# COURSE: C++ Programming

**GRADE(S):** 10 11 12

## UNIT 1: Input/output features of C++

### NATIONAL STANDARDS:
**ALL STUDENTS...**
- Demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:
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- Prepare for further education and lifelong learning

### STATE STANDARDS:

**2.5.11A.** Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.

**2.5.11B.** Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.

**2.5.11C.** Present mathematical procedures and results clearly, systematically, succinctly and correctly.

**2.5.11D.** Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

### UNIT OBJECTIVES:

1. **1.1** Introduction to C++ Programming and compare/contrast to Java Programming

2. **1.2** Write and run C++ programs using output commands to the console

3. **1.3** Use variables for input and storage

4. **1.4** Write and run C++ program accepting input from the user

5. **1.5** Use the C++ math operators +, -, *, /, %

### ACTIVITIES:

1. **1.1** Use `cout, endl, and ‘\n’` to run programs generating output
   - Write, compile, and run programs to output mailing address and original pictures.

2. **1.2 1.3 1.4**
   - Use variables (char, float, int) to accept input from user, manipulate the data with math operators, and output data.
   - Write and run programs...
   - Accepting measurements of geometric figures and outputting area and perimeter.

### ASSESSMENTS:

- Exact Change Dispenser Program

### REMEDIATION:

- Work with partners
- Examine well written programs of other students

### ENRICHMENT:

- Discover and explore the use of built-in math functions such as exponents, square root, etc.
- Cash Register Program
Accepting input, using simple formulas, and outputting answers.

Accepting dividend and divisor and outputting quotient and remainder

RESOURCES:

C++ Programming Deitel
Introduction to Computer Science using C++ - Knowlton
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### UNIT OBJECTIVES:

| 2.1 | Understand and evaluate Boolean expressions that are used in order to make logical decisions |
| 2.2 | Use if statements and if/else statements to control the flow of programs |
| 2.3 | Use logical operators &&, ||, ! in order to create compound if statements |

### ACTIVITIES:

2.1 - 2.4
- Write and run programs...
- Producing an original multiple choice question test
- Displaying a menu, accepting input, and executing correct code
- Write and run programs...
- Accepting weight and dimensions of a

### ASSESSMENTS:

- SAT Program
- Cash Register Program
- Inches, Feet, Yards Program

### REMEDIATION:

- Work with partners
- Examine other programmers code

### ENRICHMENT:

- ****
| package, outputting if package is correct size for mailing |
| accepting numerical grades and outputting corresponding letter grades |

**RESOURCES:**

- C++ Programming Deitel
- Introduction to Computer Science using C++ - Knowlton

| Add to multiple choice test program by including scoring, hints, or other extra features |
| Add special features to any previously made programs (colors, sounds, etc.) |
| Police Sketch Program |
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UNIT 3: Allegro Graphics

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### UNIT OBJECTIVES:

| 3.1 | Use primitive graphics to create geometric shapes |
| 3.2 | Use and create colors and various graphics in Allegro |
| 3.3 | Use and load BITMAP data type to display graphics |

### ACTIVITIES:

3.1 – 3.3
Using geometric shapes to output interesting pictures and designs including various colors (House, Snowman, Bullseye, 3D Box, etc...)

Photo story using BITMAP images

### RESOURCES:

C++ Programming Deitel
Introduction to Computer Science using C++ - Knowlton

### ASSESSMENTS:

Creating your own graphics quiz
Program that outputs specific geometric shape

### REMEDIAL ACTIVITY:

Graph paper drawing activity

### ENRICHMENT:

Designing programmer desired graphics
Designing personal logos
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UNIT OBJECTIVES:

4.1 Write programs using for loops in order to search data
4.2 Write programs using while loops in order to control repetition of code
4.3 Write programs using do while loops

ACTIVITIES:

4.1-4.3
- Joe's Shoe Store Program
- Metro City Election Program
- Wages Program
- Dice Game Program
- Game to 21 Program

RESOURCES:

C++ Programming Deitel
Introduction to Computer Science using C++ - Knowlton

ASSESSMENTS:

First to 100 Program
Mastermind Program
Loop Quiz
Mid-Term Exam/Program

REMEDIATION:

High-Low Game Program
Average Positive Numbers Activity

ENRICHMENT:

Prime Factorization Program
Artificial Intelligence for First to 100 Program
UNIT 5: Arrays

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UNIT OBJECTIVES:
5.1 Manipulate Single Dimensional Arrays
5.2 Search and sort through single dimensional arrays
5.3 Use looping structures to traverse arrays

ACTIVITIES:
5.1 – 5.2
  Hangman
  Mancala

RESOURCES:
C++ Programming Deitel
Introduction to Computer Science using C++ - Knowlton

ASSESSMENTS:
Array Assignment with 5 different functions for differentiation
Array quiz

REMEDIATION:
Advanced NIM
Modify previous programs to use arrays

ENRICHMENT:
Add graphics to hangman and mancala program
## UNIT 6: Multi-Dimensional Arrays

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### UNIT OBJECTIVES:

6.1 Implement multi-dimensional arrays to store Data
6.2 Use nested For Loops to traverse and manipulate multi-dimensional arrays

### ACTIVITIES:

6.1 – 6.2
- Battleship
- The Memory Game
- Use 2-d arrays to develop original pictures

### RESOURCES:

- C++ Programming Deitel
- Introduction to Computer Science using C++ - Knowlton

### ASSESSMENTS:

- 2D Array quiz
- Exploring Graphics
- Final Project

### REMEDIATION:

- Final Project
- Modify previous programs to use arrays

### ENRICHMENT:

- Final Project, addition of graphics to programs