

COMPUTER PROGRAMMING AND INFORMATICS

INDUSTRY SECTOR | Information and Communication Technology
PATHWAY | C. Software and Systems Development

COURSE ESSENTIAL QUESTION:

We have all used applications, but how do we make them?

COURSE OVERVIEW:

This course focuses on the introduction to computer programming and informatics. Students will learn the fundamentals of programming and problem solving using C++ an industry-standard language, and will also be introduced to computer science. Students will be able to put their computer programming knowledge towards game development, business, science, and mathematics.

INFORMATION:

- A. **Pre-requisite:** [Click here to enter text.](#)
- B. **Abilities Required:** Math: Pre-Algebra or higher. Basic reading comprehension and writing skills.
- C. **Dress Requirement and Grooming:** Casual
- D. **Students must master 70% of the certificate competencies to receive a certificate.**
- E. **Fee:** None
- F. **Course Length:** 2 semesters
- G. **Textbook:** None
- H. **UC a-g Approved:** Choose Yes or No
- I. **Industry Certification:** Choose Yes or No
- J. **Sequencing to Include a Capstone:** No
- K. **Community College Articulation:** Choose Yes or No
- L. **Common Core Alignment:** Yes
- M. **Community Classroom:** Choose Yes or No
- N. **Career Technical Student Organization:** Choose Yes or No
- O. **Work- Based Learning:** Choose Yes or No

THEME: UNIT 1. Programming with Scratch

ENGAGING TITLE:

ESSENTIAL QUESTION: I can play it, but how do I make it?

INSTRUCTIONAL HOURS: *Enter total course hours spent on section*

Common Core Unit Objective

Introduce overall programming structure through Scratch game engine. Discuss the fundamentals of programming and how they're applied in the real world. Students will discuss logical thinking and look at different methods to solve a problem, then find what methods are the most efficient.

Key Assignments

- Video Game Prototype – Students will create a prototype of an existing 2D game concept using Scratch

Anchor Standards

- 4.0 **Technology:** Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the Information and Communication Technologies sector workplace environment.
- 4.1 Use electronic reference materials to gather information and produce products and services.
- 5.0 **Problem Solving and Critical Thinking:** Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Information and Communication Technologies sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.
- 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
- 5.5 Use a logical and structured approach to isolate and identify the source of problems and to resolve problems.
- 5.7 Work out problems iteratively and recursively.
- 5.8 Create and use algorithms and solve problems.

Pathway Standards

- D2.0 Demonstrate an understanding of game and simulation analysis, design, standard documentation, and development tools.
- D2.5 Know how to use tools and software commonly used in game/simulation development and become familiar with popular game tools and different gaming engines.



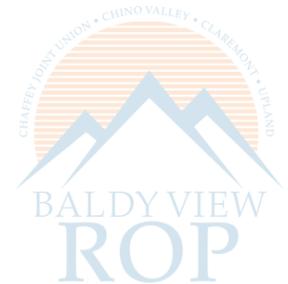
Common Core Standards

- WS 11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

RESOURCES: UNIT 1.

Resources

1. Scratch.mit.edu



THEME: UNIT 2. Introducing C++ Programming

ENGAGING TITLE:

ESSENTIAL QUESTION: You didn't think it was that easy, did you?

INSTRUCTIONAL HOURS: *Enter total course hours spent on section*

Common Core Unit Objective

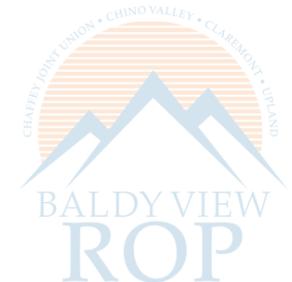
Introduction to C++ Programming. Students will touch common programming methods through the C++ language through a console application such as efficient programming styles, Data types, Input/Output, Decision & Iteration structures, Functions, Arrays, Structured Data, and Input/Output to text file.

Key Assignments

- Skillfulness using Data types, Input/Output, Decision & Iteration structures, Functions, Arrays, Structured Data, and Input/Output to text file, all correlated with game scenarios.

Anchor Standards

- 4.0 **Technology:** Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the Information and Communication Technologies sector workplace environment.
- 4.1 Use electronic reference materials to gather information and produce products and services.
- 5.0 **Problem Solving and Critical Thinking:** Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Information and Communication Technologies sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.
- 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
- 5.5 Use a logical and structured approach to isolate and identify the source of problems and to resolve problems.
- 5.6 Know the available resources for identifying and resolving problems.
- 5.7 Work out problems iteratively and recursively.
- 5.8 Create and use algorithms and solve problems.
- 5.9 Deconstruct large problems into components to solve.



Pathway Standards

- C1.0 Identify and apply the systems development process
 - C1.1 Identify the phases of the systems development life cycle, including analysis, design, programming, testing, implementation, maintenance, and improvement.
 - C1.6 Diagram processes using flowcharts and the Unified Modeling Language
- C2.0 Define and analyze systems and software requirements
 - C2.3 Develop strategies that target the specific needs and desires of the customer
- C3.0 Create effective interfaces between humans and technology.
 - C3.1 Describe and apply the basic process of input, processing, and output.
- C4.0 Develop software using programming languages.
 - C4.4 Identify and apply data types and encoding
 - C4.6 Use proper programming language syntax.
 - C4.7 Use various data structures, **arrays**, objects, files, and databases
- C5.0 Test, debug, and improve software development work
 - C5.3 Use strategies to optimize code for improved performance.
 - C5.4 Test software and projects.

Common Core Standards

- WS 11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

RESOURCES:

Resources

1. Microsoft Visual Studio 2017 with C++
2. *Starting out With C++ - 7th Edition* by Tony Gaddis
3. Norco College Computer Information Systems – Introduction to C++ Course Material

