

# ELECTRONIC TECHNOLOGY

SCHOOL OF PHYSICAL SCIENCES AND TECHNOLOGIES

**Dean:** (vacant)

**Academic Chair:** Kiana Tabibzadeh

**Faculty:** Ray Chandos, Art Zinkin

## CURRICULUM

The faculty continually reviews the curriculum in electronic technology to ensure that it equips students with the skills necessary for coping with a rapidly expanding and changing technological field. A core curriculum seeks to identify and emphasize those principles which are basic to the understanding of current and emerging technologies. In advanced courses, students learn to apply available technology to the solution of specific problems, with an emphasis on creative design and troubleshooting. The curriculum emphasizes an intuitive rather than an abstract mathematical understanding of electronics, focusing heavily on laboratory study, while still maintaining a level of mathematical rigor appropriate to four-year programs in engineering technology.

## MAJOR

A student majoring in electronic technology may choose from a number of career paths.

The Electronics Aide Certificate of Competency program equips the student for entry into the electronics industry in areas such as testing, quality assurance, customer support, production support, equipment maintenance and technical sales.

The Electronic Technology certificate program provides a solid foundation for immediate employment or further study in the field. After obtaining a certificate in Electronic Technology, a student may seek employment as an electronic technician, testing or servicing products such as radios, televisions, computers, telephones, and medical equipment.

The Electro-optics Technology emphasis allows for introductory specialization in electro-optics. Completion of the Associate in Science degree provides even broader opportunity for personal, academic, and career growth. A student may also transfer into the California State University system and complete a bachelor's degree in engineering technology.

## DEGREE OPTIONS

### • Associate in Science Degree in Electronic Technology

*Electro-Optics Technology Emphasis*

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 56-61), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 52-54 for further information.

## CERTIFICATE OPTIONS

### • Certificate of Achievement in Electronic Technology

*Electro-Optics Technology Emphasis*

### • Certificate of Competency: Electronics Aide

Students must complete all courses in the certificate program ("Major Requirements") with a grade of "C" or better. A minimum of 12 units in the certificate program must be completed at Irvine Valley College. See page 55 for further information.

## TRANSFER PREPARATION

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a baccalaureate degree. Students who plan to transfer to a four-year college or university should (1) refer to the University Studies major (page 185) and "Transfer Planning" (page 64); (2) consult the catalog of their prospective transfer institution (see the IVC Transfer Center for assistance); and (3) schedule an appointment with an IVC counselor to develop a plan of study before beginning their program. It may be helpful to meet with the department faculty at IVC.

## MAJOR REQUIREMENTS: ELECTRONIC TECHNOLOGY

### ASSOCIATE IN SCIENCE DEGREE OR CERTIFICATE OF ACHIEVEMENT

<b>Complete the following courses:</b>		<b>Units</b>
<b>ET 102</b>	Basic Electric Circuits I	4
<b>ET 104</b>	Basic Electric Circuits II	4
<b>ET 105</b>	Electronic Devices and Circuits I	4
<b>ET 107</b>	Electronic Devices and Circuits II	4
<b>ET 109</b>	Digital Electronic Circuits	4

<b>Complete one of the following courses:</b>		
<b>ET 116</b>	Industrial Electronics	4
<b>ET 120</b>	Introduction to Microprocessors	4

<b>Complete one of the following courses:</b>		
<b>CS 30</b>	BASIC Programming	4
<b>CS 34</b>	Pascal Programming	4
<b>CS 36</b>	C Programming	4
<b>CS 40A</b>	Computer Organization and Assembly Language I	4
<b>CS 40B</b>	Computer Organization and Assembly Language II	4
<b>TOTAL UNITS:</b>		<b>28</b>

**Recommended electives:** ET 101, PHYS 20.

# MAJOR REQUIREMENTS: ELECTRONIC TECHNOLOGY

## ASSOCIATE IN SCIENCE DEGREE OR CERTIFICATE OF ACHIEVEMENT

### ELECTRO-OPTICS TECHNOLOGY EMPHASIS

#### Complete the following courses:

	Units
<b>ET 102</b> Basic Electric Circuits I	4
<b>ET 104</b> Basic Electric Circuits II	4
<b>ET 105</b> Electronic Devices and Circuits I	4
<b>ET 107</b> Electronic Devices and Circuits II	4
<b>ET 109</b> Digital Electronic Circuits	4
<b>LET 200</b> Introduction to Lasers	3
<b>LET 200L</b> Introduction to Lasers Laboratory	1
<b>LET 210</b> Fundamentals of Optics	3
<b>LET 210L</b> Fundamentals of Optics Laboratory	1

#### Complete one of the following courses:

<b>CS 30</b> BASIC Programming	4
<b>CS 34</b> Pascal Programming	4
<b>CS 36</b> C Programming	4
<b>CS 40A</b> Computer Organization and Assembly Language I	4
<b>CS 40 B</b> Computer Organization and Assembly Language II	4
<b>TOTAL UNITS:</b>	<b>32</b>

**Recommended electives:** ET 101, PHYS 20.

# CERTIFICATE OF COMPETENCY: ELECTRONICS AIDE

#### Complete the following courses:

	Units
<b>ET 102</b> Basic Electric Circuits I	4
<b>ET 104</b> Basic Electric Circuits II	4
<b>ET 105</b> Electronic Devices and Circuits I	4
<b>ET 109</b> Digital Electronic Circuits	4
<b>TOTAL UNITS:</b>	<b>16</b>

**Recommended electives:** ET 101.

## COURSES

### ET 101: Survey of Electronics

3 Units  
2.5 hours lecture, 1.5 hours lab  
This course provides an introduction to the field of electronics. The course studies basic electronic principles, components and terminology and their practical application in such areas as radio, television, computer, household and automotive electronics. NR

### ET 102: Basic Electric Circuits I

4 Units  
3 hours lecture, 3 hours lab  
This introductory course, the first course in the Electronic Technology sequence, studies the basic concepts of electricity and their practical applications. The course focuses on basic two-terminal passive devices, direct current and transient circuits, plus standard laboratory test equipment and procedures. Students analyze, test, design and troubleshoot specific devices and circuits, including batteries, resistors, capacitors and inductors connected in series, parallel, and series-parallel circuits. NR

### ET 104: Basic Electric Circuits II

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 102  
This second course in the Electronic Technology sequence covers the principles and applications of AC circuits, including reactance, impedance, resonance, residential wiring and lighting, filters, spectrum analysis, audio, telephone, and radio. Students analyze, test, design and troubleshoot the devices and circuits studied. NR

### ET 105: Electronic Devices and Circuits I

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 102  
This course studies basic solid-state devices and their application circuits. Students test devices such as diodes, LEDs, transistors and thyristors and measure their characteristics. The course covers the analysis, troubleshooting, and design of solid-state application circuits, including rectifiers, switching circuits, and amplifiers. NR

### ET 107: Electronic Devices and Circuits II

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 105  
This course continues the study of solid-state devices and their application circuits begun in Electronic Technology 105. Students test and measure the characteristics of such devices as field effect transistors (FETs), operational amplifiers (op amps), linear integrated circuits, active filters, analog switches, opto-electronics, and fiber optics. They also analyze, design, and troubleshoot application circuits, including amplifiers, power supplies, voltage regulators, and oscillators. NR

### ET 109: Digital Electronic Circuits

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 102  
Corequisite: Concurrent enrollment in or prior completion of ET 105.  
This course introduces the fundamental concepts of digital electronics, including binary numbers, truth tables, logic families, and Boolean algebra. Students test, troubleshoot, analyze, and design digital circuits including gate networks, flip-flops, astables; monostables, registers, counters, memories, digital-to-analog (D/A) and analog-to-digital (A/D) converters, phase-locked loops, tri-state logic, and data communication circuits. NR

### ET 116: Industrial Electronics

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 109  
This course deals with the application of electronics to industrial monitoring and control. It introduces the basic functional blocks used in industrial systems, including sensors, actuators, controllers, and signal processors. The course covers how to monitor and control industrial processes using a microcomputer or a programmable logic controller (PLC), and how to test, troubleshoot, analyze, and design commonly used industrial circuits and systems. Topics include digital and relay logic, time delay, motors, triacs, robotics, closed-loop control, and remote control. NR

### ET 119: Industrial Automation Using PLCs

2 Units  
1.5 hours lecture, 1.5 hours lab  
This course introduces the PLC, or programmable logic controller, a small, specialized computer used to control and monitor industrial processes. Students gain hands-on experience in both connecting the PLC to external equipment and programming it using ladder diagrams. Topics covered include relay ladder logic, latching, timing, counting, sequential control, sensors, and actuators. NR

### ET 120: Introduction to Microprocessors

4 Units  
3 hours lecture, 3 hours lab  
Prerequisite: ET 109  
This course introduces the microprocessor and microcontroller. Topics include tri-state busses, memory, input/output (I/O) ports, address decoding, assembly and machine language programming, addressing modes, logical and mathematical operations, branching, loops, subroutines, interfacing, interrupts, and troubleshooting techniques. Students design the hardware, software, and interfacing circuitry to provide a microprocessor- or microcontroller-based function, or a complete system. NR