

# INSTRUMENTATION AND CONTROL TECHNOLOGY (ICTL)

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## **ICTL 205. Mechanical Practices**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Typically Offered: FALL

This course covers the types of bolts and their ratings, properties of materials, pipe sizes and threads, types of tubing/application, hoses and their fittings, tubing bending, gaskets and O rings. Other topics include instrument installation, compression fittings, introduction to conduit bending and proper use of conduit fittings and flex conduit.

## **ICTL 205L. Mechanical Practices Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Typically Offered: FALL

The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class. This lab is only available on campus.

## **ICTL 215. Instrumentation Drawings and Documents**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Typically Offered: FALL

Topics covered in this course include plant terminology, piping and industrial diagrams (P&ID), electrical and wiring diagrams, graphs, charts, documentation of settings and records keeping, calibration practices and standards, flow, pressure, position, level, temperature and analytical measurements. The use and care of test equipment is also covered.

## **ICTL 215L. Instrument Drawings and Documents Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Corequisite: Concurrent registration in, or previous successful completion of ICTL 215 or equivalent or departmental approval.

Typically Offered: FALL

The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class. This lab is only available on campus.

## **ICTL 225. Input and Output Devices**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Typically Offered: FALL

In this course students will study measurement sensors such as proximity sensors and switches, motion detectors, analog and smart transmitters, and temperature devices. Other topics include valves and their types, valve positioners, current to pneumatic (I/P) converters, electric drives and motor starters, dampers and linkages.

## **ICTL 225L. Input and Output Devices Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Corequisite: Concurrent registration in, or previous successful completion of ICTL 225 or equivalent or departmental approval.

Typically Offered: FALL

The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class. This lab is only available on campus.

**ICTL 235. Motors and Controllers**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Typically Offered: SPRING

Topics of study include, types of AC and DC motors, stepper motors, motor theory, types of motor controls, three phase power, Y and delta configurations, variable speed drives (variable frequency and variable DC), motor and other electrical equipment protection (breakers and overloads).

**ICTL 235L. Motors and Controllers Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Corequisite: Concurrent registration in, or previous successful completion of ICTL 235 or equivalent or departmental approval.

Typically Offered: SPRING

The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class. This lab is only available on campus.

**ICTL 245. Controls**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Typically Offered: SPRING

The student will gain a basic understanding of major components of the following types of controllers: programmable logic controllers (PLC), personal computers (PC), distributive control systems (DCS). Programming ladder logic, relay logic, function block control logic, relay logic, digital communications, networking, common and typical controller I/O types will be studied.

**ICTL 245L. Controls Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control Program or Electrician Technician Program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or admitted into Energy Services and Renewables Technician or Industrial Automation and Robotics Program or departmental approval.

Corequisite: Concurrent registration in, or previous successful completion of ICTL 245 or equivalent or departmental approval.

Typically Offered: SPRING

The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class. This lab is only available on campus.

**ICTL 255. Automation Overview**

Credits: 4

Prerequisite: Admitted into Instrumentation and Control program or Electrician Technician program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Typically Offered: SPRING

Students will learn to demonstrate a process control loop by building, commissioning, troubleshooting and operating a simulated control loop using interlocking logic and control processor algorithms including proportions, integral and derivative (PID) and loop tuning. Students will participate in tours of different facilities such as power plants, refineries, manufacturing facilities, coal gasification plant and food processing plants.

**ICTL 255L. Automation Overview Lab**

Credits: 1

Prerequisite: Admitted into Instrumentation and Control program or Electrician Technician program and successful completion of first-year Electronics, Electronics/Telecommunications, Instrumentation and Control Technology or Electrician Technology courses or departmental approval.

Corequisite: Concurrent registration in, or previous successful completion of ICTL 255 or equivalent or departmental approval.

Typically Offered: SPRING

The lab portion of the course is a lab/lecture, which provides hands on verification of the theory presented in class. This lab is only available on campus.