



***Department of Teaching & Learning***  
***Parent/Student Course Information***

***Electronic Systems I***  
***(TE 8416)***  
***Grades 9 - 12***  
***One Credit, One Year***

*Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.*

**COURSE DESCRIPTION**

The courses in engineering and technology provide opportunities for students to acquire skills and knowledge necessary for technological literacy, entry-level careers, and lifelong learning. Students learn Virginia's 22 Workplace Readiness Skills within the content area. Those who are completing a two-year sequence have the opportunity to verify their knowledge of the workplace readiness skills through an industry assessment. Electronics influences many aspects of the modern society. This course is designed to allow students the opportunity to explore principles of basic electricity and apply knowledge in STEM-related fields. Students analyze and conduct experiments, use testing equipment, and troubleshoot problems with electronic components and devices. Students engage in a project-based approach to understand theory, apply solutions and build electronic circuits and projects using DC and AC principles safely.

**CERTIFICATION**

Students successfully completing the Control Technology Program of Study will be prepared for the NOCTI Industry Credential in Electronics Technology or Small Engines.

**STUDENT ORGANIZATION**

Technology Student Association (TSA) is a co-curricular organization for all students enrolled in engineering and technology courses. Students are encouraged to be active members of their youth organization to develop leadership and teamwork skills and to receive recognition for their participation in local, regional, state and national activities.

**PREREQUISITE**

None

**OPTIONS FOR NEXT COURSE**

Electronics Systems II

**REQUIRED STUDENT TEXTBOOK**

*Introduction to Electronics*

## COMPETENCIES FOR ELECTRONICS SYSTEMS I

### **Demonstrating Workplace Readiness Skills: Personal Qualities and Abilities**

- 1 Demonstrate creativity and innovation.
- 2 Demonstrate critical thinking and problem solving.
- 3 Demonstrate initiative and self-direction.
- 4 Demonstrate integrity.
- 5 Demonstrate work ethic.

### **Demonstrating Workplace Readiness Skills: Interpersonal Skills**

- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate listening and speaking skills.
- 8 Demonstrate respect for diversity.
- 9 Demonstrate customer service skills.
- 10 Collaborate with team members.

### **Demonstrating Workplace Readiness Skills: Professional Competencies**

- 11 Demonstrate big-picture thinking.
- 12 Demonstrate career- and life-management skills.
- 13 Demonstrate continuous learning and adaptability.
- 14 Manage time and resources.
- 15 Demonstrate information-literacy skills.
- 16 Demonstrate an understanding of information security.
- 17 Maintain working knowledge of current information-technology (IT) systems.
- 18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation.
- 19 Apply mathematical skills to job-specific tasks.
- 20 Demonstrate professionalism.
- 21 Demonstrate reading and writing skills.
- 22 Demonstrate workplace safety

### **Examining All Aspects of an Industry**

- 23 Examine aspects of planning within an industry/organization.
- 24 Examine aspects of management within an industry/organization.
- 25 Examine aspects of financial responsibility within an industry/organization.
- 26 Examine technical and production skills required of workers within an industry/organization.
- 27 Examine principles of technology that underlie an industry/organization.
- 28 Examine labor issues related to an industry/organization.
- 29 Examine community issues related to an industry/organization.
- 30 Examine health, safety and environmental issues related to an industry/organization.

### **Addressing Elements of Student Life**

- 31 Identify the purposes and goals of the student organization.
- 32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
- 33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs and projects.
- 34 Identify Internet safety issues and procedures for complying with acceptable use standards.

### **Exploring Work-Based Learning**

- 35 Identify the types of work-based learning (WBL) opportunities.
- 36 Reflect on lessons learned during the WBL experience.
- 37 Explore career opportunities related to the WBL experience.
- 38 Participate in a WBL experience, when appropriate.

### **Introducing the Field of Electronics**

- 39 Demonstrate the safe and proper use of electronic lab equipment.
- 40 Describe techniques and methods for use of and care for soldering equipment.
- 41 Identify number systems used in electronics designs.

### **Introducing Properties of Electricity**

- 42 Describe methods of generating electricity.
- 43 Describe atomic structure as it relates to electricity.
- 44 Describe the law of charges.
- 45 Describe the effects of magnetism on electricity.
- 46 Describe the operation of electromagnetic devices.
- 47 Describe the differences between conductors and insulators.
- 48 Describe current, including its unit of measurement and symbol.
- 49 Describe voltage, including its unit of measurement and symbol(s).
- 50 Compare potential and electromotive forces.
- 51 Describe resistance, including its unit of measurement and symbol(s).
- 52 Describe the interrelationship among current, voltage, and resistance.
- 53 Define Ohm's law.
- 54 Compute current, voltage, resistance, and power, using Ohm's law and Watt's law.
- 55 Describe a circuit as a system.
- 56 Describe direct current in circuits.
- 57 Determine the direction of current flow in DC circuits.

### **Introducing Circuit Components**

- 58 Describe batteries as voltage sources.
- 59 Describe the role of conductors in a circuit.
- 60 Describe the role of insulators in a circuit.
- 61 Explain how common electrical and electronic devices work.
- 62 Identify control devices of electrical and electronic devices.
- 63 Describe resistors by type and value.
- 64 Describe the purpose and components of protected circuits.
- 65 Describe the operation of variable resistors.
- 66 Identify different types of transistors and terminals of transistors.

### **Exploring Circuits as Systems**

- 67 Construct simple electronic circuits from a schematic.
- 68 Describe series circuits, using modeling components.
- 69 Describe the flow of current in series circuits, using the systems model.
- 70 Construct parallel circuits, using modeling components.
- 71 Describe the flow of current in parallel circuits, using the systems model.
- 72 Construct series-parallel circuits, using modeling components.
- 73 Describe the flow of current in series-parallel circuits, using the systems model.
- 74 Compute electrical power in circuits.

### **Examining Current, Voltage, and Resistance**

- 75 Measure current in series and parallel circuits, using a multimeter.
- 76 Compare computed values of circuits to the measured value of circuits.

### **Constructing DC Analog Circuits**

- 77 Design series circuits.
- 78 Construct series circuits.
- 79 Design parallel circuits.
- 80 Construct parallel circuits.
- 81 Design series-parallel circuits.
- 82 Construct series-parallel circuits.
- 83 Construct circuits that satisfy design briefs, using solderless circuit boards/breadboards.
- 84 Design a circuit to be soldered on a circuit board.

### **Exploring AC Circuits**

- 85 Describe the process and application of troubleshooting procedures.

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For further information, please call (757) 263-1070.

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