



# Introduction to C++ Programming

## ITP 165x (2 Units)

**Objective** Learn to program in the standard C++ programming language. All constructs, rules and statements of the language are covered. Simple programs are developed in lab to confirm concepts.

**Concepts** Fundamentals of C++ syntax and semantics, including function declarations, overloading, memory management, classes, object creations, pointers to class members and I/O streams. Discussions include the standard libraries and all preprocessor directives. The course covers the ISO/IEC programming language standards for C++

**Prerequisite** Exposure to programming

**Lecture** 1.5hrs/week

**Lab** 1.5hrs/week

**Textbook** Class reader Introduction to C++ programming, Mary Pruitt

**Grading** The following point-structure will be used in determining the grade for the course. Final grade will be based upon the total points received, the highest total in the class, and the average of the class.

Projects	18
Midterm	32
Final Exam	50
Total	100

- Policies**
- Make-up policy for exams: In order to make up for a missed exam, the student must provide a satisfactory reason along with proper documentation. Usually make-ups are allowed only under extraordinary circumstances.
  - Projects: It is YOUR responsibility to turn in your lab projects on, or before, the deadlines as set by the instructor. IT IS NOT THE RESPONSIBILITY OF THE LAB TA!
  - Late Projects: Late submission of projects will lead to loss of points, so please turn in your projects on time! No projects will be accepted after 1 week beyond the project's original due date. Everything regarding a project should be settled within 2 weeks of the project's due date.
  - Though working together is encouraged, the projects must be your own effort. "Duplicate" projects will all receive zero points and possible referral to the Office for Student Conduct.

- All students should read, understand and abide by the University Student Conduct Code  
<http://www.usc.edu/dept/publications/SCAMPUS/governance/gov03.htm>

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## Course Outline

### Week 1 - Introduction

- Overview of the language
- Methods of compiling and testing projects
- Review of web site for class and project submittals

### Week 2 – Chapter 1 Solving problems with C++

- Introduce the basic requirements for a minimal C++ program
- Review basic input, output and simple assignment expressions

**Reading Assignment:** *Chapter 1*

**Project:** submit a project that produces "Hello World" output

### Week 3 – Chapter 2 Expressions in C++

- Understanding Literals
  - Integers, floating point, Booleans, characters and strings
- Identifiers
- Fundamental data types
- Common operators
- Assignment Expression statements

**Reading Assignment:** *Chapter 2*

**Project:** Write a program assigning variables and using them

### Week 4 – More on I/O

- Using setw and setprecision functions
- Using setiosflags to change the appearance of data on output
- Using cin for input
- detecting end of file or end of data on input

### Week 5 – Chapter 3 Selection Statements

- If statement
- Switch statement
- Logical operators
- Const definition
- Enum declaration
- The precedence table

**Reading Assignment:** *Chapter 3*

**Project:** Write a program using and testing the selection statements

### Week 6 – Chapter 4 Iteration Statements

- The while statement
- The for statement
- The do statement
- Nested loops
- Arrays of data
- Pointers and references

**Reading Assignment:** *Chapter 4*

**Project:** Write a program to use and test looping and repeating statements.

**Week 7** – Appendix A

- Program components
- Keywords
- Libraries
- The precedence table

**Reading Assignment:** *Appendix A*

**Week 8** - Midterm

Covers material from weeks 1 – 7

**Week 9** – Review mid term begin Chapter 5

- Review program style and structure
- Function - declarations

**Reading Assignment:** *Chapter 5*

**Project:** Write a program with nested loops

**Week 10** – Chapter 5 Functions

- Function definition
- Function invocation
- Argument passing
  - o Pass by value
  - o Pass by address
- Scope of an variable

**Reading Assignment:** *Chapter 5*

**Project:** Write a program with three functions.

**Week 11** – Chapter 5 functions continue

- Function overloading
- Recursive functions
- Static data
- Inline functions

**Reading Assignment:** *Chapter 6*

**Week 12** – Chapter 6 Data files

- Declaring data files
- Open and close
- The struct keyword
- Sequential files
- Random files

**Reading Assignment:** *Chapter 6*

**Week 13** – Chapter 8 Classes

- The class and struct keywords
- Access methods
- Constructors
- The this pointer

**Reading Assignment:** *Chapter 8*

**Project:** generate a file with data records, read and update that file both randomly and sequentially

**Week 14** –Chapter 9 Templates and Inheritance

- Complex data types
- Friends
- Overloading operators
- Derived classes
- Polymorphism
- Abstract classes
- templates

**Reading Assignment:** *Chapter 9*

**Project:** Write a program including a class with data members and member functions.

**Week 15** – Appendix B

- More operators
- Static casting
- More statements
- Varying the number of parameters for a function
- Exception handling

**Reading Assignment** Appendix B

**Project:** Modify the class program to overload an operator.

**Week 16** – Chapter 7 Strings

- Character data
- Character I/O
- Pointers to character data
- String functions
- Memory functions