Process Operations Technology Training Program Modules

Are you looking for a rewarding and well-paying career?

JJC's Process Operations Technology program will help get you there!

This non-credit program is designed for individuals seeking a career as a process operator technician. Participants will learn the theories behind various chemical plant processes and green technologies and gain hands-on experience in these areas.

Instruction takes place on weeknights and occasionally on Saturdays. The semester-long program offered by Corporate & Community Services at JJC includes 23 program modules, covering a variety of different topics. They've been carefully selected to provide PETRO students with a well-rounded understanding of process operations technology.

Program Modules

Introduction to the Process Industry
This course is designed to introduce you to the chemical process industry and to other related manufacturing industries that require the same skills. It covers the identification of major corporations and the products they produce. (4 hours)

Process Technician Duties and Responsibilities
Students are introduced to typical plant and refinery operations. The class covers the operator's duties, tasks and responsibilities in day-to-day operations, as well as conveying emergency operations. Typical shift patterns are covered including the 24-hour (military) system of keeping time. Also covered are workplace skills needed to succeed in the industry. Included are topics concerning understanding the importance of teamwork, problem solving and health and safety. (8 hours)

Technical Math for Operators
This course provides the student with the practical and realistic mathematical problems that are encountered by technicians. By solving the problems, the technical and mathematical aspects are strengthened, thus providing a solid foundation for a career as a technician. (20 hours)

Chemistry for Operators
A basic knowledge of organic chemistry is necessary to efficiently operate today's modern refineries and chemical complexes. Topics include basic principles, atoms and molecules and molecular bonds. All of these complexes deal with organic hydrocarbons, so a fundamental knowledge of these is necessary. Some of the hydrocarbons covered on a molecular basis are hydrogen, methane, butane and ethane. (16 hours)

Physics for Operators
This segment of the petrochemical operators course covers basic physics. The information presented teaches the student to function effectively in typical operating units. Some of the items covered are the gas laws and their applications, properties of matter, Bernoulli's Principle, the physical states of matter, temperature, pressure and heat. (16 hours)

Distillation
All the major forms of distillation and examples of operation are shown. The different types of distillation are covered along with the reasons why a particular type of process is used. The different types of trays used in towers are explained, and examples are shown. (10 hours)

Basic Electricity
This course addresses safe electrical practices and topics such as basic circuit design, control component awareness, interpreting ladder diagrams, use of electrical meters, electrical trouble shooting, fuse and breaker awareness and application and National Electrical Code requirements for basic circuits. (16 hours)

Valves and Actuation
Valves are one of the most used apparatuses within a refinery or chemical complex. This segment of the course covers the different types of valves, their construction and typical uses. Proper operation, preventative maintenance and safety precautions are stressed. Students learn actuator principles and terminology. Various manual, fluid-powered and electric actuators and their accessories are discussed. (12 hours)

Reactor Fundamentals
This course provides an overview of the reactor. Participants learn to describe exothermic, endothermic, replacement, neutralization and combustion chemical reactions as well as reaction variables and their effects. (3 hours)

Steam, Steam Systems and Traps
This course covers the fundamentals of steam generation, with practical information on steam generation chemistry. It also covers handling condensation and steam traps, which are vital since they prevent waste. The class covers disc, float, thermostatic and inverted bucket type steam traps, along with operation and upkeep. (8 hours)

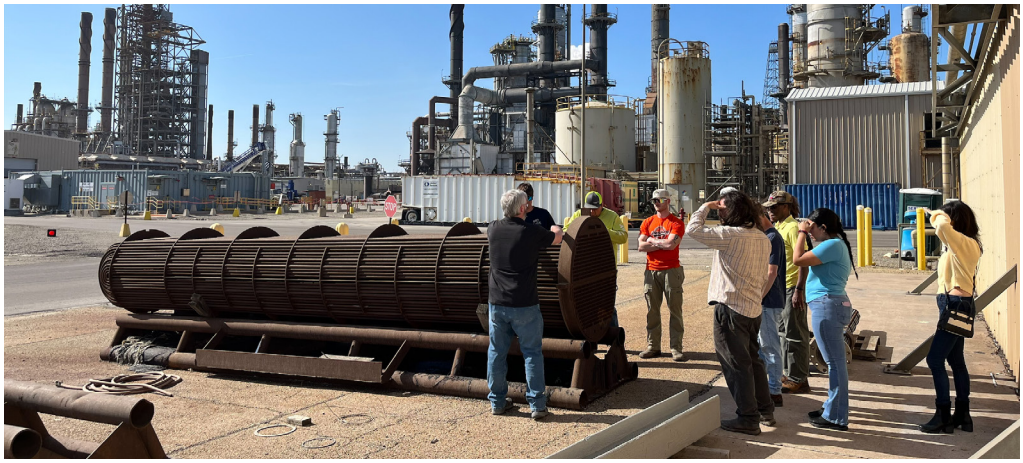
Cooling Towers
Topics covered include the introduction to cooling towers, how cooling towers work, types of cooling towers, components of cooling towers maintenance and location. (3 hours)

Heat Exchangers
Heat exchangers are essential items within refineries and chemical plants. Floating head, fixed tube, u-tube and air-cooled exchangers are covered. Construction, operation and maintenance aspects are defined and explained. (4 hours)

Steam Turbines
Many major types of machinery are powered by steam turbines. The construction of a typical turbine is covered, along with aspects of its operation. Typical applications are explained and maintenance factors are covered. (4 hours)

Compressors
Aspects of operation, safety fundamentals and preventative maintenance are covered on centrifugal and positive displacement compressors. Compressor surge and stonewall are also explained. (4 hours)

Pumps
The major types of pumps used and the principles of each are covered. The major emphasis is on centrifugal and positive displacement pumps. Safety aspects and pump operations in cold service are also covered. (8 hours)



Furnaces/Fired Heaters
The primary aspect of furnace operation is covered in detail. This provides the student with the knowledge necessary to operate them efficiently, economically and safely. Draft, air and fuels are reviewed and the important points for normal operations are emphasized. (5 hours)

Refrigeration
Many operating units use refrigeration in one form or another to accomplish separation of various products. Basic refrigeration will be covered in this segment of the course to include the compressor, condenser, expansion valve, accumulator, and chiller. CFC regulations are also discussed. (3 hours)

Motors
This course is designed to identify typical motors found in a process plant, their purpose and function. Also covered are the technician's duties and responsibilities and the identification of safe work practices. (8 hours)

OSHA 10 Safety Certificate
The class consists of 10 hours of safety training, minimally addressing 7 OSHA topics plus 2 hours related to safety in the process operations field. Students will learn how to find OSHA regulations on the OSHA website, learn the common causes of workplace accidents and the rules to be followed to minimize accidents. In order to complete the course and earn a Safety Card from OSHA, students must attend all 12 hours of training, pass an exam and participate in group discussions. (12 hours)

Piping, Instrumentation, Symbols & Drawing
All structures use certain sets of symbols to depict on paper what they represent. This segment of the operator's course covers the normal symbols used in piping, instrumentation and other structures. P&IDs are covered in detail and examples of flow charts are also covered. (8 hours)

Instrumentation
This course introduces instrumentation for the process operator. Examples of pneumatic and electronic operation are shown, as are control valve operations, variable measurements, remote instrumentation, computer control, control loops and process control. (10 hours)

Plant Systems Overview
This course provides the process operator student with overviews of electrical systems, steam systems, water and wastewater systems, P&ID systems and the opportunity to work with a computer-generated plant simulation. (12 hours)

Career Readiness
This course will review the specific skills needed to be successful in the workplace, including work habits, personal leadership, communication, teamwork and collaboration, critical thinking and problem solving. Students will complete a cover letter, résumé and a mock interview. In addition, the Career Readiness program will assess foundational skills using ACT WorkKeys® assessments, and participants will earn the ACT National Career Readiness Certificate. (15 hours)

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For more information about the Process Operations Technology program or to register, call (815) 280-1555 or email processoperator@jjc.edu.