Definition

The Electronics Technology curriculum is designed to prepare the student for employment as an electronic technician.

Staff

To access faculty and staff, dial (661) 722-6300, then the 4-digit extension.

Program Advisement:
Margaret Drake, Dean ext. 6327

Administrative Assistant:
Maureen Rethwisch ext. 6327

Faculty:
Rick Motawakel ext. 6097

Adjunct Faculty:
To access adjunct faculty voice mail, dial (661) 722-6300, then the 4-digit number.

	V.M.
Jose Alvarado	2160
John Berger	2001
Steven Brown	2238
Richard Chapman	2438
Jack Trapp	2214
Elmore Wigfall	

Program Description

This program will help students gain the skills and knowledge necessary to maintain, troubleshoot and repair a variety of electronic systems. These systems include aviation/avionics, test instrumentation, communications systems, navigational systems, and computer related electronics.

Successful students will gain experience in basic electronics, digital and analog systems, and microprocessor controlled electronics. They will also have the skills necessary to read and interpret electronic schematics and properly use electronic test equipment to evaluate the operation of a variety of systems.

Students must receive a minimum grade of "C" or better in all required core courses and the specific courses listed as program electives in order to qualify for the degree or certificate.

Distinctive Features

Students are provided with "hands-on" lab experience. Opportunities are provided to work on projects and experiments and repair of electronic/telecommunications equipment.

Career Options

Electronics Technicians:
- Aircraft/Avionics
- Computer
- Microprocessor
- Telecommunications (service and repair)

(Some of these careers may require education beyond the two-year college level.)

Certificate Program

The following courses (30 units) are required for the certificate. Students who successfully complete the certificate requirements are qualified for entry level positions as electronics technicians, test technicians, or field service technicians.

Required Courses:	**units**
ELTE 110, Electronics Mathematics	4
ELTE 125, Direct Current and Alternating Current Principles	5
ELTE 130, Digital Circuit Analysis	4
ELTE 135, Analog Circuit Analysis	4
ELTE 180, Microprocessor Systems **or** ELTE 140, Microprocessor Sys. I **and** ELTE 220, Microprocessor Sys. II	6
ELTE 235, Elect. Communications I	4
Program Elective	3
Total	**30**

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

Program Electives:	**units**
ELTE 105, Intro. to Robotics	3
ELTE 199, Occupational Work Experience	1-8
ELTE 252, Intro. to Avionics	3
ELTE 254, Radio Telephone License	3

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

Associate Degree

The requirements for an associate degree in Electronics Technology may be satisfied by completing 27 units of required courses, selecting an additional 3 units from the restricted list of program electives, 21 units of general education requirements, and sufficient elective credits to total 60 units. (See Graduation/Associate Degree Requirements.)

Students who complete the associate degree have enhanced employability in the field of electronics technology. They are well prepared for promotional opportunities such as lead technician or supervisory positions. The associate degree will also provide students with a broad range of knowledge with which to evaluate and appreciate the physical environment, the culture, and the society in which they live and with the ability to think and communicate clearly and effectively.

Except in cases of a prerequisite requirement, it is not required to take courses in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
ELTE 110, Electronics Mathematics	4
ELTE 125, Direct Current and Alternating Current Principles	5
ELTE 130, Digital Circuit Analysis	4
Course from GE requirement Area D1	3
Total	**16**

Second Semester	**units**
ELTE 135, Analog Circuit Analysis	4
ELTE 180, Microprocessor Systems	6
Course from GE requirement Area D2	3
Electives	2
Total	**15**

Third Semester	**units**
ELTE 235, Elect. Communications I	4
Course from GE requirement Area A	3
Course from GE requirement Area E	3
Program Elective	3
Electives	3
Total	**16**

Fourth Semester	**units**
Course from GE requirement Area B	3
Course from GE requirement Area C	3
Course from GE requirement Area F	3
Electives	4
Total	**13**

Degree Total 60

Program Electives:
Please refer to the Program Electives listed under the certificate program.

NOTE: Semester order for classes and time to complete may vary for night students.

Transfer

Some institutions offer a bachelor's degree in Electronics Technology and Industrial Technology. Check appropriate catalog(s) and consult a counselor.

Prerequisite Completion

If a course is listed as a prerequisite for another course, that prerequisite course must be completed with a satisfactory grade in order to enroll in the next course. According to Title 5, Section 55200(d), a satisfactory grade is a grade of "A," "B," "C" or "P". Classes in which the Pass/No Pass option is available are indicated with an asterisk **(*)** before the course title. See "Pass/No Pass Option" in the catalog for full explanation.

Electronics Technology Courses

ELTE 101 *SURVEY OF ELECTRONICS

4 units
6 hours weekly
Advisory: *Eligibility for ENGL 097, READ 099 and MATH 070.*
A course giving an overview of the physics of direct and alternating current circuits, semiconductors, integrated circuits (IC's), magnetism, electromagnetism, and Ohms law. Application of these physical laws will be studied as they pertain to electrical power generation and distribution, alternative energy sources, electronic communication, computer technology and robotic controls. Throughout the course, the scientific method, scientific history, political and socio-economic aspects of electronics technology will be examined. The laboratory experiments facilitate hands-on use of electronic test equipment to allow the comprehension of the electrical principles to be displayed, providing the student the opportunity to witness the laws of physics, chemistry and mathematics as they apply to the electrical/electronic principles. (CSU, AVC)

ELTE 105 *INTRODUCTION TO ROBOTICS

3 units
3 hours weekly
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
Intended for students who are interested in robotics and other applications for electronically controlled mechanical systems. Uses and applications for robotics, mechanical platforms, power sources, sensors, and basic controls will be covered. Students will construct and operate various small-scale robots. (AVC)

ELTE 110 *ELECTRONICS MATHEMATICS

4 units
4 hours weekly
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
Scientific notation, manipulation of algebraic expressions, basic trigonometry, logarithms, Boolean algebra, and use of electronic calculators. Emphasis is on using mathematics as a tool for understanding the principles of electronics. (AVC)

ELTE 125 *DIRECT CURRENT AND ALTERNATING CURRENT PRINCIPLES

5 units
6 hours weekly
Prerequisite: *Completion of or concurrent enrollment in ELTE 110.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
Basic concepts of direct current including voltage, current, power, and resistance Ohm's Law and Kirchoff's Laws are used to analyze series, parallel, and series-parallel circuits. Concepts of alternating current including voltage and current phasing, power factors, resistance, reactance and impedance. Capacitive and inductive circuits are included. Laboratory experiments reinforce theory and also teach proper use of test equipment and soldering techniques. Proper use of oscilloscopes and other test equipment is emphasized. (AVC)

ELTE 130 *DIGITAL CIRCUIT ANALYSIS

4 units
6 hours weekly
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
Digital circuit concepts related to small and medium scale integrated circuits. Includes Boolean algebra, basic logic gates, flip flops and more complex combinational logic circuits such as multiplexers, decoders, counters and displays. Laboratory exercises emphasize use of IC specification books, trouble-shooting, and use of test equipment. More advanced soldering techniques are also included. (AVC)

ELTE 135 *ANALOG CIRCUIT ANALYSIS

4 units
6 hours weekly
Prerequisite: *Completion of ELTE 125.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
Covers basic analog devices and circuits related to electronic signal processing. Includes diodes, transistors, and integrated circuits. Applications include power supplies, amplifier circuits, and basic operational amplifier circuits. Use of test equipment and troubleshooting is emphasized. (AVC)

ELTE 140 *MICROPROCESSOR SYSTEMS I

3 units
4 hours weekly
Prerequisite: *Completion of or concurrent enrollment in ELTE 130.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
The internal register set and basic microprocessor instructions are included in this course. Students write small programs to exercise registers

and learn the concepts of the hardware/software interface. Basic input and output techniques introduce students to microprocessor controlled systems. **Students who have taken ELTE 180 have fulfilled the content of ELTE 140 and ELTE 220.** (AVC)

ELTE 180 *MICROPROCESSOR SYSTEMS

6 units
8 hours weekly
Prerequisite: *Completion of ELTE 130.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
The internal register set and basic microprocessor instructions are included in this course. Students write small programs to exercise registers and learn the concepts of the hardware/softeware interface. Basic input and output techniques introduce students to microprocessor controlled systems. Covers topics related to interfacing microprocessors with other devices required for microprocessor controlled systems. Includes; bus structures, addressing, memory, input, output, device control techniques, and the relationshipos between hardware and software. Emphasis in the lab is on troubleshooting hardware/software systems. **Students who have taken ELTE 140 *and* ELTE 220 have fulfilled the content of this course.** (AVC)

ELTE 199 *OCCUPATIONAL WORK EXPERIENCE

1–8 units
hours vary
Prerequisite: *To participate in work experience, students must have a job or internship which is either paid or voluntary and have the approval of the supervisor and instructor supervising work experience in the specific subject area. PRIOR TO ENROLLING, students must attend a scheduled orientation or meet individually with the supervising instructor for an individual orientation.*
Occupational Work Experience Education is supervised employment designed to provide students a realistic learning experience through work. The ultimate goal is to teach students those skills and attitudes that will equip them to function and adapt as an employee in a variety of situations and jobs. Occupational Work Experience Education is supervised employment extending classroom-based occupational learning at an on-the-job learning station related to the students' educational major or occupational goal. Credit may be accrued at the rate of one to eight units per semester. For the satisfactory completion of all types of Cooperative Work Experience Education (WE 197 and WE 199), students may earn up to a total of sixteen semester credit hours. (CSU, AVC) **(R3)**

ELTE 220 *MICROPROCESSOR SYSTEMS II

3 units
4 hours weekly
Prerequisite: *Completion of ELTE 140.*
Advisory: *Eligibility for ENGL 099 and READ 099.*
A continuation of ELTE 140, and covers topics related to interfacing microprocessors with other devices required for microprocessor controlled systems. Includes: bus structures, addressing, memory, input, output, device control techniques and the relationships between hardware and software. Emphasis in the lab is on troubleshooting hardware/software systems. **Students who have taken ELTE 180 have fulfilled the content of ELTE 140 and ELTE 220.** (AVC)

ELTE 235 *ELECTRONIC COMMUNICATIONS I

4 units
6 hours weekly
Prerequisite: *Completion of ELTE 135.*
Prepares the student for entry into the rapidly expanding field of communications. Includes the analyzing of electrical signals, waveforms and harmonics, combining signals, amplitude modulation, and sideband communications, and the creating, amplifying and reproducing of signals. Knowledge gained is applied to real-world problem solving and verified in the laboratory by experiments. (AVC)

ELTE 252 *INTRODUCTION TO AVIONICS

3 units
3 hours weekly
Advisory: *Completion of ELTE 130 and ELTE 135, and Eligibility for ENGL 099, READ 099, and MATH 070.*
The electronic systems used in aircraft navigation, communication and control. Emphasis on system purpose, terminology and function. Both ground and airborne systems will be covered. (AVC)

ELTE 254 *RADIO TELEPHONE LICENSE

3 units
3 hours weekly
Prerequisite: *Completion of ELTE 110 or ELTE 135.*
A course designed to give the student a knowledge and understanding of FCC rules and regulations, skills to tune and adjust communication and broadcast transmitters, receivers and antennas, and associated knowledge required to pass the FCC Radio Telephone operator's license exam. (AVC)