reviews	Technological processes of pipeline transport / Технологические процессы трубопроводного транспорта Technological practice (training) / Технологическая практика (учебная) Technological practice (production) / Технологическая практика (производственная)	SFC
GPC-5	Able to evaluate the results of scientific and technical developments, scientific research and justify their own choice, systematizing and summarizing achievements in the oil and gas industry and related fields	History and methodology of subsoil use / История и методология недропользования Applications of Geoinformation Systems / Практикум применения геоинформационных систем	SFC
GPC-6	Able to participate in the implementation of basic and additional professional educational programs, using special scientific and professional knowledge	History and methodology of subsoil use / История и методология недропользования	SFC
SPC-1	Able to use theoretical knowledge when performing technological scientific research in the field of development, transportation and processing of oil and gas	Applications of Geoinformation Systems / Практикум применения геоинформационных систем Current development of the production of unconventional hydrocarbon resources in the world / Современное развитие добычи нетрадиционных ресурсов углеводородов в мире	Research work / Научно-исследовательская работа Pre-graduate practice / Преддипломная практика SFC
SPC-2	Able to develop and implement new advanced technologies in the field of geological exploration, evaluation and estimation of hydrocarbon raw materials	Resource estimation, computation and recalculation of hydrocarbon reserves / Оценка ресурсов, подсчет и пересчет запасов углеводородов	Research work / Научно-исследовательская работа Pre-graduate practice / Преддипломная практика SFC
SPC-3	Able to assess resources, estimate and re-estimate hydrocarbon reserves for scientific and technological projects planning	Resource estimation, computation and recalculation of hydrocarbon reserves / Оценка ресурсов, подсчет и пересчет запасов углеводородов	Research work / Научно-исследовательская работа Pre-graduate practice / Преддипломная практика SFC

* - to be filled in accordance with the matrix of competencies and CMS НЕР HE

4. SCOPE OF PRACTICE

General workload for practice «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» is 3 credit units (108 academic hours).

5. CONTENT OF PRACTICE

Table 5.1. Content of practice *

Name of practice section	Contents of the section (topics, types of practical activities)	Workload, acc.hrs.
Section 1. Organizational and preparatory	Assignment of an individual task from the supervisor	2
	Workplace safety instruction (in the laboratory and/or production site)	4
	Selection and approval of the research topic, study of the degree of scientific development of the problem	4
Section 2. Main	Research stage. Observation and information collection activities	20
	Stage of processing and analysis of the collected information. Processing and systematization of factual and literary material	20
	Data prediction	30
	Current control of the practice by the supervisor	5
	Keeping practice journal	5
Preparation of practice report		9
Preparation for defense and defense of the practice report		9
TOTAL:		108

* - the content of practice by sections and types of practical training is FULLY reflected in the student's practice report.

6. MATERIAL AND TECHNICAL SUPPORT FOR PRACTICE

Bld. 5, 8, Podolskoye Highway Classroom: room No. 360	A set of specialized furniture; chalk board; technical means: projection screen; multimedia projector SANYO plc xt20; system block DEPO Neos 220
Bld. 5, 8, Podolskoye Highway Mining Machinery Laboratory No. 358	Computer with pre-installed licensed software "ARMARIS" Intel Core i5 processor; "Wellhead equipment" - mock-up bench; 32" LED TV 3D on a rack; Layout - controller "Electron-09 1" from SU "Electron 05-250 » in compact design
Bld. 5, 8, Podolskoye Highway Laboratory of rational subsoil use No. 337	A set of specialized furniture; hardware: Acer V193L monitor, RAMEC STORM W system unit, keyboard, computer mouse-4; Plotter Hewlett Packard C7770B; Creative WebCam Live Motion 1 Camera, NIKON LV100D Microscope, AdventurerProRV214 Electronic Laboratory Balance, AdventurerProRV313 Electronic Laboratory Balance, Scimitar1000FT-IR IR Fourier Spectrometer, energy dispersive X-Ray fluorescence analyzer "PRISMA-ECO", High pressure reactor K201-512
Bld. 5, 8, Podolskoye Highway Mining machine laboratory No. 362	A set of specialized furniture; Drilling simulator "Transas SHELF 6000 Drill"; Additional trainee seat for the drilling simulator "Transas SHELF 6000 Drill"
Bld. 5, 8, Podolskoye Highway Laboratory of hydrodynamic processes of oil and gas production No. 341	Ejector; Bench desktop, Instrumentation and shut-off and control valves; Tank; Pump-ejector system bench, left view; laser diode; Column with liquid; Air compressor; Gas supply system to the column; Gas meter; pressure gauge; Photodiode; Digital oscilloscope

7. PRACTICE METHOD

The practice «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» can be carried out both in the structural divisions of RUDN University or in the organizations of Moscow (inside practice), and at bases located outside of Moscow (outside practice).

The practice on the basis of an external organization (outside RUDN University) is carried out on the basis of an appropriate agreement, which specifies the terms, place and conditions for conducting an internship in the host organization.

The timing of the practice corresponds to the period specified in the academic schedule of the HEP HE. The timing of the practice can be adjusted upon agreement with the Department of Educational Policy and the Department for the organization of practices and student employment at RUDN University.

8. EDUCATIONAL AND METHODOLOGICAL AND INFORMATION SUPPORT FOR PRACTICE

Main literature:

1. Organization of research work of undergraduates: workshop / Ministry of Education and Science of the Russian Federation, Federal State Autonomous Educational Institution of Higher Professional Education "North Caucasus Federal University"; auth.-stat. O.V. Solovieva, N.M. Borozinets. - Stavropol: NCFU, 2016. - 144 p.

<http://biblioclub.ru/index.php?page=book&id=459348>

2. Demchenko, Z.A. Methodology of research activities: teaching aid / Z.A. Demchenko, V.D. Lebedev, D.G. Myasishchev; Ministry of Education and Science of the Russian Federation, Federal State Autonomous Educational Institution of Higher Professional Education Northern (Arctic) Federal University. M.V. Lomonosov. - Arkhangelsk: NArFU, 2015. - 84 p.

<http://biblioclub.ru/index.php?page=book&id=436330>

Additional literature:

1. Astanina S.Yu. Research work of students (modern requirements, problems and their solutions): Monograph / Astanina S.Yu., Shestak N.V., Chmykhova E.V. ; Astanina S.Yu. - Moscow: Modern Humanitarian Academy, 2012. - 156 p.

<http://www.iprbookshop.ru/16934>

2. Shestak N.V. Research activities at the university (Basic concepts, stages, requirements) / Shestak N.V., Chmykhova E.V.; Shestak N.V. - Moscow: Modern Humanitarian Academy, 2007. - 179 p.

<http://www.iprbookshop.ru/16935>

Resources of the information and telecommunications network "Internet":

1) RUDN Electronic Library System (ELS) and third-party ELS, to which university students have access on the basis of concluded agreements:

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

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

– ELS "Yurayt" <http://www.biblio-online.ru>

– ELS "Student Consultant" www.studentlibrary.ru

– EBS "Lan" <http://e.lanbook.com/>

– EBS "Trinity Bridge"

2) Databases and search engines:

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

Educational and methodological materials for the practice, filling out a journal and preparing a practice report *:

1) Rules for safe working conditions and fire safety during the practice "Research work (obtaining primary skills in research work)" / «Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» (initial briefing).

2) The general arrangement and principle of operation of technological production equipment used by students during their practice; flow charts and regulations, etc..

3) Guidelines for filling in a journal by students and preparing a practice report.

* - all educational and methodological materials for practice are posted in accordance with the current procedure on the page of practice in TUIS

9. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES ON THE RESULTS OF PRACTICE

Marking criteria (MC) and a 100-point (score) scale (PSS)* for assessing the level of competency (part of competencies) formation based on the results of practice «Research work (obtaining primary skills in research work) / Научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)» are presented in the Appendix to this Practice Program (module).

* - MC and PSS are formed on the basis of the requirements of the relevant local normative act of the Peoples' Friendship University of Russia.

DEVELOPERS:

Associate Professor of the Department of Mineral
Developing and Oil&Gas Engineering

Position, Department



Signature

Tyukavkina O.V.

Full name

Head of Department:

Director of the Department of Mineral Develop-
ing and Oil&Gas Engineering

Name of Department



Signature

Kotelnikov A.E.

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Head of Educational Programme:

Professor of the Department of Mineral Develop-
ing and Oil&Gas Engineering

Position, Department



Signature

Kapustin V.M.

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