

**ITT Technical Institute**  
**ET376T**  
**C/C++ Programming**  
**Onsite Course**

**SYLLABUS**

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**Credit hours:** 4

**Contact/Instructional hours:** 60 (36 Theory Hours, 24 Lab Hours)

**Prerequisite(s) and/or Corequisite(s):**

Prerequisites: ET156T Introduction to C Programming or equivalent

**Course Description:**

This course introduces structured and object-oriented programming in C and C++. Student will become familiar with concepts and techniques of problem-solving, fundamental algorithms, and working knowledge of programming.

# Syllabus: C/C++ Programming

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Instructor: _____
Office hours: _____
Class hours: _____

## Major Instructional Areas

1. C++ program structure
2. Expressions and operators
3. Decisions, loops, and recursion
4. Functions
5. Classes and objects
6. Arrays and strings
7. Searching and sorting
8. Pointers
9. Inheritance and polymorphism
10. File input and output
11. Exceptions
12. Standard Template Library

## Course Objectives

1. Write code that uses variables, expressions, and operators.
2. Write code that uses various control structures.
3. Use structured programming techniques to modularize a program.
4. Use object-oriented programming techniques.
5. Write code that processes data using arrays.
6. Write code that processes text data.
7. Write code that performs file input and output.
8. Use debugging and exception-handling techniques.
9. Write code that uses pointers.
10. Write code that uses the Standard Template Library (STL).

## SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. The committee, created by the National Secretary of Labor in the early 1990s, created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market.

1. Acquires information.
2. Knows how technological systems work and operate effectively.
3. Demonstrates competence in understanding systems.
4. Knows how a system's structures relate to goals.
5. Demonstrates competence in selecting technology including determining desired outcomes and applicable constraints.
6. Demonstrates competence in how to apply technology to task.

## Course Outline

Note: All graded activities, except the Project, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Lab 3.1 refers to the 1<sup>st</sup> lab activity in Unit 3.

Unit	Activities
1— C++ Overview	<ul style="list-style-type: none"> <li>• Content Covered:               <ul style="list-style-type: none"> <li><i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 1, "Introduction to Computers and Programming"</li> <li>○ Chapter 2, "Introduction to C++"</li> <li>○ Appendix K, "Introduction to Microsoft Visual C++ 2005"</li> </ul> </li> </ul> </li> <li>• Assignments: 1.1</li> <li>• Labs: 1.1</li> <li>• Project: Part 1 assigned</li> </ul>
2— Expressions and Interactivity	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 3, "Expressions and Interactivity"</li> </ul> </li> <li>• Assignments: 2.1</li> <li>• Labs: 2.1</li> <li>• Project: Part 2 assigned</li> </ul>
3— Control Structures	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 4, "Making Decisions"</li> <li>○ Chapter 5, "Looping"</li> </ul> </li> <li>• Assignments: 3.1</li> <li>• Labs: 3.1</li> <li>• Project: Part 3 assigned</li> <li>• Quizzes: 3.1</li> </ul>
4— Functions	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 6, "Functions"</li> </ul> </li> <li>• Assignments: 4.1</li> <li>• Labs: 4.1</li> <li>• Project: Part 4 assigned</li> </ul>
5— Object-Oriented Programming	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 7, "Introduction to Classes and Objects"</li> </ul> </li> <li>• Assignments: 5.1</li> <li>• Labs: 5.1</li> <li>• Project: Part 5 assigned</li> <li>• Exam I</li> </ul>
6— Arrays, Searching, and Sorting	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 8, "Arrays"</li> <li>○ Chapter 9, "Searching, Sorting, and Algorithm Analysis"</li> </ul> </li> <li>• Assignments: 6.1</li> <li>• Labs: 6.1</li> <li>• Project: Part 6 assigned</li> </ul>
7— Pointers and Other Techniques	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 10, "Pointers"</li> <li>○ Chapter 11, "More About Classes and Object-Oriented Programming" pp 651-713</li> </ul> </li> <li>• Assignments: 7.1</li> <li>• Labs: 7.1</li> <li>• Project: Part 7 assigned</li> <li>• Quizzes: 7.1</li> </ul>
8— Inheritance and Strings	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects:</i> <ul style="list-style-type: none"> <li>○ Chapter 11, "More About Classes and Object-Oriented</li> </ul> </li> </ul>

Unit	Activities
	<ul style="list-style-type: none"> <li>Programming” pp. 651-713               <ul style="list-style-type: none"> <li>○ Chapter 12, “More About Characters, Strings, and the string Class”</li> </ul> </li> <li>• Assignments: 8.1</li> <li>• Labs: 8.1</li> <li>• Project: Part 8 assigned</li> </ul>
9— File I/O and Recursion	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects</i>:               <ul style="list-style-type: none"> <li>○ Chapter 13, “Advanced File and I/O Operations”</li> <li>○ Chapter 14, “Recursion”</li> </ul> </li> <li>• Assignments: 9.1</li> <li>• Labs: 9.1, 9.2</li> <li>• Project: Part 9 assigned</li> <li>• Exam II</li> </ul>
10— Advanced Topics	<ul style="list-style-type: none"> <li>• Read from <i>Starting Out with C++ Early Objects</i>:               <ul style="list-style-type: none"> <li>○ Chapter 15: “Polymorphism, Virtual Functions, and Multiple Inheritance”</li> <li>○ Chapter 16, “Exceptions, Templates, and the Standard Template Library”</li> </ul> </li> <li>• Assignments: 10.1</li> <li>• Labs: 10.1</li> <li>• Project: Part 10 assigned</li> <li>• Quizzes: 10.1</li> </ul>
11— Review and Final Exam	<ul style="list-style-type: none"> <li>• Final Exam</li> </ul>

## Instructional Methods

C/C++ Programming builds on the programming skills you have already acquired. The first part of the course will review structured programming techniques and instructs you in the syntax for implementing them in a C++ programming environment. Next, you will learn about object-oriented programming and see how to create objects and templates that can be used to solve programming problems. Object-oriented programming promotes code reuse, which reduces the amount of time and effort required to get a product to market. Knowledge of object-oriented programming is critical to your success because many modern embedded programming projects use an object-oriented language such as C++.

During the course, you will use the Visual C++ 2005 compiler to practice the techniques covered in the reading and in lecture. You will have the opportunity to demonstrate your skills by completing written assignments, labs, and a project. You will also have two exams and a final.

## Instructional Materials and References

### Student Textbook Package

Gaddis, Tony, Judy Walters, and Godfrey Muganda. *Starting Out with C++ Early Objects*. 7<sup>th</sup> ed. Upper Saddle River, NJ: Pearson Education, Inc., 2010.

### Other Required Resources

In addition to the student textbook package, the following is also required in this course:

- Internet access

### Equipment and Tools

- Windows XP
- Visual C++ 2005
- Microsoft Office 2003
- Visio 2003

## References

### ITT Tech Virtual Library

Log on to the ITT Tech Virtual Library at <http://library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

#### Books

You may click “Books” or use the “Search” function on the home page to find the following books.

- Books 24x7
  - Horowitz, Ellis, Sartaj Sahni, and Dines P. Mehta. *Fundamentals in Data Structures in C++*. 2<sup>nd</sup> ed. Summit, NJ: Silicon Press, 2007.
  - Horton, Ivor. *Ivor Horton’s Beginning Visual C++ 2005*. Indianapolis, IN: Wiley Publishing, 2006.
  - Horstmann, Cay S., and Timothy A. Budd. *Big C++*. 2<sup>nd</sup> ed. Hoboken, NJ: John Wiley & Sons, 2009.
  - Lischner, Ray. *Exploring C++: The Programmer’s Introduction to C++*. New York: Apress, 2009.
  - Miller, Aaron, and Jerry Lee Ford, Jr. *Microsoft Visual C++ 2005 Express Edition Programming for the Absolute Beginner*. Boston: Cengage Course Technology, 2006.
  - Reese, Greg. *C++ Standard Library Practical Tips*. Hingham, MA: Cengage Charles River Media, 2006.
  - Schildt, Herbert. *C++: The Complete Reference*. 4<sup>th</sup> ed. New York: McGraw Hill/Osborne, 2003.
  - Schildt, Herb. *Herb Schildt’s C++ Programming Cookbook*. New York: McGraw Hill/Osborne, 2008.
  - Schildt, Herbert. *The Art of C++*. New York: McGraw Hill/Osborne, 2004.
  - Solter, Nicholas A., and Scott J. Kleper. *Professional C++*. Indianapolis, IN: Wiley Publishing, Inc., 2005.
  - Walls, Colin. *Embedded Software: The Works*. Massachusetts, Newnes, 2006.
  - Willis, Dean C. *Pro Visual C++ 2005 for C# Developers: Featuring C++/CLI*. New York: Apress, 2009.
  - Yadav, Hirday Narayan. *Object-Oriented C++ Programming*. New Delhi: Laxmi Publications, 2008.
- Ebrary
  - Easttom, William. *C++ Programming Fundamentals: CyberRookies*. Hingham, MA: Charles River Media, 2003.
  - Henkemans, Dirk, and Mark Lee. *C++ Programming*. Boston: Course Technology, Inc., 2002.
  - Hubbard, John. *Data Structures with C++*. New York: McGraw-Hill Professional Book Group, 2000.
  - Kent, Jeff. *C++ Demystified*. New York: McGraw-Hill Companies, 2004.
  - Misfeldt, Trevor, Jim Shur, and Gregory Bumgardner. *Elements of C++ Style*. New York; Cambridge University Press, 2004.
  - Smiley, John. *Learn to Program with C++*. New York: McGraw-Hill/Osborne, 2002.

## Other References

The following resource may be found **outside** of the ITT Tech Virtual Library.

Web site

- Microsoft Developer Network  
<http://msdn.microsoft.com>  
This site provides videos, virtual labs, tutorials, and reference information for beginners, plus developer tools for the Microsoft family of products.

All links to Web references outside of the ITT Tech Virtual Library are always subject to change without prior notice.

## Course Evaluation and Grading

### Evaluation Criteria Table

The final grades will be based on the following categories:

<b>CATEGORY</b>	<b>WEIGHT</b>
Exams	20%
Quizzes	15%
Labs	20%
Assignments	10%
Project	15%
Final Exam	20%
<b>Total</b>	<b>100%</b>

Note: Students are responsible for abiding by the Plagiarism Policy.

**Grade Conversion Table**

The final grades will be calculated from the percentages earned in the course, as follows:

A	90–100%	4.0
B+	85–89%	3.5
B	80–84%	3.0
C+	75–79%	2.5
C	70–74%	2.0
D+	65–69%	1.5
D	60–64%	1.0
F	<60%	0.0

*(End of Syllabus)*