

INSTRUMENTATION & CONTROL TECHNOLOGY

TECHNICAL LIMITED ENROLLMENT

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Instrumentation and Control technicians are in vital demand in a world experiencing a high technology revolution. These industries will continue to need more and more skilled workers.

According to the U.S. Department of Labor, Bureau of Labor Statistics, these are among the fastest growing occupations requiring a college education, but less than a baccalaureate degree. This is good news for graduates of this program, because they should experience excellent job opportunities and job security for years to come.

Virtually every process, energy generation and manufacturing industry has an instrumentation and control aspect, with systems designed to meet each industry's particular needs.

Students attain entry-level skills required to enter the diversified instrumentation and control industry. Most graduates gain employment in the process, energy generation, chemical, pharmaceutical and manufacturing industry. The department maintains contact in the instrumentation and control industries and assists with placement.

This program prepares students with a good basic instrumentation and control background. The program is intense and directly applicable to the job market. This program includes both classroom instruction and work in a well-equipped modern laboratory.

Graduates earn a program diploma or an Associate in Applied Science degree, depending on the option selected.

See page 51-52 for program diploma and degree requirements.

Enrollment: A limited number of students will be enrolled in late August. Refer to the Admission section of this catalog beginning on page 10 for application procedures and requirements. Also refer to the limited enrollment program information on page 13.

Required placement scores:

ACT Math – 16 or higher

ACT Reading - 18 or higher

COMPASS Math - (algebra) 41 or higher

COMPASS Reading - 80 or higher

Background in these areas helpful:

- High school algebra
- Basic computer literacy
- Physics
- Good reading skills

INSTRUMENTATION AND CONTROL TECHNOLOGY DIPLOMA PROGRAM

FRESHMAN YEAR FALL SEMESTER

CREDITS

Direct Current Analysis (ELEC 100).....	4
Direct Current Analysis Lab (ELEC 100L)	1
Solid State Devices I (ELEC 118)	4
Solid State Devices I Lab (ELEC 118L).....	1
Digital Electronics I (ELEC 114).....	3
Digital Electronics I Lab (ELEC 114L).....	1
Math 102 or higher.....	3
Total credits.....	17

SPRING SEMESTER

CREDITS

Active Devices (ELEC 130)	4
Active Devices Lab (ELEC 130L)	1
AC Analysis (ELEC 120)	4
AC Analysis Lab (ELEC 120L)	1
Digital Electronics II (ELEC 115)	3
Digital Electronics II Lab (ELEC 115L)	1
Total credits	15

SOPHOMORE YEAR FALL SEMESTER

CREDITS

Mechanical Practices (ICTL 205).....	4
Mechanical Practices Lab (ICTL 205L)	1
Instrument Drawings and Documentation (ICTL 215).....	4

Instrument Drawings and Documentation Lab (ICTL 215L)	1
Input and Output Devices (ICTL 225)	4
Input and Output Devices Lab (ICTL 225L)	1
Communications Elective	3
Total credits	18

SPRING SEMESTER

CREDITS

Motors and Controllers (ICTL 235)	4
Motors and Controllers Lab (ICTL 235L)	1
Controls (ICTL 245)	4
Controls Lab (ICTL 245L)	1
Automation Overview (ICTL 255)	4
Automation Overview Lab (ICTL 255L)	1
Humanities/Social Science Elective	3
Total credits	17

See page 37 for general education requirements for a diploma program.

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FRESHMAN YEAR FALL SEMESTER

CREDITS

Direct Current Analysis (ELEC 100)	4
Direct Current Analysis Lab (ELEC 100L)	1
Solid State Devices I (ELEC 118)	4
Solid State Devices I Lab (ELEC 118L)	1
Digital Electronics I (ELEC 114)	3
Digital Electronics I Lab (ELEC 114L)	1
Math 102 or higher	3
Total credits	17

SPRING SEMESTER

CREDITS

Active Devices (ELEC 130)	4
Active Devices Lab (ELEC 130L)	1
AC Analysis (ELEC 120)	4
AC Analysis Lab (ELEC 120L)	1
Digital Electronics II (ELEC 115)	3
Digital Electronics II Lab (ELEC 115L)	1
Communications Elective	3
Total credits	17

SOPHOMORE YEAR FALL SEMESTER

CREDITS

Mechanical Practices (ICTL 205)	4
Mechanical Practices Lab (ICTL 205L)	1
Measurement and Documentation (ICTL 215)	4
Measurement and Documentation Lab (ICTL 215L)	1
Input and Output Devices (ICTL 225)	4
Input and Output Devices Lab (ICTL 225L)	1
Communications Elective	3
Total credits	18

SPRING SEMESTER

CREDITS

Motors and Controllers (ICTL 235)	4
Motors and Controllers Lab (ICTL 235L)	1
Controls (ICTL 245)	4
Controls Lab (ICTL 245L)	1
Automation Overview (ICTL 255)	4
Automation Overview Lab (ICTL 255L)	1
Humanities/Social Science Elective	3
Business/Math/Science/Technology Elective	3
Total credits	20

See page 51 for general education requirements for Associate in Applied Science degree.

INSTRUMENTATION AND CONTROL TECHNOLOGY (ICTL)

ICTL 205	Mechanical Practices	Fall	4 credits
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program or instructor's approval. 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	Fall	1 credit
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program. Co-requisite: ICTL 205 or equivalent and instructors approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ICTL 215	Instrument Drawings and Documentation	Fall	4 credits
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program or instructor's approval. Topics covers in this course include plant terminology, piping and industrial diagrams (P&ID), electrical and wiring diagrams, graphs, charts, documentation of settings and record 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 Documentation Lab	Fall	1 credit
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program. Co-requisite: ICTL 215 or equivalent and instructor's approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ICTL 225	Input and Output Devices	Fall	4 credits
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program or instructor's approval. 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	Fall	1 credit
Prerequisite: Completion of first year Electronics/Telecommunications Technology Program. Co-requisite: ICTL 225 or equivalent and instructors approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ICTL 235	Motors and Controllers	Spring	4 credits
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. Topics of study include types of AC and DC motors, stepper motors, motor theory, and 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	Spring	1 credit
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. Co-requisite: ICTL 235 or equivalent and instructors approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ICTL 245	Controls	Spring	4 credits
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. The student will gain a basic understanding of major components of the following types of controllers: programmable logic controllers (PLC), computerized numerical controllers (CNC), personal computers (PC), distributive control system (DCS). Programming ladder logic, relay logic, SAMA control logic, function block control logic, relay logic, digital communications, networking, common and typical controller I/O types will be studied.			
ICTL 245L	Controls Lab	Spring	1 credit
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. Co-requisite: ICTL 245 or equivalent and instructors approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ICTL 255	Automation Overview	Spring	4 credits
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. 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 proportion, 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	Spring	4 credits
Prerequisite: Completion of the third semester of the I&C program or instructor's approval. Co-requisite: ICTL 255 or equivalent and instructors approval. The lab portion of the course is a lab/lecture, which provides hands-on verification of the theory presented in class.			
ELEC 197-297	Cooperative Education/Internship		1-3 credits
Repeatable up to six semester hours. Students get on-the job experience under qualified supervision in electronics/telecommunications technology occupations. Work hours are arranged by the employer, adviser, and student. Student progress is checked by oral and written reports from the employer. Student adviser conferences are held to discuss progress and/or problems. All co-op experiences are graded on a satisfactory/unsatisfactory basis. Consent of department chairperson.			