

## ◆ Chemical Operator Certificate - 45 Credit Hours ◆

**INDT 101 Introduction to Chemical Operator** An introduction to the Chemical Operator certificate program. The class consists of four modules which include: Applied Mathematics, Chemical Theory, Safety Health & Environmental, and Mechanical Systems. Anyone considering seeking employment or employed as a Chemical Operator who can benefit from a formal education program providing basic instruction in relevant subjects should take this class first. The class also serves as an introduction to online learning. Math Pre-test and Post-test. (4 credits)

**INDT 221 Process Control I** Examines process loops including valves, pumps and sensors, feedback networks including proportional, integral and derivative control, and other systems used in modern chemical process and manufacturing plants. Topics include basic process control theory, reading PID's, and feedback control utilizing computer simulation software. This course follows principles outlined by the Instrumentation Society of America (ISA). (4 credits)

**INDT 222 Process Control II** This course is a continuation of Process Controls I but adds instruction in total design of systems, use of pneumatic controls as well as programmable controllers, and specifics on electric utility plants and some knowledge on nuclear power plants. (4 credits)

**INDT 121 Industrial Safety/Hazmat** An introduction to occupational health and safety through recognition and control of health and safety hazards in the workplace. Tools and techniques are taught for injury/illness prevention, incident investigation, and the implementation of a typical safety program. (3 credits)

**INDT 134 Team Concepts and Practices** This course focuses on the urgency of making American business competitive in a global economic environment. It will present an overview of total quality management. Includes (TQM) for technicians and managers in organizations of all types and sizes. Principles and processes, as well as the tools and techniques for continuous improvement are emphasized. This course describes how individuals and organizations applying TQM principles can increase productivity and effectiveness. (3 credits)

**MATH 108 Pre Algebra** An introduction to algebra for students who have not had high school algebra or need a refresher course. Topics include geometry, metric and English measurement, introduction to real numbers, solving equations, scientific notation, introduction to statistics/probability, and constructing and interpreting graphs. (4 credits)

**MATH 109 Elementary Algebra** Covers simplifying and evaluation expressions, solving, graphing, and writing of linear equations and inequalities. Also includes operations with exponents and on polynomials. (4 credits)

**MECH 206 Statistical Process Control** Introduces techniques to improve quality and reduce production costs; variable ( $\bar{X}$  and R) and attributes (p, np, c, u); charting techniques using data from a variety of production cases; introductory statistics, including frequency, distribution, measures of central tendency, and measure of dispersion. (3 credits)

**INDT 133 Industrial Electricity** This course introduces the basic concepts of electricity, electrical components and equipment, and their application in an industrial environment. Electrical basics, Ohm's Law, series and parallel circuits, resistance, capacitance and inductance are covered; as well as direct and alternating electrical current. Electrical drawings and symbols, power and energy, motors, motor control, transformers, electrical distribution, and basic industrial electronics will also be covered. The application of trouble shooting is incorporated and electrical safety awareness in the workplace is reinforced. (3 credits)

**ELET 241 Programmable Logic Controllers I** Introduces programmable logic controllers (PLCs): basic operations, history, numbering systems, and programming panels. (3 credits)

**PHYS 101 Applied Physics** Introduction to the principles of physics combined with its applications. This course covers the broad fields of systems of measurement, graphing, mechanics, properties of matter and heat. Specific topics include laws of motion, flow of fluids, work, energy, simple machines, thermal expansion & gas laws. (3 credits)

**MECH 110 Engineering Materials:** Introduces engineering materials including ferrous and nonferrous material, plastics, and ceramics; various material property tests such as tension, compression, shear, elongation, and impact; basic metallurgy. (3 credits)

**CHEM 110 Introduction to Chemistry** Designed for students with no high school chemistry. This course provides a background in basic chemistry including the scientific process, Metric System (SI), atomic and molecular structure, chemical equation, states of matter, lab and safety techniques, acid/base concepts and problem solving. (4 credits)