TECHNICAL
EDUCATION
ACADEMY

School of Engineering

COURSE PROGRAMME

000487

ATIC017 - Automation of technological processes in the oil and gas

The training program "Automation of Technological Processes in the Oil and Gas Industry" is your key to success in the field of industrial automation and control.



Learn from the Best in the Business!

Course overview

Duration: 5 days / 40 hours · Intermediate level

Why take this course

The training program "Automation of Technological Processes in the Oil and Gas Industry" is your key to success in the field of industrial automation and control. Our program offers a comprehensive study of the principles, methods, and tools of automation, tailored to modern technological processes.

You will start your journey with the basics of metrology, where you will master the classification of technical measuring instruments, measurement methods and quality, and learn to evaluate measurement system errors. Then, you will get acquainted with a variety of instruments and automation tools used for controlling technological processes, studying their operating principles, classification, and areas of application.

Next, you will delve into the study of technological control objects (TCO) and automatic control systems (ACS), where you will master general information about controlling technological processes, characteristics and properties of TCO, as well as the principles of operation and classification of ACS.

A significant part of the program involves the development of control systems and the principles of creating automation schemes. At this stage, you will learn to select controlled variables, analyze technological processes, and build automatic control systems.

The final part of the program is dedicated to managing various types of technological processes, such as thermal, mass transfer, hydromechanical, mechanical, and chemical processes. You will learn to automate the control of these processes, analyze their characteristics and behavior, and design automatic control systems.

Who it is for and how it helps

This training program is designed for engineers, technicians, automation specialists, operators, and managers working in the oil and gas industry, as well as for students and teachers specializing in this field. The program will be beneficial for those who want to gain knowledge about the main control and measuring instruments and automation tools used in the oil and gas industry from world-renowned manufacturers such as Metron, DuPont, Artvik, Emerson, Magnetrol, Yokogawa, Bently Nevada, Mettler Toledo, Endress+Hauser, Flowsic, Allen Bradley, Crohne, FISHER, Foxboro, SPM, PANAMETRICS, Siemens, and Metso Automation.

Moreover, the program is suitable for specialists involved in the development, design, and implementation of automated control and monitoring systems for technological processes at oil and gas facilities, as well as for those who seek to improve their qualifications and expand professional competencies in the field of automation.

What you will learn

- Understand the basics of metrology, classification, and principles of technical measuring instruments.

Course overview — continued

- Evaluate measurement system errors and determine metrological characteristics of measuring instruments
- Apply instruments and automation tools to control various technological processes, including temperature, pressure, liquid and bulk material levels, and composition and properties of substances
- Develop and analyze automatic control systems, considering the characteristics of technological control objects, their classes, and types of processes.
- Determine efficiency criteria and classification of automatic control systems
- Develop functional automation schemes and create automation diagrams considering the selection of controlled variables, regulation impact channels, monitored and signaling parameters.
- Manage thermal, mass transfer, hydromechanical, mechanical, and chemical processes using automated control systems
- Analyze and optimize automation processes based on their characteristics and behavior, as well as build automatic control systems
- Compare and select suitable control and measuring instruments and automation tools from various world manufacturers for application in the oil and gas industry
- Exchange experiences and knowledge with colleagues in the field of technological process automation, participating in the professional community

Curriculum

Modules 01–03

01 Basics of Metrology

- Classification of technical measuring instruments
- Measurement methods, measurement quality, measuring instruments, their elements, and parameters
- Metrological characteristics of measuring instruments
- Evaluation of measurement system errors in technical measurements, control systems, and their elements

02 Instruments and Automation Tools for Controlling Technological Processes

- General information about temperature changes and temperature scales
- Classification of instruments for measuring, recording, signaling, and regulating temperature
- General information about pressure and vacuum changes
- Classification of instruments for measuring, recording, signaling, and regulating pressure and vacuum
- General information about changes in the levels of liquid and bulk media and flow rate
- Classification of instruments for measuring, recording, signaling, and regulating levels of liquid and bulk media and flow rate
- General information about changes in the composition and properties of substances
- Classification of instruments for measuring, recording, signaling, and regulating composition and properties of substances
- Actuating mechanisms
- Connection of actuating mechanisms with working organs
- Actuating mechanisms: purpose, classification, and area of application

03 Technological Control Objects (TCO)

- General information about controlling technological processes
- Characteristics and properties of TCO
- Classes and types of process technology
- Typical automation solutions
- Process parameter characteristics
- Analysis of disturbance impacts

Curriculum

Modules 04–08

04 Automatic Control Systems (ACS)

- Concept of control system, general definitions
- Efficiency criteria of ACS
- Classification of ACS
- Automatic regulation systems
- Automatic control, signaling, blocking, and protection systems

05 Development of Control Systems and Principles of Creating Automation Schemes

- Selection of controlled variables and regulation impact channels, monitored, signaling variables, and protection parameters
- Automation tools
- Functional automation schemes
- Decoding automation tool designations on technological diagrams

06 Thermal Process Control

- Automation of heating and cooling process control of liquids, artificial cooling, evaporation
- Analysis of the considered processes, their characteristics
- Building automatic control systems

07 Mass Transfer Process Control

- Automation of rectification, absorption, desorption, separation process control
- Analysis of the considered processes, their characteristics
- Building automatic control systems

08 Hydromechanical, Mechanical, and Chemical Process Control

- Automation of fluid and gas movement process control, liquid mixing, filtration, and electrical purification
- Automation of solid material movement, dosing, and grinding
- Automation of reactor processes

Curriculum

Modules 08–11 · Module 08 — continued

- Analysis of the considered processes, their characteristics
- Building automatic control systems

09 Control and Measuring Instruments and Automation Tools Used in the Oil and Gas Industry by World Manufacturers

- Introduction to control and measuring instruments and automation tools
- Overview of the application of control and measuring instruments and automation tools in the oil and gas industry
- Main requirements for instruments and automation tools in the oil and gas sector

10 Overview of Products from World Manufacturers of Control and Measuring Instruments and Automation Tools

- Overview of products and application of instruments from the following companies in the oil and gas industry: Metron, DuPont, Artvik, Emerson, Magnetrol, Yokogawa, Bently Nevada, Mettler Toledo, Endress+Hauser, Flowsic, Allen Bradley, Crohne, FISHER, Foxboro, SPM, PANAMETRICS, Siemens, Metso Automation

11 Trends in the Development of the Control and Measuring Instruments and Automation Tools Market in the Oil and Gas Industry

- Trends in the development of the control and measuring instruments and automation tools market in the oil and gas industry
- Selection of optimal solutions for specific tasks and projects

Programme instructor



Павел Миляев

Павел Миляев - опытный инженер-электрик с более чем 40-летним опытом работы в различных областях промышленности. Он имеет высшее образование в области автоматизации, телемеханики и связи на железнодорожном транспорте, а также множество специализаций в сфере технического обслуживания, управления производством и метрологического обеспечения производства.

Павел является экспертом в области коммерческого учета товарной продукции и вопросов технологии переработки газа, кислого газа, ШФЛУ и газового конденсата. Он знаком с оборудованием КИПиА фирм: Метран, DuPont, Artvik, Emerson, Yokogawa, BentlyNevada, MettlerToledo, Endress+Hauser, Flowsic, AllenBradley, Crohne, FISHER, Foxboro, SPM.

Павел также имеет большой опыт работы в области проектного управления, в том числе в реконструкции коммерческих и хозрасчетных узлов измерения основных материальных потоков. Он участвовал в комиссии по оценке тендерной документации при заключении договоров на ремонт оборудования КИПиА.

В настоящее время Павел является лектором в УПЦ ООО «Газпром добыча Астрахань», где ведет лекции по направлению КИПиА, метрологии и автоматизации технологических процессов.

Благодаря своему богатому опыту и профессионализму, Павел Миляев является надежным и компетентным инструктором, готовым поделиться своими знаниями и опытом с коллегами и студентами.

Павел Миляев имеет более чем 40-летний трудовой опыт, начиная со студенческих лет и заканчивая работой на газоперерабатывающем заводе ООО «Газпром Добыча Астрахань». За это время он занимал различные должности, начиная от главного корабельного старшины до заместителя главного прибориста по ремонту средств КИПиА.

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Participant ratings

Programme evaluation based on participant feedback

Overall programme rating — 4.6 / 5

Clarity of learning objectives	**4.6 / 5**
Confidence in applying knowledge and skills	**4.2 / 5**
Achievement of learning objectives	**4.2 / 5**
Relevance of content to job tasks	**4.4 / 5**
Suitability of difficulty for the level of preparation	**4.6 / 5**
Increase in knowledge	**4.0 / 5**
Skills development	**4.0 / 5**
Willingness to recommend the programme to colleagues	**4.2 / 5**

5 responses

Joining the programme

Contact the Academy and quote course code 000487 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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