



VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

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 21 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. Electronic devices are everywhere in modern life and business, and, as a result, opportunities abound for any who should master the knowledge and skills required to design, alter repair and construct them. This course allows students the opportunity to explore principles of electricity, apply knowledge in mathematics and science and conduct experiments with electronics. Students solve problems using simple electrical devices and circuits and build electronic projects using DC and AC devices and circuits.

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 People Skills

- 1 Demonstrate positive work ethic.
- 2 Demonstrate integrity.
- 3 Demonstrate teamwork skills.
- 4 Demonstrate self-representation skills.
- 5 Demonstrate diversity awareness.
- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate creativity and resourcefulness.

Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills

- 8 Demonstrate effective speaking and listening skills.
- 9 Demonstrate effective reading and writing skills.
- 10 Demonstrate critical-thinking and problem-solving skills.
- 11 Demonstrate healthy behaviors and safety skills.
- 12 Demonstrate an understanding of workplace organizations, systems and climates.
- 13 Demonstrate lifelong-learning skills.
- 14 Demonstrate job-acquisition and advancement skills.
- 15 Demonstrate time-, task- and resource-management skills.
- 16 Demonstrate job-specific mathematics skills.
- 17 Demonstrate customer-service skills.

Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills

- 18 Demonstrate proficiency with technologies common to a specific occupation.
- 19 Demonstrate information technology skills.
- 20 Demonstrate an understanding of Internet use and security issues.
- 21 Demonstrate telecommunications skills.

Examining All Aspects of an Industry

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

Addressing Elements of Student Life

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

Introducing the Field of Electronics

- 34 Demonstrate the safe and proper use of electronic lab machines.

- 35 Research occupational opportunities in electronics.
- 36 Identify number systems used in electronics design.

Introducing Properties of Electricity

- 37 Describe atomic structure, as it relates to electricity.
- 38 Describe the law of charges.
- 39 Describe the differences among conductors, insulators and semiconductors.
- 40 Describe current, including its unit of measure and symbol.
- 41 Describe voltage, including its unit of measure and symbol.
- 42 Compare potential and electromotive forces.
- 43 Describe resistance, including its unit of measure and symbol(s).
- 44 Describe the interrelationship of current, voltage and resistance.
- 45 Define Ohm's law.
- 46 Compute current, voltage, resistance and power, using Ohm's law and Watt's law.

Describe a circuit as a system.

- 47 Describe direct current (DC) in circuits.
- 48 Determine the direction of current flow in DC circuits.

Introducing Circuit Components

- 49 Describe batteries as voltage sources.
- 50 Describe the role of conductors in a circuit.
- 51 Describe the role of insulators in a circuit.
- 52 Identify common output devices.
- 53 Identify common control and sensing devices.
- 54 Identify resistors by type and value.
- 55 Describe the purpose and components of protected circuits.
- 56 Describe the operation of variable resistors.
- 57 Describe the operation of basic semiconductor devices.
- 58 Identify semiconductor components.
- 59 Identify integrated circuit (IC) components.

Exploring Circuits as Systems

- 60 Construct simple electronic circuits from a schematic.
- 61 Describe series circuits, using modeling components.
- 62 Describe the flow of current in series circuits, using the systems model.
- 63 Construct parallel circuits, using modeling components.
- 64 Describe the flow of current in parallel circuits, using the systems model.
- 65 Construct series-parallel circuits, using modeling components.
- 66 Describe the flow of current in series-parallel circuits, using the systems model.
- 67 Compute electrical power in circuits.
- 68 Describe open-loop and closed-loop systems in circuit context.

Measuring Current, Voltage, and Resistance

- 69 Measure current in series and parallel circuits, using a multi meter.
- 70 Measure voltage in series and parallel circuits, using a multi meter.
- 71 Measure resistance in series and parallel circuits, using a multi meter.
- 72 Measure resistance in series-parallel circuits, using a multi meter.
- 73 Compare computed values of circuits to the measured value of circuits.

Designing DC Analog Circuits

- 74 Identify schematic symbols for circuit components.
- 75 Design series circuits.
- 76 Construct series circuits.
- 77 Design parallel circuits.
- 78 Construct parallel circuits.
- 79 Design series-parallel circuits.
- 80 Construct series-parallel circuits.
- 81 Construct circuits that satisfy design briefs, using solder less circuit boards/breadboards.
- 82 Design a circuit to be soldered on a circuit board.

Exploring AC Circuits

- 83 Compare DC and AC waveforms, using an oscilloscope.
- 84 Describe methods of generating electricity.
- 85 Describe alternating current (AC) and its hazards.
- 86 Describe the effects of magnetism on electricity.
- 87 Describe the operation of electromagnetic devices.
- 88 Describe inductance.
- 89 Describe capacitance.

Analyze values in AC circuits.

- 90 Describe the operation and function of a transformer.
- 91 Construct AC circuits from schematics.
- 92 Describe the process and application of troubleshooting procedures.

Aaron C. Spence, Ed.D., Superintendent
Virginia Beach City Public Schools
2512 George Mason Drive, Virginia Beach, VA 23456-0038

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

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To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/ Executive Director of Student Support Services at (757) 263-1980,

2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email at Charles.Hurd@vbschools.com.

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