

# Introduction to C++ Programming

## ITP 165 (2 Units)

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**Spring 2014**

### **Objective**

This course will teach students problem solving skills through the use of the C++ programming language.

### **Concepts**

Programming fundamentals including variables, control statements, loops, and arrays, pointers, functions and object-oriented programming.

### **Prerequisites**

None. This class is intended for non-programmers.

### **Instructor**

Nathan Greenfield

### **Contacting the Instructor**

nathan.greenfield@usc.edu

### **Office Hours**

Listed on Blackboard under Contacts

### **Lab Assistants**

Listed on Blackboard under Contacts

### **Lecture / Lab**

One hour and 50 minutes, twice a week, for a total of 3 hours and 40 minutes.

Section1: 10am to 11:50am Tuesday and Thursday

Section2: 2pm to 3:50pm Tuesday and Thursday

### **Required Textbooks**

*Problem Solving with C++ (8th Edition)*. Walter Savitch. Addison-Wesley. ISBN-13: 9780132162739. The e-text can be found at myProgrammingLab.com website where you may also find additional materials for study.

### **Optional Textbooks**

None.

### **Website**

All course material will be on Blackboard (<http://blackboard.usc.edu>).

## Grading

The following percentage breakdown will be used in determining the grade for the course.

|                                             |             |
|---------------------------------------------|-------------|
| Class participation                         | 5%          |
| Assignments<br>(8 in total each worth 7.5%) | 60%         |
| Midterm exam                                | 15%         |
| Final exam                                  | 20%         |
| <b>Total</b>                                | <b>100%</b> |

## Grading Scale

The following shows the grading scale to be used to determine the letter grade.

|               |    |
|---------------|----|
| 93% and above | A  |
| 90% - 92%     | A- |
| 87% - 89%     | B+ |
| 83% - 86%     | B  |
| 80% - 82%     | B- |
| 77% - 79%     | C+ |
| 73% - 76%     | C  |
| 70% - 72%     | C- |
| 67% - 69%     | D+ |
| 64% - 66%     | D  |
| 63% and below | F  |

## **Policies**

### **Exams**

No make-up exams (except for documented medical or family emergencies) will be offered nor will there be any changes made to the Final Exam schedule. There are two exams: a midterm and a final, and these exams are comprehensive of all topics covered.

### **Assignments**

Each assignment must be completely *individually*. There are not any group projects in this class. The assignments will be posted on Blackboard under the "Assignments" section. Each lab assignment will include instructions, a due date, and a link for electronic submission. Labs must be submitted using this link.

It is your responsibility to submit your assignments on or before the due date. Assignments turned in one day late will have 20% of the total points deducted from the graded score. Assignments turned in two days late will have 50% of the total points deducted from the graded score. After two days, submissions will not be accepted and you will receive a 0. All assignments will be digitally submitted through Blackboard except where specifically specified. Do not email them to the lecturer or lab assistant.

If you have questions about any of the lab assignments, attend a lab session or send an email to the lab assistant/s assigned to the lab session in which you are registered. Do not send any email to the instructor regarding labs or ask specific lab questions during the lecture sessions. You are encouraged to attend the instructor's office hours for lab-related questions.

### **Lab facilities**

You are required to save your labs using a USB flash drive or a website such as <http://www.dropbox.com>. You must keep a copy of all labs. You will not be able to save your work on the ITP lab computers. Any work saved to the computer will be erased after restarting the computer.

ITP is not responsible for any work lost.

ITP will have open lab hours starting the second week of the semester. The open labs will not have a lab assistant for this specific class. These lab times are there in case you need extra time to complete a lab.

### **Attendance and participation**

A roster will be passed around the room during each lecture session. Please sign by your name for the appropriate week.

## Incomplete and Missing Grades

Excerpts for this section have been taken from the University Grading Handbook, located at <http://www.usc.edu/dept/ARR/grades/gradinghandbook/index.html>. Please see the link for more details on this and any other grading concerns.

A grade of Missing Grade (MG) “should only be assigned in unique or unusual situations... for those cases in which a student does not complete work for the course before the semester ends. All missing grades must be resolved by the instructor through the Correction of Grade Process. One calendar year is allowed to resolve a MG. If an MG is not resolved [within] one year the grade is changed to [Unofficial Withdrawal] UW and will be calculated into the grade point average a zero grade points.

A grade of Incomplete (IN) “is assigned when work is no completed because of documented illness or other ‘emergency’ **occurring after the twelfth week** of the semester (or 12<sup>th</sup> week equivalency for any course scheduled for less than 15 weeks).”

## Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. *Scampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

In this class, all code submissions will be ran against current, previous, and future students using MOSS, which is a code plagiarism identification tool. If your code significantly matches another student’s submission, you will be reported to SJACS.

Generally, the rule of thumb is that it is acceptable to discuss solutions to problems with other students, but once you are looking at someone else’s code, it crosses over into the realm of cheating. It does not matter if this code is online or from a student you know, it is cheating in all situations. Do not share your code with anyone else in this or a future section of the course, as allowing someone else to copy off your code carries the same penalty as you copying the code yourself.

## **Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your course instructor (or TA) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday. Website and contact information for DSP

[http://sait.usc.edu/academicssupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicssupport/centerprograms/dsp/home_index.html) (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) [ability@usc.edu](mailto:ability@usc.edu)

## **Emergency Preparedness/Course Continuity in a Crisis**

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a “Plan B” project that can be completed ‘at a distance.’ For additional information about maintaining your classes in an emergency, please access:

<http://cst.usc.edu/services/emergencyprep.html>

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### Course Outline

Note: Schedule subject to change

#### Week 1

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##### Introduction & variables

- Course overview
- About programming
- Variables and data types
- Keyboard input and screen output

##### Reading

Chapters 1 and 2

##### Assignment

Lab – Tool setup, Instruction list  
Homework 1 – Mad Libs

#### Week 2

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##### Operators

- Operator overview
- Operator precedence
- C++ operators vs. algebra operators

##### Reading

Chapter 2

##### Assignment

Homework 2 – Vending machine

#### Week 3

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##### Control flow

- Expressions
- Branching code

##### Reading

Chapters 2 and 3

##### Assignment

Homework 3 – Temperature conversion

## Week 4

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### Control flow (part 2)

- Boolean expressions
- Multipath branches
- Loops

### Assignment

Homework 3 – Largest number and factorial

## Week 5

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### Functions

- Writing C++ functions
- Using C++ functions
- Variable scope

### Reading

Chapter 4

### Assignment

Homework 4 – Roulette

## Week 6

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### Functions (part 2)

- Retrieving data from functions
- Call by reference

### Reading

Chapter 5

## Week 7

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### Midterm

15% of overall grade

## Week 8

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### I/O streams

- Streams
- File I/O
- Using classes

### Reading

Chapter 6

### Assignment

Homework 5 – Letter counter (part 1)

## **Week 9**

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### **Arrays**

- Introduction to arrays
- Fixed-size arrays

### **Reading**

Chapter 7

### **Assignment**

Homework 6 – Letter counter (part 2)

## **Week 10**

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### **Strings and vectors**

- C-style strings
- C++ style strings
- Vectors

### **Reading**

Chapter 8

## **Week 11**

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### **Pointers**

- Using pointers
- Memory management

### **Reading**

Chapter 9

## **Week 12**

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### **Pointers and dynamic memory**

- Dynamic arrays
- Pointer arithmetic

### **Assignment**

Homework 7 – Hex adder

## **Week 13**

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### **Classes and structures**

- Structures
- Classes

### **Reading**

Chapter 10



## **Week 14**

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### **Using classes**

- Abstract data types
- Inheritance

### **Assignment**

Homework 8 – Hex adder 2.0

## **Week 15**

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### **Expanding classes**

- Friend functions
- Operator overloading
- Arrays in classes

### **Reading**

Chapter 11

## **Final Exam**

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According to the final exam schedule on the Schedule of Classes  
20% of overall grade