# NEW YORK STATE EDUCATION DEPARTMENT
# MIDDLE LEVEL CAREER AND TECHNICAL EDUCATION

# COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

# THE COMPUTATIONAL WORLD CONTENT MODULE

# MODULE DESCRIPTION

The Computational World introduces students to the hardware, software, and networking capabilities that are evolving to impact our ever-changing world. Networked computing systems affect how we develop and maintain relationships, how we share and find information, collaborate, and work.

In this module, students will be exposed to the history of computing and how innovations impacted the evolution of computing and society's use of computing. Students will consider the benefits of extending humankind's capabilities and unintended consequences of computing innovations. They will develop their understanding of computer hardware, software, and networked systems. Students will develop an appreciation of the roles and capabilities of our networked world, and the various ways in which digital citizens may contribute and participate in that world.

# GUIDING QUESTION

What skills, knowledge, and attitudes are necessary for students to demonstrate successful understanding of the computational world and to develop them into ethical consumers and creators of computational systems?

# MODULE CONTENT

## 1. IMPACT OF COMPUTING ON SOCIETY

**STUDENTS WILL:**

a) Describe how computing technology has changed the way people communicate
b) Identify significant innovations in computing
c) Explain the impacts that innovations in computing have had on society
d) Identify and differentiate how current computing devices have changed the workplace
e) Investigate various laws and regulations that address the intended and unintended impacts of computing technology (i.e., HIPAA, Gramm-Leach-Bliley Act, etc.)

## 2. ETHICS OF COMPUTING

**STUDENTS WILL:**

a) Identify current events involving ethics and computing
b) Describe issues related to the collection and use of public and private data
c) Assess the strengths and weaknesses of a software program in terms of accessibility

d) Redesign computational artifacts such as spreadsheets, documents, or web sites to be more accessible to different users
e) Demonstrate an understanding of empathy in seeing how a computational artifact, device, or program is experienced by different users

## 3. COMPUTER HARDWARE AND SOFTWARE

**STUDENTS WILL:**

a) Identify the key hardware components of computational devices
b) Demonstrate use of troubleshooting skills to solve common problems with computational devices
c) Identify and describe components common in user and systems software and how they are connected to the use, functionality, and accessibility of the application
d) Identify how the design of a graphical user interface can impact the ease of learning, desirability, and accessibility of a software application

## 4. NETWORK SOFTWARE AND SYSTEM DESIGN

**STUDENTS WILL:**

a) Explain why protocols are needed for successful network communication
b) Describe how protocols support the scalability and resilience of the Internet
c) Differentiate between local and remote resources
d) Visualize the systems involved in facilitating data transmission between computing devices

## 5. CAREERS INVOLVING COMPUTER SCIENCE

**STUDENTS WILL:**

a) Explain roles and functions of individuals in computer science careers
b) Investigate education, training requirements, and opportunities for career paths in fields in which computer science skills are required
c) Identify the computer science skills, knowledge, and understanding needed for success in a given career
d) Assess personal competencies for careers requiring computational thinking and evaluate personal interest and suitability for such careers

## PROBLEM SOLVING AND INNOVATION

### COMMUNICATING WITH LIMITED RESOURCES

Groups of students invent a communication system to send several messages using only six envelopes and a deck of cards. All groups in the class begin sending the same messages and analyze the successes, failures, and challenges. The various group solutions are compared with Internet protocols and systems.

## SUSTAINABILITY

### COMPARING SUSTAINABILITY

Students will research the components of digital devices, identifying some of the significant materials that are needed for production. They will analyze those resources for various characteristics such as recyclability, toxicity, use of restricted resources, and methods of creating/mining/gathering them. Students will explore some of the impacts of regulations of acquiring the raw materials.

# STANDARDS ADDRESSED

## NEW YORK STATE CAREER DEVELOPMENT AND OCCUPATIONAL STUDIES

3. Attend to personal health and financial well-being
4. Communicate clearly and effectively with reason