

# INSTRUMENTATION TECH (INTC)

---

## **INTC 1315 Final Control Elements 3 Credits (2 Lec, 2 Lab)**

This course is a study of the various designs of final control elements including disassembly, assembly, calibration, troubleshooting, and required documentation. It includes instruction in basic techniques and calculations for proper valve sizing.

Prerequisite(s): INTC 2310 Reading level 6, Writing level 6, Math level 6.

Course Type: Technical

## **INTC 1322 Analog Controls I 3 Credits (2 Lec, 2 Lab)**

This course is a study of basic concepts, related industrial electrical controls, and analog electrical controls in industrial processes. Includes components, terminology, symbols, and diagrams used in analog control systems, electrical distribution, motor controls, relay logic, and ladder logic.

Prerequisite(s): CETT 1302, Reading level 6, Writing level 6, Math level 6,

Prerequisite with concurrency: INCR 1302

Course Type: Technical

## **INTC 1341 Principles of Automatic Control 3 Credits (2 Lec, 2 Lab)**

This course is a study of the theory of basic measurements, automatic control systems and design, closed loop systems, controllers, feedback, control modes and control configurations. Topics include a study of process characteristics, control modes, control loop configurations, control loop analysis and controller tuning concepts. Computer based simulation will be used to reinforce the study learning objectives. Reading level 6, Math level 6, Writing level 6

Course Type: Technical

## **INTC 1348 Analytical Instrumentation 3 Credits (3 Lec, 0 Lab)**

This course is a study of analytical instruments emphasizing their utilization in process applications including, but not limited to, chromatography, PH, conductivity, and spectrophotometer instruments. Topics include density, viscosity, conductivity, humidity/moisture, chromatography, spectroscopy, fugitive emissions and the flammable and explosive characteristics of solids, liquids and gases.

Prerequisite(s): INCR 1302. Reading level 6, Math level 6, Writing level 6.

Course Type: Technical

## **INTC 1350 Digital Measurement and Controls 3 Credits (2 Lec, 2 Lab)**

This course offers a review of basic measurement control instrumentation. Includes movement of digital data through common systems employing parallel and serial transfers.

Course Type: Technical

## **INTC 1353 Analog Controls II 3 Credits (2 Lec, 2 Lab)**

This course is a study of analog controls in industrial processes. Includes electrical distribution, motor controls, relay logic, and ladder logic.

Prerequisite(s): INTC 1322, Reading level 6, Math level 6, Writing level 6.

This course will no longer be taught beginning Fall 2018.

Course Type: Technical

## **INTC 1355 Unit Operations 3 Credits (2 Lec, 2 Lab)**

This course is an in-depth study of automatic control requirements of industrial process. Includes control systems, control loop tuning, and analysis.

Prerequisite(s): INTC 2310. Reading level 6, Math level 6, Writing level 6

Course Type: Technical

## **INTC 1375 Sample Systems 3 Credits (2 Lec, 2 Lab)**

This course is designed to foster a comprehensive understanding of sample systems used in conjunction with process analytical instrumentation. Coverage will include sample system theoretical foundations, various sample system applications, design, testing and safety procedures, along with basic troubleshooting and maintenance techniques used when working with this hardware.

Prerequisite(s): INCR 1302. Reading level 6, Math level 6, Writing level 6.

Course Type: Technical

## **INTC 1448 Analytical Instrumentation 4 Credits (3 Lec, 2 Lab)**

This course is a study of analytical instruments emphasizing their utilization in process applications including, but not limited to, chromatography, pH, conductivity, and spectrophotometer instruments. Topics include density, viscosity, conductivity, humidity/moisture, chromatography, spectroscopy, fugitive emissions, and the flammable and explosive characteristics of solids, liquids, and gases.

Prerequisite(s): Reading level 6, Writing level 6, Math level 6,

Prerequisite with concurrency: INCR 1302

Course Type: Technical

## **INTC 1475 Sample Systems 4 Credits (3 Lec, 2 Lab)**

This course is designed to foster a comprehensive understanding of sample systems used in conjunction with process analytical instrumentation. Coverage will include sample system theoretical foundations, various sample system applications, design, testing and safety procedures, along with basic troubleshooting and maintenance techniques used when working with this hardware.

Prerequisite(s): INCR 1302 Reading level 6, Writing level 6, Math level 6

Course Type: Technical

## **INTC 2310 Principles of Industrial Measurement II 3 Credits (2 Lec, 2 Lab)**

This course is a study of additional principles of measurement. Includes devices used to measure process variables and basic control functions.

Prerequisite(s): INTC 1301 or INCR 1302. Reading level 6, Math level 6, Writing level 6.

Course Type: Technical

## **INTC 2330 Instrumentation Systems Troubleshooting 3 Credits (2 Lec, 2 Lab)**

This course in an in-depth coverage of the techniques of troubleshooting instrumentation systems in a process environment. Includes troubleshooting upsets in processes.

Prerequisite(s): INTC 1315 Reading level 6, Writing level 6, Math level 6

Course Type: Technical

**INTC 2333 Instrumentation Systems Installation 3 Credits (2 Lec, 2 Lab)**

This course covers synthesis, application, and integration of instrument installation components and includes a comprehensive final project.

Prerequisite(s): INTC 2310

Course Type: Technical

**INTC 2336 Distributed Control and Programmable Logic 3 Credits (2 Lec, 2 Lab)**

This course is an overview of distributed control systems including configuration of programmable logic controllers, smart transmitters, and field communicators. It includes functions of digital systems in a process control environment.

Prerequisite(s): Reading level 6, Math level 6, Writing level 6

Course Type: Technical

**INTC 2339 Instrument and Control Review 3 Credits (3 Lec, 0 Lab)**

This course is an overview of instrument and control technology, stressing preparation for industry employment testing for the National Institute of Engineering Technologist Certification (level 2) or the Instrumentation Systems and Automatic Certified Control Systems Technician (level I) Certificate (ISA CCST). This course prepares graduating students with the background necessary to take the ISA Technician Training certification in preparation for industry employment and national testing. NOTE: This course will no longer be taught beginning Fall 2018.

Prerequisite(s): Reading level 6, Math level 6, Writing level 6

Course Type: Technical

**INTC 2345 Advanced Analyzers 3 Credits (2 Lec, 2 Lab)**

This course covers advanced topics in composition analyzers and their sample systems. The course is designed to foster a comprehensive understanding of the more advanced analyzers, such as the gas chromatographs, ultraviolet and infrared analyzers. Coverage will include sample systems for the analyzers, the design and theory of operation of each analyzer type, safety procedures along with basic troubleshooting and maintenance techniques.

Prerequisite(s): INTC 1348 and INTC 1375. Instrumentation Associate of Applied Science degree. Department Chair Approval. Reading level 7, Math level 6, Writing level 6.

Course Type: Technical

**INTC 2359 Distributed Control Systems 3 Credits (2 Lec, 2 Lab)**

This course is a study of philosophy and application of distributed control systems. Topics include hardware, firmware, software, configuration, communications and networking systems required to implement a distributed control strategy.

Prerequisite(s): INTC 1315, Reading level 6, Math level 6, Writing level 6

Course Type: Technical

**INTC 2374 Physical Properties Analyzers 3 Credits (2 Lec, 2 Lab)**

This course covers the theory of operation, calibration, sample analysis, maintenance and repair of pH, ORP, conductivity, oxygen and moisture analyzers and relevant safety concepts associated with each.

Prerequisite(s): INTC 1348 and INTC 1375, Instrumentation Associates of Applied Science degree, Department Chair Approval, Reading level 6, Math level 6, Writing level 6.

Course Type: Technical

**INTC 2388 Internship Instrumentation Technology/Technician 3 Credits (0 Lec, 18 Lab)**

This is a work-based learning experience that enables the student to apply specialized occupational theory, skills and concepts. A learning plan is developed by the College and the employer.

Prerequisite(s): department chair approval. Reading level 6, Math level 6, Writing level 6.

Course Type: Technical