ITT Technical Institute

CS310

Programming in C++

Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 50 (30 Theory Hours, 20 Lab Hours)

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

Prerequisite: CS300 Application Design or equivalent

Course Description:

This course introduces the knowledge and skills in how to write and maintain C++ programs. Object-oriented programming, Standard Template Library (STL), data structures, and file input/output are discussed.

Syllabus: Programming in C++

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).

Course Outline

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

Unit	Activities
1— C++ Overview	• Content Covered: *Starting Out with C++ Early Objects*: o Chapter 1, "Introduction to Computers and Programming" o Chapter 2, "Introduction to C++" o Appendix M, "Introduction to Microsoft Visual C++ 2008 Express Edition" (Student CD) • Assignments: 1.1 • Labs: 1.1 • Project: Part 1 assigned

Unit	Activities
2— Expressions and Interactivity	• Read from *Starting Out with C++ Early Objects*: ○ Chapter 3, "Expressions and Interactivity" • Assignments: 2.1 • Labs: 2.1 • Project: Part 2 assigned

3—
Control Structures
	• Read from *Starting Out with C++ Early Objects*:
	  ○ Chapter 4, "Making Decisions"
	  ○ Chapter 5, "Looping"
	• Assignments: 3.1
	• Labs: 3.1
	• Project: Part 3 assigned
	• Quizzes: 3.1

4— Functions	• Read from *Starting Out with C++ Early Objects*: ○ Chapter 6, "Functions" • Assignments: 4.1 • Labs: 4.1 • Project: Part 4 assigned
5— Object-Oriented Programming	• Read from *Starting Out with C++ Early Objects*: ○ Chapter 7, "Introduction to Classes and Objects" • Assignments: 5.1 • Labs: 5.1 • Project: Part 5 assigned • Exam I

6—
Arrays, Searching, and Sorting
	• Read from *Starting Out with C++ Early Objects*:
	  ○ Chapter 8, "Arrays"
	  ○ Chapter 9, "Searching, Sorting, and Algorithm Analysis"
	• Assignments: 6.1
	• Labs: 6.1
	• Project: Part 6 assigned

7—
Pointers and Other Techniques
	• Read from *Starting Out with C++ Early Objects*:
	  ○ Chapter 10, "Pointers"
	  ○ Chapter 11, "More About Classes and Object-Oriented Programming," pp. 677-693
	• Assignments: 7.1
	• Labs: 7.1
	• Project: Part 7 assigned
	• Quizzes: 7.1

8—
Inheritance and Strings
	• Read from *Starting Out with C++ Early Objects*:
	  ○ Chapter 11, "More About Classes and Object-Oriented Programming," pp. 694-762
	  ○ Chapter 12, "More About Characters, Strings, and the string Class"
	• Assignments: 8.1
	• Labs: 8.1
	• Project: Part 8 assigned

9—
File I/O and Recursion
	• Read from *Starting Out with C++ Early Objects*:
	  ○ Chapter 13, "Advanced File and I/O Operations"
	  ○ Chapter 14, "Recursion"

Unit	Activities
	• Assignments: 9.1 • Labs: 9.1, 9.2 • Project: Part 9 assigned • Exam II
10— Advanced Topics	• Read from *Starting Out with C++ Early Objects*: o Chapter 15, "Polymorphism and Virtual Functions" o Chapter 16, "Exceptions, Templates, and the Standard Template Library (STL)" • Assignments: 10.1 • Labs: 10.1 • Project: Part 10 assigned • Quizzes: 10.1
11— Course Review and Final Exam	• Final Exam

Instructional Methods

This course 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++ compiler to practice the techniques covered in the readings 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*. 7th ed. Upper Saddle River, NJ: Pearson Education, Inc., 2011.

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++
- Microsoft Office
- Visio

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" from the Main Menu or use the "Library Catalog" function on the home page to find the following books.

ITT Tech Virtual Library> Main Menu> Books> Books24x7

- Horowitz, Ellis, Sartaj Sahni, and Dines P. Mehta. *Fundamentals in Data Structures in C++*. 2nd ed. Summit, NJ: Silicon Press, 2007.
- Horton, Ivor. *Ivor Horton's Beginning Visual C++ 2008*. Indianapolis, IN: Wiley Publishing, 2008.
- Reese, Greg. *C++ Standard Library Practical Tips*. Hingham, MA: Cengage Charles River Media, 2006.
- Schildt, Herbert. *C++: The Complete Reference*. 4th ed. New York: McGraw Hill/Osborne, 2003.
- Schildt, Herbert. *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++*. 2nd ed. Indianapolis, IN: Wiley Publishing, Inc., 2011.
- Walls, Colin. *Embedded Software: The Works*. Burlington, MA: Newnes, 2006.
- Yadav, Hirday Narayan. *Object-Oriented C++ Programming*. New Delhi: Laxmi Publications, 2008.

ITT Tech Virtual Library> Main Menu> Books> Ebrary

- Easttom, William. *C++ Programming Fundamentals: CyberRookies*. Hingham, MA: Charles River Media, 2003.

Other References

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

Websites

- 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:

CATEGORY	WEIGHT
Exams	20%
Quizzes	15%
Labs	20%
Assignments	10%
Project	15%
Final Exam	20%
Total	**100%**

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