



Department of Teaching & Learning
Parent/Student Course Information

Control Technology Program
Electronic Systems II
(TE 8412)
Grades 10 - 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. This course enables students to further study advanced electronic theory and digital logic circuitry in a project-based approach. Students design, analyze and build circuits to apply theories and laws safely. The study of AC, semi-conductors and integrated circuits used in a variety of modern applications. Students investigate STEM-related careers and pathways.

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

Electronics Systems I

OPTIONS FOR NEXT COURSE

Introduction to Engineering

REQUIRED STUDENT TEXTBOOK

Introduction to Electronics

COMPETENCIES FOR ELECTRONIC SYSTEMS II

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 Electronics Industry

- 39 Demonstrate the use of electronic lab equipment.
- 40 Research occupational opportunities.

Exploring Semiconductor Devices

- 41 Describe the characteristics, operation, and applications of basic semiconductor devices.
- 42 Identify semiconductor materials and the rationale behind their use.
- 43 Identify types of semiconductor memories.
- 44 Compare Direct Current (DC) and Actual Current (AC) waveforms, using an oscilloscope.
- 45 Describe the basic characteristics of amplifiers.
- 46 Construct an amplifier circuit.
- 47 Describe the characteristics, operation, and applications of power-supply circuits.
- 48 Identify schematic symbols for circuit components.
- 49 Describe inductance.
- 50 Construct a power-supply circuit.
- 51 Describe modulation methods.
- 52 Describe integrated circuit (IC) chip transistor type and terminals.
- 53 Classify integrated circuits.
- 54 Test the amplifier circuits.
- 55 Design circuits containing integrated circuit components.

Exploring Diodes

- 56 Describe the operation of basic semiconductor devices.
- 57 Identify the main function of a diode.
- 58 Identify diode materials and components.
- 59 Describe the types of diodes and their applications.
- 60 Connect a PN junction.
- 61 Forward-bias a diode.
- 62 Reverse-bias a diode.
- 63 Compare the functions and characteristics of diodes.

Implementing Digital Microprocessors and Microcontrollers

- 64 Compare analog and digital devices.
- 65 Describe the function of major components used in implementing digital circuits.
- 66 Describe the input and output interfaces of microprocessors and microcontrollers.
- 67 Design a device to be controlled by a microcontroller.
- 68 Manipulate the microcontroller device, using object-oriented programming.

Investigating Digital Electronics and Logic Circuits

- 69 Convert between the binary and decimal number systems.
- 70 Describe Boolean logic and its role in logic circuits.
- 71 Describe the operation of basic logic circuits.
- 72 Describe logic gates and their functions.
- 73 Describe the characteristics of sequential and combinational logic circuits.
- 74 Compare combinational and sequential logic.

- 75 Describe the function of AND, OR, and inverter gates.
- 76 Design a basic logic circuit.
- 77 Simulate a simple, combinational logic circuit designed with AND, OR, and inverter gates.
- 78 Construct a functional, combinational logic circuit, using logic gates.
- 79 Describe the function of a D flip-flop.
- 80 Simulate a simple, sequential logic circuit design with D flip-flops.
- 81 Construct logic circuits to meet design-brief goals.
- 82 Analyze values in AC circuits.
- 83 Construct AC circuits from schematics.
- 84 Describe the operation and function of a transformer.

Exploring Transistors

- 85 Describe the types of transistors and their functions.
- 86 Describe transistor materials, components, and construction techniques.
- 87 Describe transistor configurations.
- 88 Reconfigure a transistor.
- 89 Describe transistor circuit characteristics.
- 90 Compare transistor ratings.
- 91 Test a transistor.

Working with Amplifiers

- 92 Describe the types and functions of amplifiers.
- 93 Describe the characteristics of amplifier circuits.
- 94 Reconfigure an amplifier's biasing.
- 95 Apply an amplifier coupling.
- 96 Describe capacitance.

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

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