TECHNICAL
EDUCATION
ACADEMY

School of Engineering

COURSE PROGRAMME

000546

GASP008 - Modern methods of oil and gas purification



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Course overview

Intermediate level

Why take this course

The seminar "Modern Methods of Oil and Gas Purification" will focus on studying the main methods of separation and preparation of oil and gas, as well as modern energy-saving technologies for gas purification from acidic components. It will cover the processing of natural and associated petroleum gases, as well as the treatment of wastewater and industrial water, including the removal of petroleum products. Special attention will be given to the main directions for improving the repair of existing gas processing equipment. The seminar will also include examples of successful implementation of these methods in the industry and their impact on environmental indicators.

The seminar will cover the following topics and sections:

• Explanation of effective methods for separating crude oil obtained from wells into gas, oil, and formation water for subsequent processing

• Explanation of natural and associated petroleum gas processing

• Explanation of the principles of modern gas purification technologies from acidic components

• Explanation of the types of wastewater and industrial water and stages and methods of their purification, including the removal of petroleum products

• Explanation of the differences between fixed (adopted) principles of technical maintenance and repair and a flexible methodology that will determine efficiency and improvement in work execution

• Explanation of the organization and safe conduct of work with electrical equipment at oil and gas processing enterprises performed as part of current operations

• Explanation of the hazardous area classification system

• Explanation of the potential danger of high voltage and training of an authorized person to perform high voltage switching

• Implementation of emergency shutdown systems and explanation of their functions and methods of operation

• Explanation of the basics of programmable logic controllers (PLC)

Who it is for and how it helps

Heads of oil and gas preparation shops, steam and water supply, and boiler houses, repair and mechanical shops, central electric stations, and instrumentation and control systems.

What you will learn

- Explain methods for processing crude oil to obtain gas or liquids used to enhance crude oil extraction from a reservoir
- Explain methods for processing crude oil to ensure these substances become suitable for transportation or local use

Course overview — continued

- Explain methods for processing crude oil for waste preparation and safe local disposal
- Explain natural and associated petroleum gas processing
- Explain the differences between physical-energy, thermochemical, chemical-catalytic methods of hydrocarbon gas processing
- Explain the differences and analyze the efficiency and energy-saving of gas purification from acidic components of the aforementioned technologies and processes
- Explain and select the best technologies for existing wastewater treatment and petroleum product removal and for designing new ones
- Explain the 13 essential elements of improving technical maintenance and repair
- Practically apply critical requirements for this process
- Ensure that any electrical equipment and power supply meet the country's rules and standards and are used, tested, and maintained safely according to the measures described above
- Classify hazardous areas
- Explain the coding of equipment used in hazardous areas
- Illustrate one-way and two-way barriers and explain how to test them
- List all steps of safe high voltage switching
- Explain actions at each switching step
- Use a high voltage tester
- Explain the principle of "grounding"
- Identify devices used in emergencies and emergency shutdown systems and explain how they work
- Describe the function of the emergency shutdown system (ESD)
- Explain the difference between PLC systems and old relay systems, the operation of a simple ladder diagram (PLC), the function of Allen-Bradley PLC components
- Explain using a block diagram three main PLC systems, single, double, and triple redundant PLC

Curriculum

Modules 01–05

01 Separation and Preparation of Oil and Gas

- Gas processing
- Oil processing
- Formation water processing

02 Modern Energy-Saving Technologies for Gas Purification from Acidic Components

- Absorption and adsorption processes
- Direct oxidation of hydrogen sulfide and catalytic methods
- Microbiological purification
- Membrane technology

03 Processing of Natural and Associated Petroleum Gases

- Compression processing
- Absorption processing
- Low-temperature processing

04 Treatment of Wastewater and Industrial Water, Purification from Petroleum Products

- Types and classification of wastewater and industrial water
- Preliminary treatment - coagulation, flotation, mixing, settling
- Primary treatment - sedimentation, flotation, gravity separation, filtration, demulsification
- Secondary treatment - chemical oxidation (reduction), chemical neutralization, biochemistry, electrocoagulation, electric flotation, electrolysis, electrodialysis, membrane separation
- Advanced treatment - adsorption on activated carbon (organic substances), reverse osmosis (salts), ion exchange (inorganic substances)

05 Main Directions for Improving the Repair of Existing Gas Processing Equipment

- Contour model for maintenance and repair improvement
- Design and organization

Curriculum

Modules 05–09 · Module 05 — continued

- Work list control
- Contract strategy
- Cost control
- Logistics
- Cost and risk optimization

06 Organization and Conduct of Work with Electrical Equipment in Oil and Gas Processing Enterprises

- Electrical safety work
- Organizational and current measures ensuring safety
- Documentation list for the responsible electrical manager
- Organization of work in electrical installations by delegated personnel
- Classification of premises by the degree of electric shock hazard

07 Safety in Hazardous Areas

- Hazardous areas
- Equipment used in hazardous areas
- Safety barriers

08 Safety in High Voltage Equipment Maintenance

- Equipment insulation
- Lockouts and tagouts
- Grounding
- Work permits, obtaining work permits

09 Modern Technologies in Industrial Automation - Emergency Shutdown System (ESD)

- ESD system construction
- Description of the ESD system
- Logical control schemes

Curriculum

Modules 10

10 Modern Technologies in Industrial Automation - Introduction to PLC (Programmable Logic Controller)

- PLC systems
- Ladder diagrams
- Relay systems and comparison with PLC
- Examples of PLC systems
- Simple PLC shutdown system

Joining the programme

Contact the Academy and quote course code 000546 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

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