THE FIRST HIGHER TECHNICAL UNIVERSITY IN RUSSIA

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION
Federal State Budgetary Educational Institution of Higher Education
"Saint-Petersburg Mining University"

IOM3 PD APPROVED

The Institute of Materials, Minerals and Mining

Approved by
Vice-Rector for Educational Activity
Prof. A. GOSPODARIKOV

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Professional training program

«Development and exploitation of oil and gas fields»

In accordance with the professional standard:
"Specialist of oil, gas and gas condensate production"

Priority area of modernization and technological development of the Russian economy: Energy Efficiency and Efficient Use of Resources

Attendance: full time

Course Leader: _____ M. K. Rogatchev
Head of Development and exploitation of oil and gas fields department, DScTech., Professor

Course Developer: _____ D. S. Tananykhin
associate professor of Development and exploitation of oil and gas fields department

SAINT PETERSBURG
2017

1. General provisions.

1.1. **Course objectives:**

The objective of the training program:

The purpose of training is to acquire additional knowledge in the oil and gas development and exploitation fields, necessary to perform main professional activities.

1.2 Competences to be formed following the training results

The main professional competences to be formed following the training results are given in the Table below.

№ competence	Target groups	Description of professional competences gained /availability for occupational activities as part of the occupational performance types.
1.1	The research and development departments engineering staff of oil and gas companies	– carry out the selection of candidate wells for basic workover actions;
1.2		– collect operational information for workover actions and analysis of their effectiveness in the workover actions;
1.3		– to participate in the development of proposals for the efficient use of geological and technical programs;
1.4		– to develop measures for the off-stream well reactivation, with a reduction in flow rate, etc. with the preparation of the program of research and measures to restore flow rates.
2.1	Specialists of field development departments of oil and gas companies, geological services of oil and gas production workshops, departments of workover actions and production of oil and gas, as well as contractors' specialists	– improve or develop measures concerning assurance of oil, gas and gas condensate production;
2.2		– ensure the monitoring and analyzing the field development current state;
2.3		– provide training and formation of scheduled reporting on field development;
2.4		– ensure the orders and instructions preparation, the organization of meetings related to the department tasks;
2.5		– preparation of business proposals for technological activities in oil and gas production;
2.6		– to ensure the norms and specifications conformity of technological operations;
2.7		– to organize and supervise the timely contracts and amendments completion for works on workover actions;
2.8		– to work together with relevant government agencies, ministries and research institutions in the spheres of their activities;
2.9		– monitor the implementation of the decisions approved process engineering documents for field development.

1.3. Requirements for the results of the training program

In order to achieve professional competences specified in Table 1.2 in the course of the training program the learner should:

Gain the practical experience:

- In improving or developing workover actions concerning assurance of oil, gas and gas condensate production;
- In selecting the optimal type of artificial lift for wells;
- In choosing the optimal configuration of wells, improving control and operation of the process of production;

- In planning and controlling measures to eliminate the causes of failure to reach the required performance;

- In analyzing the actual and expected parameters of the system formation - well - downhall equipment - gathering facilities;

- In drawing up a set of measures for efficient use of the well capacity, maximizing oil production in economically reasonable limits;

- In planning and monitoring the intensification of oil, gas and condensate production from fields.

Skills to:

- Compare actual and expected parameters of the system formation - well - downhall equipment - gathering facilities;

- Assess risks and constraints that determine system formation - well - downhall equipment - gathering facilities;

- Diagnose technological parameters of the wells;

- Assess the impact on the productivity index of the different formation damage mechanisms;

- Organize and conduct monitoring of the field and wells operation.

Knowledge of:

- Advanced domestic and foreign experience in the field of oil, gas and gas condensate production;

- The methods of development indicators evaluation of fields;

- A specialized software products for the development of oil, gas and gas condensate;

- The main types of information required for decisions concerning the corrective and preventive actions;

- Methods for monitoring the effectiveness of the intensification and enhanced oil recovery work;

- Industrial safety requirements, occupational health and environmental safety.

1.4. Course description

Type of educational work	Total, hours
Total	**18**
Lectures	12
Laboratory and practical works	6

1.5. Course structure

№	Module	Total hours	Including		Competencies list (see Table above)
			Laboratory and practical works	Laboratory and practical works	
1.	Module 1. «Geology of oil and gas fields»	6	4	2 (2112, 2117, 1113)	1.1, 1.2, 2.4-2.6
2.	Module 2. «Exploitation of oil and gas wells»	6	4	2 (2112, 2117, 1113, 1118, 1120)	1.3, 1.4, 2.7, 2.8
3.	Module 3. «Development of oil and gas fields»	6	4	2 (2112, 2117, 1113, 1118, 1120)	2.1, 2.2, 2.3, 2.9

1.6. Final form of examination

The final form of examination is a library-research paper.

1.7. Certificates

After training program having been successfully accomplished, the listeners obtain certificates of advanced training.

1.8. Training process staffing

№	Full name	Education, qualification, Institution graduated	Position, academic degree, academic rank, work experience (years)	The total number of publications
Course Leader				
1	Rogatchev Michail	Higher, Petroleum Engineer, Ufa Oil Institute	Head of Development and Exploitation of Oil and Gas Fields Department, Professor, DScTech, 35 years	More than 190 publications
Lecturers				
2	Tananykhin Dmitry	Higher, Petroleum Engineer, Samara State Technical University	PhD, Associate Professor, 6 years	More than 40 publications
3	Shangaraeva Liliya	Higher, Petroleum Engineer,	PhD, Associate Professor, 6 years	More than 40 publications

		Almetyevsk State Oil Institute		
4	Roshin Pavel	Higher, Petroleum Engineer, Samara State Technical University	PhD, Associate Professor, 5 years	More than 35 publications

1.9 Course program

Training modules	Content of training material, laboratory works and practical classes, self-studies	Hours
Module 1. Geology of oil and gas fields		
Topic 1.1. Oil and gas complex - the composition and structure of the formations. Oil and gas traps.	Main quantitative parameters of the provinces, the stratigraphy of oil and gas complexes. Major oil and gas embayments of foreign countries. The large and unique oil and gas fields. Belts, zones and oil and gas units. Oil and gas provinces and regions in Russia. Natural reservoirs of oil and gas. Grain composition.	2
	Practical classes: Determination of physical properties of oil and gas reservoirs. Calculation of physical properties of oil and gas reservoirs.	2
Topic 1.2. Exploration technique of oil and gas reservoirs	Geological methods. Geophysical methods. Hydrogeochemical methods. The stages of exploration. Classification of oil and gas deposits. Problems in exploration technique of oil-and-gas reservoirs. Ways to speed up the exploration, applicable to all groups of gas fields.	2
Module 2. Exploitation of oil and gas wells		
Topic 2.1. The current state of the downhole hydrocarbon production technologies in Russia and abroad.	The current state of the downhole hydrocarbon production technology in Russia and abroad. Classification of lift methods.	2
Topic 2.2. Exploitation of oil and gas wells. Basics choosing a rational method of operating wells.	Flowing well operation. Terms for flowing of well. Gas lift well operation. Application of gas lift. Downhole pumping well operation. The main types of downhole pumping systems, their range of application and prospects of further development. Operation of downhole sucker rod pumping units. Operating wells installations electric submersible pumps. Driving and operation of the electric submersible pumps. Selection of equipment and the establishment of modes of electric submersible pumps. Driving and operation of wells equipped with screw, diaphragm and jet pumps.	2
	Practical classes: Equipment selection and well operation conditions setting with electric submersible pumps installations.	2
Module 3. Development of oil and gas fields		
Topic 3.1. Current state and	General characteristics of oil parameters, gas and	1

prospects of oil and gas industry development in Russia.	gas condensate deposits that define the processes of hydrocarbons production.	
Topic 3.2. Field development on the natural reservoir drive and with the reservoir pressure maintenance	Production mechanisms of a reservoir. Field development in elastic drive. Field development in dissolved gas drive. Development of the field in terms of displacement of gas-cut oil by water.	1
	Practical classes: Determination of technological parameters of the field development. Calculation of the development of indicators on the development of the dissolved gas drive.	2
Topic 3.3. System development of oil, gas and gas condensate fields	The concept of the system and the development of the object. Allocation of production facilities. Systems of simultaneous projects development. Systems consistent development facilities. System development of oil fields. Placement of wells, placing the wells on a uniform grid, well spacing, a continuous development of the system, slow the development of the system, placing the wells on the irregular grid, system design with artificial water flooding reservoirs, developing a system with gas injection into the reservoir. Features of the development of gas, gas condensate fields. Regulation of the development process. The regulation concept for the development process, criteria and methods of regulating.	2

1.10 Course venue – premises of the Saint Petersburg Mining university

U1.11 Basic Literature

1. Dyke L.P. Fundamentals of oil and gas fields. M .: OOO "Premium Engineering", 2009. - 570 p.

2. Zakirov S.N. and others. The new principles and technologies of oil and gas fields. Moscow., 2004. - 290 p.

3. Mishchenko I.T. Downhole oil production: A manual for higher education. - Moscow: Federal State Unitary Enterprise Publishing House of the "Oil and Gas" Russian State University of oil and gas, 2003.- 816 p.