

# ELECTRONICS TECHNOLOGY

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## ASSOCIATE DEGREE AND DIPLOMA PROGRAMS

The Electronics Fundamentals diploma program is a one-year program designed to prepare students for entry-level employment in the electronics field where the employer provides specialty training. The Electronics Fundamentals program requires 65 quarter credit hours for graduation. Program graduates receive a diploma.

The six-quarter associate degree program prepares students for careers in electronics technology professions. Learning opportunities develop academic, technical, and professional knowledge and skills required for job acquisition, retention, and advancement. Topics in the technical major include AC and DC circuits, solid state devices, linear integrated circuits, digital electronics, microprocessors, and microprocessor interfacing. A computer applications option introduces students to computer applications software, operating systems, and program design and development. An industrial control option introduces students to motors, motor control circuits, and programmable logic controllers.

The general studies component develops written and oral communication skills and provides breadth to the curriculum in the areas of humanities, behavioral sciences, and mathematics. Students who complete the General Education, Technical Major and one of the cognate-area technical electives options will receive the associate of applied science degree in Electronics Technology, which requires 103 credit hours of coursework for graduation.

## CAREER OPPORTUNITIES

Electronics technicians maintain electronic equipment in a wide variety of electronics occupations. Duties include following directions on maintenance request forms, keeping records of maintenance activities, reading and interpreting technical manuals and schematic diagrams, installing electronics equipment, and troubleshooting and repairing faulty equipment. Depending on which option is selected, gradu-

ates qualify for positions as electronics technicians, electronics mechanics, field technicians, test technicians, electronics assemblers, electronics parts and equipment sales representatives, and various technical management positions.

## PROGRAM EXPENSES

The recent reauthorization of the Higher Education Act requires all colleges and universities to notify students and prospective students of all program costs for which they will be responsible. Students will be responsible for the following expenses:

- Quarterly tuition (\$45 per credit hour)
- Quarterly student activity fees (\$16)
- Quarterly registration fee (\$26)
- Quarterly accident insurance fee (\$4)
- Quarterly instructional and technology supply fee (\$35)
- Calculator (\$80)
- Textbooks (Approximately \$1,200 for the Electronics Fundamentals program, \$2,800 for the Electronics Technology program, \$800 for the Alternative Energy Fundamentals program, and \$500 for the Basic Electronics Assemblers program.)

The expenses are based on costs in effect at the time this catalog was published. Prices are subject to change.

## ADMISSION REQUIREMENTS

Applicants must submit: the following information to the Admissions Office:

- a. Completed and signed application for admission and a \$20 nonrefundable application fee;
- b. Official high school or GED transcripts and/or official college transcripts from all colleges attended in the past (see *General Admission Requirements*); and
- c. Valid COMPASS, ASSET, SAT, or ACT test scores (see *ASSET and COMPASS Placement Tests*).

## ELECTRONICS FUNDAMENTALS CURRICULUM OUTLINE

*Diploma Program (Major Code: EF02)*

*Credits Required for Graduation: 65 quarter credit hours*

### General Core

EMP	1000	Interpersonal Relations and Professional Development
ENG	1010	Fundamentals of English
MAT	1013	Algebraic Concepts
MAT	1015	Geometry and Trigonometry

### Credits

**18**

3

5

5

5

<b>Technical Core</b>			<b>27</b>
ELC	104	Soldering Technology	2
ELC	108	Direct Current Circuits II	4
ELC	110	Alternating Current II	4
IFC	100	Industrial Safety Procedures	2
IFC	101	Direct Current Circuits I	4
IFC	102	Alternating Current I	4
IFC	103	Solid State Devices I	4
SCT	100	Introduction to Microcomputers	3

<b>Technical Major</b>			<b>20</b>
ELC	115	Solid State Devices II	4
ELC	117	Linear Integrated Circuits	4
ELC	118	Digital Electronics I	4
ELC	119	Digital Electronics II	4
ELC	120	Microprocessors Fundamentals	4

### **ELECTRONICS TECHNOLOGY CURRICULUM OUTLINE**

*Associate of Applied Science Degree Program (Major Code: EFA3)*

*Credit Required for Graduation: 103 quarter credit hours*

<b>General Education</b>			<b>Credits</b>
			<b>30</b>
ENG	1101	Composition and Rhetoric	5
ENG	1102	Literature and Composition	
	OR		5
HUM	1101	Introduction to Humanities	
ENG	1105	Technical Communications	5
MAT	1111	College Algebra	5
MAT	1112	College Trigonometry	
	OR		5
MAT	1113	Pre-Calculus	
PSY	1101	Introduction to Psychology	
	OR		
ECO	2105	Principles of Macroeconomics	5
	OR		
ECO	2106	Principles of Microeconomics	

<b>Technical Major</b>			<b>58</b>
ELC	104	Soldering Technology	2
ELC	108	Direct Current Circuits II	4
ELC	110	Alternating Current II	4
ELC	115	Solid State Devices II	4
ELC	117	Linear Integrated Circuits	4
ELC	118	Digital Electronics I	4
ELC	119	Digital Electronics II	4
ELC	120	Microprocessors Fundamentals	4
ELC	123	Communications Electronics Survey	7
ELC	124	Industrial Electronics Survey	4
IFC	100	Industrial Safety Procedures	2
IFC	101	Direct Current Circuits I	4
IFC	102	Alternating Current I	4
IFC	103	Solid State Devices I	4
SCT	100	Introduction to Microcomputers	3

**Electives** **15**  
 (Students must choose one of the elective options on the next page)

### **Computer Applications Option**

CIS	106	Computer Concepts	5
CIS	122	Microcomputer Installation and Maintenance	7
CIS	1140	Networking Fundamentals	6

OR

### **Industrial Control Option**

IDS	105	DC and AC Motors	3
IDS	110	Fundamentals of Motor Controls	3
IDS	113	Magnetic Starters and Braking	3
IDS	141	Basic Industrial Programmable Logic Controllers (PLCs)	6

### **ALTERNATIVE ENERGY FUNDAMENTALS**

*Technical Certificate of Credit (Major Code: AEF1)  
Credit Required for Completion: 22 quarter credit hours*

#### **Credits**

#### **Technical Certificate**

			<b>22</b>
IFC	101	Direct Current Circuits I	4
IFC	102	Alternating Current I	4
IFC	103	Solid State Devices	4
MAT	1013	Algebraic Concepts	5
STT	1290	Alternative Energy and Green Technology Systems	5

### **BASIC ELECTRONICS ASSEMBLER CURRICULUM OUTLINE**

*Technical Certificate of Credit (Major Code: OBO1)  
Credit Required for Completion: 15 quarter credit hours*

#### **Credits**

#### **Technical Certificate**

			<b>15</b>
ELC	104	Soldering Technology	2
ELC	108	Direct Current Circuits II	4
IFC	101	Direct Current Circuits I	4
MAT	1013	Algebraic Concepts	5

## **COMPUTER INFORMATION SYSTEMS**

*Department Code: CIS*

### **CIS 106**

#### **Computer Concepts (5-0-5)**

*Banner Title: Computer Concepts*

Instructors provide students with an overview of computers and information technology. Topics include computer history and terminology, data representation, data storage concepts, fundamentals of information processing, fundamentals of hardware operation, fundamentals of communications and networking, struc-

ture programming concepts, program development methodology, system development methodology, and computer number systems.

*Prerequisite: Diploma-level program admission*

*Offered quarterly*

### **CIS 122**

#### **Microcomputer Installation and Maintenance (4-6-7)**

*Banner Title: Microcomputer Install/Maint*

This course introduces the fundamentals of installing and maintaining microcomputers. Topics include identifying

components and their functions, safety, installation procedures, troubleshooting techniques, and preventive maintenance.

*Prerequisite: CIS 106 with a grade of C or better*

*Offered Winter and Summer terms*

### **CIS 1140**

#### **Networking Fundamentals (4-4-6)**

*Banner Title: Networking Fundamentals*

This course introduces networking technologies and covers a wide range of material about networking, from careers in networking to local area networks, wide area networks, protocols, topologies, transmission media, and security. This course

also focuses on operating network management systems and implementing the installation of networks. This course also reviews cabling, connection schemes, the fundamentals of LAN and WAN technologies, TCP/IP configuration and troubleshooting, remote connectivity, and network maintenance and troubleshooting.

*Prerequisite: CIS 106 with a grade of C or better*

*Offered quarterly*

## ECONOMICS

*Department Code: ECO*

### **ECO 2105** **Principles of** **Macroeconomics** (5-0-5)

*Banner Title: Macroeconomics*

This course provides a description and analysis of macroeconomic operations in contemporary society. Students develop an understanding of macroeconomic concepts, theories, and policies. Topics include basic economic principles; macroeconomic principles, theories, and policies; money and banking; and the United States economy in perspective.

*Prerequisites: ENG 099 with a grade of C\* or better or placement by diagnostic testing, MAT 097 with a grade of C\* or better and MAT 099 with a grade of C\* or better or placement by diagnostic testing*

*Offered quarterly*

### **ECO 2106** **Principles of** **Microeconomics** (5-0-5)

*Banner Title: Microeconomics*

This course provides a description and analysis of microeconomic operations in contemporary society. Students develop an understanding of microeconomic concepts and theories as they apply to daily life. Topics include basic economic principles; theories of the corporate firm; the market system; market structures, pricing, and government regulations; resource markets; and international trade.

*Prerequisites: ENG 099 with a grade of C\* or better or placement by diagnostic testing, MAT 097 with a grade of C\* or better and MAT 099 with a grade of C\* or better or placement by diagnostic testing*

*Offered quarterly*

## ELECTRONICS TECHNOLOGY

*Department Code: ELC*

### **ELC 104** **Soldering Technology** (1-2-2)

*Banner Title: Soldering Technology*

Students develop the ability to solder

and desolder connectors, components, and printed circuit boards using industry standards. Topics include safety practices, soldering, desoldering, antistatic grounding, and surface mount techniques.

*Prerequisite: Provisional admission*

*Offered Winter term*

### **ELC 108** **Direct Current Circuits II** (3-2-4)

*Banner Title: Direct Current Circuits II*

Students continue to develop their understanding of direct current concepts and applications. Topics include complex series/parallel circuits and direct current theorems.

*Prerequisites/Corequisites: IFC 101,*

*MAT 1013 or MAT 1111*

*Offered Fall and Spring terms*

### **ELC 110** **Alternating Current II** (3-2-4)

*Banner Title: Alternating Current II*

This course continues the development of AC concepts with emphasis on constructing, verifying, and troubleshooting reactive circuits using RLC theory and oscilloscopes. Topics include reactive components, simple RLC circuits, AC circuit resonance, passive filters, and nonsinusoidal wave forms.

*Prerequisite/Corequisite: IFC 102*

*Offered Winter and Summer terms*

### **ELC 115** **Solid State Devices II** (3-2-4)

*Banner Title: Solid State Devices II*

This course continues the exploration of the physical characteristics and applications of solid state devices. Topics include bipolar junction theory, bipolar junction application, and field effect transistors.

*Prerequisite/Corequisite: IFC 103*

*Offered Fall and Spring terms*

### **ELC 117** **Linear Integrated Circuits** (3-2-4)

*Banner Title: Linear Integrated Circuits*

This course provides instruction on the characteristics and applications of linear integrated circuits. Topics include operational amplifiers, timers, and three-terminal voltage regulators.

*Prerequisite/Corequisite: ELC 115*

*Offered Fall and Spring terms*

### **ELC 118** **Digital Electronics I** (3-2-4)

*Banner Title: Digital Electronics I*

Instructors introduce the basic building blocks of digital circuits. Topics include binary arithmetic, logic gates and truth tables, Boolean algebra and minimization techniques, logic families, and digital test equipment.

*Prerequisite/Corequisite: IFC 103*

*Offered Summer and Winter terms*

### **ELC 119** **Digital Electronics II** (1-9-4)

*Banner Title: Digital Electronics II*

Students use the concepts developed in ELC 118 as a foundation to study more advanced devices and circuits. Topics include flip-flops, counters, multiplexers and demultiplexers, encoding and decoding, display drivers, and analog to digital and digital to analog conversions.

*Prerequisite/Corequisite: ELC 118*

*Offered Summer and Winter terms*

### **ELC 120** **Microprocessors** **Fundamentals** (3-2-4)

*Banner Title: Microprocessors*

*Fundamentals*

This course provides students with a basic understanding of microprocessor and microcontroller operation, programming, interfacing, interrupts, and troubleshooting.

*Prerequisite/Corequisite: ELC 119*

*Offered Fall and Spring terms*

### **ELC 123** **Communications Electronics** **Survey** (5-5-7)

*Banner Title: Communications Elect*

*Survey*

This course introduces the fundamental concepts and devices used in electronics communications. Topics include transmission, modulation and detection, receivers, transmitters, propagation, antennas, and deterioration.

*Prerequisite/Corequisite: ELC 115*

*Offered Winter and Spring terms*

### **ELC 124** **Industrial Electronics** **Survey** (3-2-4)

*Banner Title: Industrial Electronics*

*Survey*

Instructors introduce the fundamental concepts and technologies utilized in industrial electronics applications. Topics include process controls, sensors, motor controls, programmed controls, mechanical devices, fluid power, and robotics.

*Prerequisite/Corequisite: ELC 120*

*Offered Winter and Spring terms*

## EMPLOYABILITY SKILLS

*Department Code: EMP*

### **EMP 1000** **Interpersonal Relations and** **Professional Development** (3-0-3)

*Banner Title: Interpersonal Relations*

Students study human relations and professional development in today's changing world in order to prepare themselves for

living and working in a complex society. Topics include human relations skills, job acquisition skills and communications, job retention skills, job advancement skills, and professional image skills.

*Prerequisite: Provisional admission*

*Offered quarterly*

## ENGLISH

*Department Code: ENG*

### ENG 1010

#### **Fundamentals of English I (5-0-5)**

*Banner Title: Fundamentals of English I*

This course emphasizes the development and improvement of written and oral communication abilities. Topics include analysis of writing techniques, applied grammar and writing skills, editing and proofreading skills, research skills, and oral presentation skills.

*Prerequisites: ENG 097 with a grade of C\* or better and RDG 097 with a grade of C\* or better or placement by diagnostic testing*

*Offered quarterly*

### ENG 1101

#### **Composition and Rhetoric (5-0-5)**

*Banner Title: Composition and Rhetoric*

Students practice various modes of writing ranging from exposition to argumentation and persuasion. The course also explores the analysis of literature and articles about issues in the humanities and in society. The course includes a review of standard grammatical and stylistic usage in proofreading and editing. An introduction to library resources lays the foundation for research. Topics covered in the course include writing analysis and practice, revision, and research. Students write a research paper using library resources and using a formatting and documentation style appropriate to the purpose and audience.

*Prerequisites: ENG 099 with a grade of C\* or better and RDG 098 with a grade of C\* or better or placement by diagnostic testing*

*Offered quarterly*

### ENG 1102

#### **Literature and Composition (5-0-5)**

*Banner Title: Literature and*

*Composition*

This course emphasizes the ability of students to read literature analytically and meaningfully and to communicate clearly. Students analyze the form and content of literature in historical and philosophical contexts. Topics include reading and analysis of fiction, poetry, and drama; research, and writing about literature.

*Prerequisite: ENG 1101 with a grade of C or better*

*Offered quarterly*

### ENG 1105

#### **Technical Communications (5-0-5)**

*Banner Title: Technical Communications*

This course emphasizes practical knowledge of technical communications techniques, procedures, and reporting formats used in industry and business. Topics include reference use and research, device and process description, formal technical report writing, business correspondence, and oral technical report presentation.

*Prerequisite: ENG 1101 with a grade of C or better*

*Offered quarterly*

## HUMANITIES

*Department Code: HUM*

### HUM 1101

#### **Introduction to Humanities (5-0-5)**

*Banner Title: Introduction to*

*Humanities*

This course explores the philosophic and artistic heritage of humanity expressed through a historical perspective on visual arts, music, and literature. Instructors present the humanities as a source of subjective insights for the understanding of people and society. Topics include historical and cultural developments and contributions of the humanities. Students will complete a research project as part of this course.

*Prerequisite: ENG 1101 with a grade of C or better*

*Offered Fall, Winter, and Spring terms*

## FUNDAMENTAL CORE

*Department Code: IFC*

### IFC 100

#### **Industrial Safety Procedures (2-1-2)**

*Banner Title: Industrial Safety*

*Procedures*

This course provides an in-depth study of the health and safety practices required for maintenance of industrial, commercial, and home electrically operated equipment. Topics include OSHA regulations, safety tools, equipment, procedures, and first aid and cardiopulmonary resuscitation.

*Prerequisite: Provisional admission*

*Offered quarterly*

### IFC 101

#### **Direct Current Circuits I (3-2-4)**

*Banner Title: Direct Current Circuits I*

This introductory course introduces direct current (DC) concepts and applications, including electrical principles and laws; batteries; DC test equipment; series, parallel, and simple combination circuits;

and laboratory procedures and safety. Students must pay a \$10 supply fee when registering for this course.

*Prerequisite/Corequisite: MAT 098*

*proficiency level for Electronics*

*Technology and Industrial Systems*

*Technology students; MAT 1012 for other program students*

*Offered quarterly*

### IFC 102

#### **Alternating Current I (3-2-4)**

*Banner Title: Alternating Current I*

This course introduces the theory and applications of varying sine wave voltages and current. Topics include magnetism, AC wave generation, AC test equipment, inductance, capacitance, and basic transformers.

*Prerequisites/Corequisites: MAT 1013 or MAT 1111, IFC 101*

*Offered quarterly*

### IFC 103

#### **Solid State Devices I (3-2-4)**

*Banner Title: Solid State Devices I*

This course introduces the characteristics and applications of solid state devices. Topics include semiconductor fundamentals, diode applications, basic transistor fundamentals, basic amplifiers, and semiconductor switching devices.

*Prerequisite/Corequisite: IFC 102*

*Offered quarterly*

## INDUSTRIAL SYSTEMS TECHNOLOGY

*Department Code: IDS*

### IDS 105

#### **DC and AC Motors (2-3-3)**

*Banner Title: DC and AC Motors*

This course introduces the fundamental theories and applications of single-phase and three-phase motors. Topics include motor theory and operating principles, motor terminology, motor identification, NEMA standards, AC motors, DC motors, scheduled preventive maintenance, troubleshooting, and failure analysis.

*Prerequisites/Corequisites: IFC 101, IFC 102, MAT 1013*

*Offered quarterly*

### IDS 110

#### **Fundamentals of Motor Controls (2-3-3)**

*Banner Title: Fundamentals of Motor Controls*

This course introduces the fundamental concepts, principles, and devices involved in industrial motor control. Students develop a theoretical foundation of industrial motor control devices. Topics

include principles of motor control, control devices, symbols and schematic diagrams, and Article 430 of the National Electric Code.

*Prerequisite/Corequisite: IDS 105*  
*Offered quarterly*

**IDS 113**  
**Magnetic Starters and Braking** (1-5-3)

*Banner Title: Magnetic Starters and Braking*

This course provides instruction in wiring motor control circuits and on designing and installing magnetic starters in across-the-line, reversing, jogging circuits, and motor braking. Topics include control transformers, full-voltage starters, reversing circuits, jogging circuits, and braking.  
*Prerequisite/Corequisite: IDS 110*  
*Offered quarterly*

**IDS 141**  
**Basic Industrial Programmable Logic Controllers (PLCs)** (4-6-6)

*Banner Title: Basic Industrial PLCs*

This basic course introduces operational theory, systems terminology, programmable logic controllers (PLC) installations, and programming procedures for programmable logic controls. The course emphasizes PLC programming, connections, installations, and start-up procedures. Topics include PLC hardware, software, functions, and terminology; introductory numbering systems; PLC installation and set up; PLC programming basics; relay logic instructions; timers and counters; connecting field devices to I/O cards; and PLC safety procedures.  
*Prerequisite/Corequisite: IDS 110*  
*Offered quarterly*

**MATHEMATICS**

*Department Code: MAT*

**MAT 1013**  
**Algebraic Concepts** (5-0-5)

*Banner Title: Algebraic Concepts*

Instructors introduce concepts and operations which can be applied to the study of algebra. Course content emphasizes basic mathematical concepts and both basic and intermediate algebraic concepts. Class includes lecture, applications, and homework to reinforce learning.  
*Prerequisite: MAT 098 with a grade of C\* or better or placement by diagnostic testing*  
*Offered quarterly*

**MAT 1015**  
**Geometry and Trigonometry** (5-0-5)

*Banner Title: Geometry and Trigonometry*

This course introduces basic geometric and trigonometric concepts. The course content emphasizes geometric and trigonometric concepts.  
*Prerequisite: MAT 1013 with a grade of C or better*  
*Offered Winter term*

**MAT 1111**  
**College Algebra** (5-0-5)

*Banner Title: College Algebra*

This course emphasizes techniques of problem solving using algebraic concepts. Topics include fundamental concepts of algebra, equations and inequalities, functions and graphs, systems of equations, analytic geometry, and optional topics, including sequences, series, and probability.

*Prerequisite: MAT 097 with a grade of C\* or better and/or MAT 099 with a grade of C\* or better or placement by diagnostic testing*  
*Offered Quarterly*

**MAT 1112**  
**College Trigonometry** (5-0-5)

*Banner Title: College Trigonometry*

This course emphasizes techniques of problem solving using trigonometric concepts. Topics include trigonometric functions and properties of trigonometric functions, vectors and triangles, inverse of trigonometric functions and graphing, logarithmic and exponential functions, and complex numbers.

*Prerequisite: MAT 1111 with a grade of C or better*  
*Offered Summer term*

**MAT 1113**  
**Pre-Calculus** (5-0-5)

*Banner Title: Pre-Calculus*

This course prepares students for calculus. Topics include an intensive study of polynomial, rational, exponential, logarithmic, and trigonometric functions, and their graphs. Applications include simple maximum and minimum problems and exponential growth and decay.

*Prerequisites: MAT 1111 with a grade of C or better*

*Offered Fall, Winter, and Spring terms*

**PSYCHOLOGY**

*Department Code: PSY*

**PSY 1101**  
**Introduction to Psychology** (5-0-5)

*Banner Title: Introduction to Psychology*

This course emphasizes the basics of psychology. Topics include the science of psychology; social environments; life stages; physiology and behavior; personality; emotions and motives; conflicts, stress, and anxiety; abnormal behavior; and perception, learning, and intelligence.

*Prerequisites: ENG 099 with a grade of C\* or better and RDG 098 with a grade of C\* or better or placement by diagnostic testing*  
*Offered quarterly*

**SCIENCE AND TECHNOLOGY**

*Department Code: SCT*

**SCT 100**  
**Introduction to Microcomputers** (1-4-3)

*Banner Title: Intro to Microcomputers*

This course introduces the fundamental concepts and operations necessary to use microcomputers. Course content emphasizes basic functions and familiarity with computer use. Topics include computer terminology and an introduction to the Windows environment, networking, word processing, spreadsheets, presentation graphics, and databases.

*Prerequisite: Provisional admission*  
*Offered quarterly*

**ALTERNATIVE ENERGY AND GREEN TECHNOLOGY**

*Department Code: STT*

**STT 1290**  
**Alternative Energy and Green Technology Systems** (4-2-5)

*Banner Title: Green Tech Systems*

This course introduces students to alternative energy and green technology systems. Topics include wind turbines, hydroelectrics, bio-fuels, environmental monitoring, solar power, fuel cells, inverters, electronic power monitoring devices, power control electronics, and green technologies.

*Prerequisites: IFC 101, IFC 102*  
*Corequisite: IFC 103*  
*Offered quarterly*