# Introduction to C++ Programming

<table>
<thead>
<tr>
<th><strong>Objective</strong></th>
<th>This course will teach students problem solving skills through the use of the C++ programming language.</th>
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<tbody>
<tr>
<td><strong>Concepts</strong></td>
<td>Programming fundamentals including variables, control statements, loops, and arrays, pointers, functions and object-oriented programming.</td>
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<tr>
<td><strong>Prerequisites</strong></td>
<td>None. This class is intended for non-programmers.</td>
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<tr>
<td><strong>Instructor</strong></td>
<td>Nathan Greenfield</td>
</tr>
<tr>
<td><strong>Contacting the Instructor</strong></td>
<td><a href="mailto:nathan.greenfield@usc.edu">nathan.greenfield@usc.edu</a></td>
</tr>
<tr>
<td><strong>Office Hours</strong></td>
<td>Listed on Blackboard under Contacts</td>
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<tr>
<td><strong>Lab Assistant</strong></td>
<td>Listed on Blackboard under Contacts</td>
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<tr>
<td><strong>Lecture/Lab</strong></td>
<td>One hour and 50 minutes, twice a week, for a total of 3 hours and 40 minutes. 10:00 am – 11:50 am, Tuesday and Thursday</td>
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<tr>
<td><strong>Required Textbooks</strong></td>
<td><em>Problem Solving with C++</em>. Walter Savitch. Addison-Wesley. ISBN-13: 97801327774185. This comes with access to the myProgrammingLab.com website where you may also find the e-book.</td>
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<tr>
<td><strong>Optional Textbooks</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Website</strong></td>
<td>All course material will be on Blackboard (<a href="http://blackboard.usc.edu">http://blackboard.usc.edu</a>).</td>
</tr>
<tr>
<td><strong>Grading</strong></td>
<td>The following percentage breakdown will be used in determining the grade for the course.</td>
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<tr>
<td></td>
<td>Class Participation</td>
</tr>
<tr>
<td></td>
<td>Assignments</td>
</tr>
<tr>
<td></td>
<td>Midterm</td>
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<tr>
<td></td>
<td>Final Project</td>
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<tr>
<td></td>
<td>Total</td>
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</tbody>
</table>

There is no grade curving. Students will receive the grade they earn.

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<thead>
<tr>
<th><strong>Grading Scale</strong></th>
<th>The following shows the grading scale to be used to determine the letter grade.</th>
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</thead>
<tbody>
<tr>
<td>93% and above</td>
<td>A</td>
</tr>
<tr>
<td>90% - 92%</td>
<td>A-</td>
</tr>
<tr>
<td>87% - 89%</td>
<td>B+</td>
</tr>
<tr>
<td>83% - 86%</td>
<td>B</td>
</tr>
<tr>
<td>80% - 82%</td>
<td>B-</td>
</tr>
<tr>
<td>77% - 79%</td>
<td>C+</td>
</tr>
<tr>
<td>73% - 76%</td>
<td>C</td>
</tr>
<tr>
<td>70% - 72%</td>
<td>C-</td>
</tr>
<tr>
<td>67% - 69%</td>
<td>D+</td>
</tr>
<tr>
<td>64% - 66%</td>
<td>D</td>
</tr>
<tr>
<td>63% and below</td>
<td>F</td>
</tr>
</tbody>
</table>
Policies

Participation:
Students can earn participation points through answering questions, posed by the instructor, during each class.

Assignments:
The labs will be posted on Blackboard under the “Assignments” section. Each lab 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.

After an assignment has been graded and returned you have up to 1 week to make corrections and resubmit the assignment to be re-graded. You will be able to recover up to half of the missed points on any assignment through re-grades.

Although working together is encouraged, all work claimed as yours must in fact be your own effort. Students who plagiarize the work of other students will receive zero points and possibly be referred to Student Judicial Affairs and Community Standards (SJACS).

All assignments will be digitally submitted through Blackboard except where specifically specified. Do not email them to the lecturer or lab assistant.

Exam make-up policy:
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.

Final project:
The final project is an individual programming assignment. It will be due during the final exam time listed in the exam schedule on the USC Schedule of Classes.

Lab access:
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.

Lab computer use:
Before logging off a computer, students must ensure that they have emailed or saved projects created during the class or lab session. Any work saved to the computer will be erased after restarting the computer. ITP is not responsible for any work lost.
### 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](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 12th week equivalency for any course scheduled for less than 15 weeks).”

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### 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](http://www.usc.edu/dept/publications/SCAMPUS/gov/), 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/](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/](http://www.usc.edu/student-affairs/SJACS/).

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### 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 is [http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html](http://sait.usc.edu/academicsupport/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)

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### 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](http://cst.usc.edu/services/emergencyprep.html)
# Tentative Course Outline

## Week 1
**Introduction to programming**
- Course overview
- What is programming?

**Assignment**
Get textbook

**Lab**
Access programming tools and *Hello World*

## Week 2
**Computing fundamentals**
- Variables and data types
- Keyboard input
- Screen output

**Reading**
Chapter 2

**Assignment / Lab**
Lab 1 – Mad Libs

## Week 3
**Flow of control**
- Expressions
- Branching code

**Reading**
Chapter 2

**Assignment / Lab**
Lab 2 – Vending machine

## Week 4
**Flow of control**
- Boolean expressions
- Multipath branches
- Loops

**Reading**
Chapter 3

**Assignment / Lab**
Lab 3 – Temperature conversion

## Week 5
**Functions**
- Using C++ functions
- Defining functions
- Variable scope

**Reading**
Chapter 4

**Assignment / Lab**
Lab 4 – Largest number and factorial

## Week 6
**Functions**
- Returning data from functions
- Call by reference parameters
- Debugging

**Reading**
Chapter 5

**Assignment / Lab**
Midterm preparation
<table>
<thead>
<tr>
<th>Week 7</th>
<th>Midterm</th>
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</thead>
</table>
| Week 8 | **Input and output streams**  
- Streams  
- File input and output  
- Character input and output  
- Introduction to classes  

**Reading**  
Chapter 6  

**Lab**  
Lab 5 – Captain’s log |
| Week 9 | **Arrays**  
- Static arrays  
- Multidimensional static arrays  

**Reading**  
Chapter 7  

**Lab**  
Lab 6 – Athletes 1.0 |
| Week 10 | **Strings and vectors**  
- C and C++ style strings  
- String class  
- Vectors  

**Reading**  
Chapter 8  

**Lab**  
Lab 7 – Athletes 2.0 |
| Week 11 | **Pointers and dynamic arrays**  
- Pointers  
- Memory management  

**Reading**  
Chapter 9  

**Lab**  
Lab 8 – Athletes 3.0 |
| Week 12 | **Pointers and dynamic arrays**  
- Dynamic arrays  
- Pointer arithmetic  

**Reading**  
Chapter 9  

**Lab**  
Lab 8 – Athletes 3.0 |
| Week 13 | **Defining classes**  
- Structures  
- Classes  

**Reading**  
Chapter 10  

**Lab**  
Final project |
| Week 14 | **Using classes**  
|        | - Abstract data types  
|        | - Inheritance  
| **Reading** | Chapter 10  
| **Lab** | Final project  
| Week 15 | **Expanding classes**  
|        | - Friend functions  
|        | - Overloading operators  
|        | - Arrays in classes  
|        | - Classes and dynamic arrays  
| **Reading** | Chapter 11  
| **Lab** | Final project  
| Week 16 | **Final Projects**  
| **Assignment** | Final project due at the end of the scheduled final exam time  