

Theory and Foundation

Overall Expectations

- TFV.01** · identify the function and interaction of basic computer components and peripherals;
- TFV.02** · describe the relationship among computer hardware, networks, and operating systems;
- TFV.03** · explain internal number and character representation systems and how to make conversions among them;
- TFV.04** · explain the function of logic gates and combinations of gates;
- TFV.05** · describe a problem-solving model and the fundamental programming constructs required to implement it.

Computer Logic and Electronics

- TF1.01** – explain how binary, decimal, and hexadecimal number systems relate to computer logic;
- TF1.02** – identify standard ways of representing characters (e.g., ASCII, EBCDIC);
- TF1.03** – describe the function of decoder and timer chips and the fundamental logic gates AND, NAND, OR, NOR, XOR, and NOT;
- TF1.04** – explain how Boolean algebra relates to the fundamental logic gates;
- TF1.05** – describe how combinations of logic gates interact.

Hardware, Interfaces, and Networking Systems

- TF2.01** – explain the function and interaction of the basic components (e.g., CPU, I/O devices, memory) of a computer system;
- TF2.02** – describe the function and interaction of computer peripherals (e.g., mouse, keyboard, screen, printer);
- TF2.03** – identify differences between stand-alone and network hardware;
- TF2.04** – describe similarities and differences between network and desktop operating systems.

Programming Concepts

- TF3.01** – define constants, variables, expressions, and assignment statements, including the order in which the operations are performed;
- TF3.02** – describe how computers store and work with different types of data, including numbers, characters, and arrays;
- TF3.03** – explain how selection and repetition structures are used in computer programs;
- TF3.04** – describe how subroutines are used in computer programs;
- TF3.05** – explain parameter passing and scope.

Skills and Processes

Overall Expectations

- SPV.01** · use internal numbering, character representation systems, and logic gates;
- SPV.02** · construct systems that use computer programs to interact with hardware components;
- SPV.03** · properly install and configure key computer hardware and software components;
- SPV.04** · use network services to facilitate intranetworking among workstations.

Computer Logic and Electronics

- SP1.01** – perform base-to-base conversions;
- SP1.02** – perform simple arithmetic with whole numbers in binary;
- SP1.03** – build an interface that visually displays internal representations of numbers and characters;

- SP1.04 – generate truth tables to represent logic gates and Boolean equations;
- SP1.05 – assemble electronic circuits using a series of logic gates.

Hardware, Interfaces, and Networking Systems

- SP2.01 – build interfaces that control hardware components (e.g., LEDs, direct current motors, and stepper motors);
- SP2.02 – verify the correctness of the input and output of a system consisting of a computer, interface, and a hardware device;
- SP2.03 – properly install and configure key software and hardware components and peripherals;
- SP2.04 – properly install and configure a workstation operating system, including a network connection;
- SP2.05 – demonstrate an ability to download freeware utilities;
- SP2.06 – use utilities to compress and expand files;
- SP2.07 – properly implement standard network protocols for file transfer.

Programming Practices

- SP3.01 – use design tools to plan programming solutions (e.g., flow charts, pseudocode, structure charts);
- SP3.02 – apply fundamental programming constructs by writing, testing, and debugging programs.

Impact and Consequences

Overall Expectations

- ICV.01 · describe examples of rapid change in information technology;
- ICV.02 · describe the impact of computer technology on society;
- ICV.03 · describe issues relating to the ethical use of computers;
- ICV.04 · identify computer engineering career paths.

Specific Expectations

- IC1.01 – describe the evolution and historical impact of developments in computer hardware;
- IC1.02 – explain how computer technology affects daily life;
- IC1.03 – describe issues that arise from the growing use of networked systems (e.g., complexity, compatibility, security);
- IC1.04 – examine a number of available sources of information using a computer network and evaluate their ease of use and reliability;
- IC1.05 – describe the computer expertise required for engineering and technology careers;
- IC1.06 – identify postsecondary educational opportunities leading to careers in engineering and technology, as well as their entry requirements;
- IC1.07 – use a variety of software applications to make class presentations on ethical issues in computing;
- IC1.08 – use appropriate strategies to avoid potential health and safety problems associated with computer use, such as musculo-skeletal disorders and eye strain.