

*Federal State Autonomous Educational Institution of Higher Education  
"Peoples' Friendship University of Russia"*

**Academy of Engineering**

**ANNOTATION OF EDUCATIONAL DISCIPLINE**

**Educational program**

21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

<b>Name of the discipline</b>	<b>Foreign language in the professional activities of the master</b>
<b>Scope of discipline</b>	<b>6 CU ( 216 hours)</b>
<b>Discipline Summary</b>	
<b>The name of the sections ( topics) of the discipline</b>	<b>Summary of sections ( topics) of the discipline :</b>
Institute of Science and Technology (Foreign-speaking countries)	The specifics of the functioning of the Institute of Science and Technology in foreign-speaking countries and in Russia. The ability to compare this knowledge in communication.
Specialized culture	Rules and norms of communication in the professional scientific and technical field in foreign-speaking countries and in Russia
Reports	Formation of the ability to understand oral reports / lengthy speeches in a foreign language on engineering topics.
Articles	Written foreign language general scientific / highly specialized articles in the field of engineering.
Patents	Foreign language patents in engineering.
Business letter	Complicated argument in business foreign letters.
Prepared Conversation	The ability to conduct an unprepared conversation on the general scientific and highly specialized topics in the field of engineering.
Reputable scientists in the field of engineering (taking into account the studied direction)	Famous scientists in the field of science and technology. History and main directions of development of science and technology in foreign-speaking countries, Russia in the field of engineering.
Argumentation	Logical argument in a foreign language. Arguments and Counterarguments
Discussion	Discussions on general scientific and highly specialized issues. Expression of one's position in a foreign language.

Message	A message on the proposed general scientific subjects in the field of engineering in a foreign language.
Presentation of scientific and technical concepts in professionally oriented discourse	Scientific and technical concepts in a foreign language and Russian text in the field of engineering
The logic of scientific exposition	Composition, motives, pragmatic attitude of a foreign language scientific text.
Text abstract	Key pieces of text. Receiving the information. Abstract Review.
The main idea and copyright	The main idea of the text. The author's attitude to the topic of the text.
abstract	Summarizing a foreign language text in engineering. The ability to determine your attitude to the content of what you read.
Overview	A review of development achievements in engineering.
Business conversation	Professional / Scientific / Industrial Conversation

Developers:

Doctor of Pedagogy , prof. KIA IA N.N. Gavrilenko

Art. Lecturer KIA IA V.A. Chauzova

Head KIA IA

S.V. Dmitrichenkova

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Information technology in the oil and gas complex
Scope of discipline	_ 2 _CU (_ 72 _ hours.)
Discipline Summary	
Information and Information technologies	Information and information resources. Information technologies and information systems of the oil and gas complex
General characteristics of information technology software	Software classification . Basic software support. Application software provision and trends in its development. Specialized software software
Computer networks	Local computer networks. Global computer networks. Workstation

**The developers are**

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Senior lecturer of the Department of Subsurface Use and Oil and Gas Engineering D.A. Drozdov

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Volumetric viscous oil pumps
Scope of discipline	_ 4 _ CU ( _144 hours.)
Discipline Summary	
Classification , types, properties of volumetric pumps	Pumps with rotational movement of the working body; Pumps with translational movement of the working body. Impeller pumps , vane pumps , in intuitive pumps , piston pumps , peristaltic pumps , variable displacement pumps
The principle of operation of the simplest volumetric pump	Advantages and disadvantages of volumetric pumps , Pump operation process
Volumetric Pump Performance	The working volume of the pump, ie In theory efficiency (feed) pump , f Practical (actual) throughput of Volumetric pump efficiency (volumetric efficiency) , n ominational and excessive pressure , n otreblyaemaya pump power , etc. Usable capacity of the pump , n A complete pump efficiency .

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Operation of wells with submersible gidrost p uyn bubbled pumps
Scope of discipline	_ 4 _CU (_ 144 _ hours.)
Discipline Summary	
The principle of the jet pump , the use of jet pumps in the development and operation of wells	Types of hydro- jet apparatus for well development and oil production , with a jet pump unit ,
T Tehnological diagram jetting operation wells with drive power from a submersible centrifugal pump	Method of calculation hydr jetting pump , t ipovaya lift pattern layout , strapping ground equipment , in Selecting permissible value drawdown , p Calculating jetting pump device for well operation
Development of a water-jet method of operating wells	Well operation packer installations hydro pump , e kspluatatsii wells bespakernymi installations hydro pump with double lift , with Hema power mini station driven by ESP , n Prospects for development hydr jetting process oil , n odbor equipment for the improvement of the system oil , etc. Advantages and disadvantages water jet pump installations

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Field Geophysics
Scope of discipline	_ 4 _ CU (_ 144 _ hours.)
Discipline Summary	
Introduction . The role and place of GIS in the complex of geological and geophysical works .	The history of GIS development, the role of domestic geophysicists in this process. Used physical fields and their relationship with the parameters of the section and wells. Classification of GIS methods. The characteristic of the object of study. Tasks solved by GIS methods.
Electrical and electromagnetic methods	Theoretical foundations of electrical and electromagnetic methods. Methods of electrochemical activity. Methods of apparent resistance. Electric logging with focused probes. Electromagnetic GIS methods.
GIS Acoustic Methods	Acoustic logging. AK for speed and attenuation. Acoustic Logging on Reflected Waves. Downhole seismoacoustic methods . Synthetic gathers
Methods for studying the technical condition of wells, monitoring field development and perforating blasting in wells	Studying the technical condition of wells. Thermometry. Profilemetry . Shooting and blasting in wells .

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Current development of production of unconventional hydrocarbon in the world
Scope of discipline	_ 4 _CU (_ 144 _ hours.)
Discipline Summary	
General information on unconventional hydrocarbon deposits	Geological and physical features of unconventional hydrocarbon deposits
Quarry method of field development	General information about open pit mining operations Opening of deposits
Mine method of field development	Ukhta method Downhole method
Borehole method of field development	Downhole hydraulic extraction of raw

**The developer is**

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Small-sized ESP for sidetracks
Scope of discipline	_ 5 _ CU (_ 1 80 _ hours.)
Discipline Summary	
With uschestvuyuschi e method s exploitation of oil wells with sidetracks	Review of existing methods of operation of oil wells with lateral trunks of small-diameter , main problems in the operation of wells with sidetracks .
Design features of ESP for the operation of sidetracks of small-sized wells	Design features of small-sized ESP installations. Analysis of the operation of centrifugal pumps of small (2A, 3) and conventional dimensions, including centrifugal pumps with a retaining section
Operation of sidetracks using ESPs with flexible intersectional connections	The use of flexible couplings as part of ESP . And Using e installations small (2A and 3) of dimensions

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Application of ESP Colibri on geophysical cables
Scope of discipline	_ 5 _ CU (_ 1 80 _ hours.)
Discipline Summary	
Operation of the ESPC Colibri on cable	Principle of operation of the Colibri ESP pump on cable
Components of the installation	Load-bearing cable. Load-bearing coupling. Hydroprotection (upper and lower). Submersible telemetry unit. Two-section valve electric motor. Pump sections. Gas stabilizer. Valve- safety valve. Packer- anchor layout.
Advantages of installation	Sealing module of fountain fittings. Flangeless connection of installation units. Installing the packer- anchor layout

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	System analysis and mathematical modeling in oil and gas engineering
Scope of discipline	_ 3 _CU (_ 108_ hours.)
Discipline Summary	
The subject and methods of system analysis	Systematicity as a universal property of matter. The emergence and development of systemic representations . Models of systems. The black box model. The composition and structure of the system. Artificial and natural systems. Classification of systems. Large and complex systems.
The role of measurements in creating system models	Experiment and model. Measuring scales. A vague and probabilistic description of situations.
Decomposition and synthesis of systems	Algorithmization of the decomposition process. Types of aggregation. Emergence and inner integrity.
Action and decision research	A variety of selection tasks. The operation of selecting a solution. Criterion language of choice description. Investigation of multi-criteria selection operations

**The developer is**

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Economics and management of oil and gas production
Scope of discipline	_ 3 _ CU (_ 108 _ hours.)
Discipline Summary	
General information on the economic aspect of the oil field development project	Calculation of indicators of fixed assets of the enterprises of the oil and gas industry (PNC): status and movement, extensive, intensive and integrated use of generalizing indicators. Factor analysis of capital productivity. Development of proposals and recommendations to improve the efficiency of use of fixed assets of enterprises of oil and gas enterprises
Methods for assessing the funds used in the development of an oil field	Calculation of indicators of use of material resources of enterprises of oil and gas enterprises. Profit analysis per ruble of material costs. Development of proposals and recommendations to improve the efficiency of use of material resources of enterprises of oil and gas enterprises
Economic parameters of field development	The process of formation of the product cost, and its expression. Capital and operating costs. Internal and external factors affecting the cost of production
Taxation of the oil business	Value and tax system. The impact of the tax system on production efficiency and its development. Stimulating oil production through tax changes

**The developer is**

Associate Professor of the Department of Subsurface Use and Oil and Gas Affairs T.V. Chekushina

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Name of the discipline	Project management in the oil and gas industry
Scope of discipline	_ 4 _ CU (_ 144 _ hours.)
Discipline Summary	
Technologies for design and modeling of research objects in the field of oil and gas business	Design methodology, familiarity with the main design documents in the oil and gas industry and software for their implementation. Approaches to the design and justification of technical, technological and other indicators characterizing technological processes, objects, systems, projects, oil and gas organizations
Software used in the design and accompanying the life cycle of deposits	Mathematical and computer models of processes, phenomena and objects related to the professional field. Methods of analysis of information on the objects of work.
Optimization of the design of oil and gas facilities	Collection, processing, analysis and systematization of scientific and technical information on the research topic. Approaches to improving the design methodology based on modern achievements of information and communication technologies.

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Dual completion of well for production
Scope of discipline	_ 5 _CU (_ 180 _ hours.)
Discipline Summary	
Introduction	The principles of separate operation of several layers in one well . Introduction and development of WEM
Installation of equipment for simultaneous separate injection and production from a multilayer reservoir.	Variations in the production of oil reserves from the reservoir with the WEM . Separate production using Y-TOOL systems ( bypass systems)
Organization of work for simultaneous and separate well operation	Variations in the production of oil reserves from the reservoir with the WEM for OR E. Types of WEM installations . Advantages and disadvantages of simultaneous and separate operation

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Software complex for assessing the reliability of submersible equipment from operational data
Scope of discipline	_ 3 _ CU (_ 108 _ hours.)
Discipline Summary	
Methodology for determining the reliability of submersible equipment and the experience of its application	Methodology for determining reliability. Reliability of the "well - ESP" system. The procedure for preparing data for calculations. Estimation of the required sample size and test duration. The insufficiency of empirical reliability indicators used.
Submersible Software Products	NovometSel - Pro - program for the selection of submersible plants and optimization of the "formation-well-installation" system, Novomet Stat Pro - program for evaluating the reliability of submersible equipment
Management Station Software	Software KSU-02 SU "Novomet-05" , "Novomet-03". A universal program for viewing archives of the work of the Novomet SU with KSU-02.

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Universal method of selection of installations of submersible pumps for oil production
Scope of discipline	_ 4 _CU (_ 144 _ hours.)
Discipline Summary	
Operation of wells by centrifugal submersible pumps	Installations of submersible centrifugal pumps (ESP) for oil production from wells. Submersible centrifugal modular pumps type ETsND. Gas separators type MNGB
Well operation by submersible centrifugal electric pumps	General installation scheme of a submersible centrifugal electric pump. Elements of electrical equipment installation. Submersible pump unit. Installation of special purpose power stations. Determination of the suspension depth
Submersible Centrifugal Pump Selection	Calculation of a submersible centrifugal pump for forced fluid withdrawal

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Name of the discipline	Output of wells equipped with ESP to the mode
Scope of discipline	_ 3 _CU ( _ 108 _ hours.)
Discipline Summary	
ESP package	The designation of the ESP. Technical requirements, guidelines for the rejection of ESP. P Settings control in the repair of ESP. Revision, input control of ESP. Submersible motor. Technical requirements, guidelines for rejection of submersible electric motors SEM. Control parameters for repairing the SEM
Selection of ESP for a well	The order of selection of ESP. ESP selection. Selection of tubing diameter. ESP calculation calculation
Preparation of a well for operation of its ESP	Transfer of the well for repair. Placement of equipment. The boundaries of responsibility and control in preparing the well for the operation of its ESP. The rise of the ESP from the well. The rise of the ESP due to a decrease in the insulation of the cable-motor system.

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21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

<b>Name of the discipline</b>	<b>Practical Applications of Earth Remote Sensing Data and GIS</b>
<b>Scope of discipline</b>	<b>3 CU (108 hours)</b>
<b>Discipline Summary</b>	
<b>The name of the sections (topics) of the discipline</b>	<b>Summary of sections (topics) of the discipline:</b>
Space activity of the Russian Federation	Basic information about space activities. Fundamental concepts in the use of RGD. Types of space activities. The main directions of space activities. Space products and services. National infrastructure for the use of RGD.
Earth remote sensing	The concept of remote sensing of the Earth (ERS). The use of remote sensing data in solving applied problems (review). Aerospace monitoring of the earth's surface.
The use of the results of space activities in the interests of various industries	Land use management. Land Registry. Water management. Energy complex management. Oil and gas management and mining. Transport Infrastructure Management. Management of forestry and agriculture. Environmental Management. Management of the development of recreational, sports areas and facilities. Municipal Management . Identification and prediction of industrial environmental impact .
The use of geographic information systems in the interests of various industries.	"The concept of geographic information system" (GIS). Integrated use of remote sensing data and geographic information technologies in industry management.
Geoportal solutions based on the use of RGD in industry management	The importance of spatial data in industry management. Regional geoportals in industry management. Examples of regional geoportals .

**The developer is**

Ph.D., associate professor V.V. Kravtsov  
(position, department name, initials, surname)

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Name of the discipline	The technology and technique of oil production by submersible pumps in the complicated conditions
Scope of discipline	_4 _CU (_144_hours)
Discipline Summary	
General information about submersible pumping equipment	Scheme and basic elements of the installation of a submersible centrifugal pump (ESP). Performance characteristics of a submersible centrifugal pump. Head, feed and speed coefficient of a vane pump. The effect of density and viscosity of the pumped liquid on the characteristic of the ESP. The main complicating factors in the operation of wells with submersible pumps. Prospects for the use of submersible pumping units.
The effect of free gas on the performance of submersible centrifugal pumps	Forms of gas-liquid mixture flow in the channels of the working bodies of a centrifugal pump. Parameters affecting the characteristics of submersible centrifugal pumps during the evacuation of GHS. The design, selection model gazozhid - bone mixtures and methods of experiments studying effect of free gas on characteristics of submersible centrifugal pumps. Investigation on the influence of gas characterized - teristics submersible centrifugal pump when working on model mixtures "water gas", "water-surfactant-gas" and different pressures on reception. Results The investigations - dovaniya operation of submersible centrifugal pumps for viscous liquid mixtures "gas-oil". Analysis of the average integral parameters of submersible centrifugal pumps operating on gas-liquid mixtures. Methodology for calculating the characteristics of submersible centrifugal pumps when pumping oil and gas mixtures from wells.
Non - separation methods for increasing the efficiency of ESP operation during pumping out gas-liquid mixtures	Deepening the pump under the dynamic fluid level in the well. Gravy degassed fluid in the annulus. Using a "conical" pump circuit. The use of pumps with dispersants . The use of steps of special designs.

Application of gas separators and solids to ESP	The main types of gas separators for ESP . Field tests of MNG separators. The effect of supercavitation and its role in the working process of the gas separator to ESP. Bench research and field tests of gas separators MN-GSL and MNG and separators company "REDA". Experimental studies characteristics gas separators and gas separators - dispersant to ESP shaft at different frequencies. Development and field tests of a centrifugal separator of mechanical impurities at the inlet of a submersible pump installation. Extraction of natural gas from flooded gas wells and methane in coal deposits using submersible pumping systems.
The use of pumping and ejector systems for oil production	The scheme and principle of operation of the inkjet apparatus. Schematic diagrams and basic elements of pump-ejector systems. Characteristics of the collaboration of submersible centrifugal pumps and ejectors. The results of field tests and industrial implementation of the Tandem-1 submersible pump and ejector systems , the new Tandem-2, Tandem-3 and Tandem-4 submersible pump and ejector systems. Field research of packer hydro-jet pump units at the Samotlor field. Development and field tests of a packer-free arrangement of a hydro-jet pump with a double-row elevator. Opportunities for the development of a hydro-jet method of operation using power ground mini-stations.

**The developers are**

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Name of the discipline	Pressure maintenance systems using multistage vane pumps
Scope of discipline	_4 _CU (_144_ hour.)
Discipline Summary	
General information about submersible pumping equipment	Scheme and basic elements of reservoir pressure maintenance systems . Performance characteristics of a multi-stage vane pump. Head, feed and speed coefficient of a vane pump. The effect of the density and viscosity of the pumped liquid on the characteristics of the pump .
Existing reservoir pressure maintenance systems	Examples of the implementation of reservoir pressure maintenance systems in the fields of the Russian Federation. The main complicating factors in the implementation of the reservoir pressure maintenance system.
Application Lopasov m GOVERNMENTAL pumps	Deepening the pump under the dynamic fluid level in the well. Gravy degassed fluid in the annulus. Using a "conical" pump circuit. The use of pumps with dispersants . The use of steps of special designs.

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Name of the discipline	Technology and technology of water-gas impact on the reservoir
Scope of discipline	_6 _CU (_216_ hours)
Discipline Summary	
General information about the water-gas effect on the oil reservoir	The scheme and principle of operation of the inkjet apparatus. Schematic diagrams of pump- ejector systems.
Inkjet apparatus as a part of pump-ejector systems for water-gas treatment	Hydraulic characteristics of jet pumps for homogeneous liquids. Cavitation characteristics . Constructions - tive features flow part hydramjetting pumps with the central nozzle. Analytical races odd characteristics of the jet apparatus. Characterized - teristics ejectors for pumping liquid jet of liquid and gas / gas jet . Features of the operation of jet devices when injecting a gas-liquid mixture into the nozzle. Characteristics of the collaboration of submersible centrifugal pumps and ejectors. Prospects for water-gas effects on the reservoir using pumping-ejector systems.
The use of pumping and ejector systems for oil production	The results of field tests and industrial implementation of the Tandem-1 submersible pump-ejector systems , the testing of the new Tandem-2, Tandem-3 and Tandem-4 submersible pump-ejector systems. Field studies packer jetting pump SETTING - wok at the Samotlor field. Development and field tests of a packer-free arrangement of a hydro-jet pump with a double-row elevator. Hydro-jet method of operation using power ground mini-stations.

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Name of the discipline	Installation of submersible pumps for oil production
Scope of discipline	_3 _CU (_108_ hours)
Discipline Summary	
General information about submersible pumping equipment	Scheme and basic installation elements of a submersible vane pump. Performance characteristic of submersible vane pump. Head, feed and speed coefficient of a vane pump. The main complicating factors in the operation of wells with submersible pumps ..
The effect of free gas on the performance of submersible vane pumps	Parameters affecting the characteristics of submersible vane pumps during evacuation of GHS. The design of the installation, the choice of model gas-liquid mixtures, and the methodology for conducting experiments to study the effect of free gas on the characteristics of pumps. Investigation of the influence of gas on the characteristics of the pump when working on model mixtures of "water-gas", "water-surfactant-gas" and various receiving pressures. The results of the study of the operation of submersible vane pumps on viscous gas-liquid mixtures of oil-gas. Methodology for calculating the characteristics of submersible vane pumps when pumping oil and gas mixtures from wells.
M Methods for improving operation efficiency of the rotary pump for Oil	Deepening the pump under the dynamic fluid level in the well. Gravy degassed fluid in the annulus. Using a "conical" pump circuit. The use of pumps with dispersants . The use of steps of special designs. Prospects for the use of submersible pumping units

**The developers are**

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подпись

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***Academy of Engineering***

**ANNOTATION OF EDUCATIONAL DISCIPLINE**

**Educational program**

21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Methods of increasing the resource ESP
Scope of discipline	_ 4 _ CU (_1 44 _ hours.)
Discipline Summary	
General information about submersible pumping equipment	Scheme and basic elements of the installation of a submersible centrifugal pump (ESP). Performance characteristics of a submersible centrifugal pump. Head, feed and speed coefficient of a vane pump. The effect of density and viscosity of the pumped liquid on the characteristic of the ESP. The main causes of failure of the ESP .
Assessment of the influence of the main technological characteristics of producing wells on the ESP resource.	ESP operating conditions. ESP reliability analysis. Technological factors contributing to clogging of the pump by mechanical impurities. The influence of technological factors on the nature of wear of the working bodies of the ESP. The process of deposition of a solid phase on the working bodies of ESP. Reliability parameters of the electrical part of the ESP. The results of studies of the effect of bottomhole pressure on the intensity of the process of scaling and removal of mechanical impurities, the change in gas-liquid flow at the reception of ESP
Methods of increasing the service life of ESP	Improving the efficiency of ESP operation by rational selection and optimization of equipment operation . Essentially guides physical, Technolitic - nological and chemical control methods of scaling . Methods of controlling the removal of solids. Methods for the prevention and control of asphalt-resin-paraffin substances. Improving the efficiency of ESP operation by improving the design .

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**ANNOTATION OF EDUCATIONAL DISCIPLINE**

**Educational program**

21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Oil production intellectualization
Scope of discipline	_ 3 _CU (_1 08 _ hours.)
Discipline Summary	
Intelligent Well Overview	The concept of an intellectual well. The basic elements and principle of operation of an intellectual well. Examples of intellectualization of wells for oil production.
Systems of intellectual automation in technological operations for oil and gas production.	Specifications e solutions intelligent control systems for artificial lift . Inflow control devices. Intelligent Manara Production Management System (Schlumberger) . Intelligent completion system WellWatcher FLUX (Schlumberger) .
Examples of Intellectual Technology	Intellectual developments and their implementation in Russian fields. Foreign experience in the implementation of intellectual development. Prospects for the development of high-tech "smart" deposits in Russia and abroad .

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**ANNOTATION OF EDUCATIONAL DISCIPLINE**

**Educational program**

21.04.01 Oil and Gas Engineering / Oil and gas production and transportation technologies

Name of the discipline	Cyclic operation of wells equipped with an ESP
Scope of discipline	_ 4 _ CU (_ 1 44 _ hours.)
Discipline Summary	
General information about submersible pumping equipment during cyclic well operation	The main parameters of the ESP. Scheme and basic elements of the installation of a submersible centrifugal pump (ESP). The effect of density and viscosity of the pumped liquid on the characteristic of the ESP. The concept of cyclic well operation. Reasons for the introduction of cyclic operation of wells equipped with ESP.
Cyclic Efficiency	The use of cyclic operation for low-flow and medium-flow wells. Tehniko-Tehnological solutions for the implementation of the cyclic operation of wells with ESP. Industrial experience in introducing cyclic operation in oil fields.
Limitations of cyclic well operation	Constructive limitations of the introduction of cyclic operation. Technological cal limit exploitation wells in the mode of short-term cyclic selection. Prospects for the method of cyclic well operation.

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