Course Outline
CS162: Introduction to Computer Science
Winter 2015

(the following outline is subject to change!)

WEEKS #1 and 2: *Getting started with C++*

***** NO LABS on January 5th, 6th or 7th**

Date: **Topic:** **Reading/Projects:**

1/6 **Topic #1** ***** Please read the syllabus *****

• Introduction: Syllabus, Objectives for the Course, Class Introduction, and Review Outline. **Malik: 1, Shk: 1**

1/8 **• Overview and/or Review of C++** **Malik: 2, 3**

- Structure of C++ Programs
- C++ Statements
- Data Types
- Operators

Lab #1 - Putting the pieces together of a C++ Program **By 1/2 – Get a CS Account (prior to your first lab!)**

- **No Prelab Exercises for the first lab!**
- Demonstration: Using Unix, Editing and Compiling programs
- Demonstration: connecting via PCs and MACs

1/13 **• Continue with C++ (Loops and Arrays)**

• I/O, Conditionals, Repetition, Arrays **Malik: 4, 5, Shk: 2**

- Branching Statements
- Loops and Relational Expressions
- I/O and formatting output
- Arrays, Strings, String I/O

1/14 6pm Written Homework #1 Due - Submit to the D2L Dropbox

1/15 Demonstration: Creating a complete program in C++

- Explore C++ assignment statements, conditionals, and truth tables
- Explore C++ arrays of characters

Lab #2 – Topic #1 Getting Started with C++ syntax

- Bring your Lab book with the Pre-Lab exercise completed!
- Practice creating a C++ program using assignment statements, conditionals and truth tables
- Gain experience with loops

WEEKS #3 and 4: *Functions, Structures, External Files*

*** Monday labs: PSU is CLOSED 1/19/2014 for Martin Luther King day. *Please schedule a makeup session.*

Date: **Topic:** **Reading/Projects:**

1/20 **Topic #2**

Overview of C++ Functions **Malik: 6, 7**

- Prototypes vs. Function Definitions
- Pass by value, by reference, by const
- Passing fundamental types and arrays

1/21 6pm Program #1 Due - Submit to the D2L Dropbox

1/22 **Functions:**

- Demonstration: Designing using modularity
- Demonstration: Writing programs using functions with arguments
- Explore C++ functions, pass by reference, pass by value, and returning values

Lab #3 – Topic 1 - Arrays

- Bring your Pre-Lab exercise completed!
- Practice C++ arrays of characters, creating, reading, manipulating
- Gain experience with cstring and cctype libraries

1/27 **Topic #2: Structures** **Malik: 11, Shk: 3**

- What they are
- How to create them
- Working with arrays of structures

1/28 6pm Written Homework #2 Due - Submit to the D2L Dropbox

1/29 **External Files and Structs**

- Lecture: External Data Files
- Demonstration: Writing programs using structs and external files
- Explore C++ functions working with structs
- Experience external data files
- **REVIEW for the Midterm Exam**

Lab #4 – Topic 2 – Modularity (Functions and Arguments)

- Bring your Pre-Lab exercise completed!
- Practice: Writing programs using functions with arguments
- Explore C++ functions, pass by reference, pass by value, and returning values

WEEKS #5 and 6:

2/3 Midterm Exam

Midterm Proficiency Demos

- Midterm Proficiency Demos are by appointment

Date: **Topic:** **Reading/Projects:**

2/4 6pm Program #2 Due - Submit to the D2L Dropbox

2/5 Topic #3 C++ Class Construct, Data Abstraction and Abstract Data Types

- Data Abstraction and Abstract Data Types **Malik: 12**
- The C++ Class, Class versus Structs **Shk: 4**
- Class Constructors, Defining and Using Functions and Classes.
- General discussion of the C++ Class and creating .h files
- Constructors

Lab #5 – Topic 2 - Structures and External Data Files

- Bring your Pre-Lab exercise completed!
- Practice: Writing programs using structs
- Explore C++ functions working with structs
- Experience using external data files

2/10 More on Classes

- Demonstration: Designing a system that uses classes and structs
- Explore the C++ class construct

2/11 6pm Written Homework #3 Due - Submit to the D2L Dropbox

2/12 Pointers and Dynamic Memory **Malik: 14**

- Introduce pointer variables, memory allocation and deallocation
- Examples manipulating pointers **Shk: 5.1-5.4**

Lab #6 – Topic 3 - Classes

- Bring your Pre-Lab exercise completed!
- Experience building classes and member functions

WEEKS #7 and 8:

Date:	Topic:	Reading/Projects:
2/17	**Topic #4** **Dynamic Data Structures** • Review of Pointers and the new Operator • Pointer Arithmetic • Introduction to Linked Lists • Demonstration: Using pointers and linked lists	**Malik: 18** **Shk: 5.5-5.6**

2/18 6pm Program #3 Due - Submit to the D2L Dropbox

2/19 Topic #4 Continued
Dynamic Data Structures
• Insert Algorithms for Linear Linked Lists

Lab #7 – Topic 4 - Pointers and Dynamic Memory (Intro to Linear Linked Lists)

- Bring your Pre-Lab exercise completed!
- Experience pointers and dynamic memory
- Practice traversing linear linked lists
- Continue exploring the use of classes

2/24 Topic #4 Continued
Dynamic Data Structures
• Insert and Removal Algorithms

2/25 6pm Written Homework #4 Due - Submit to the D2L Dropbox

2/26 Dynamic Data Structures
• Demonstration: Inserting and Removal
• Explore writing functions to traverse and modify a linear linked list
• Explore Classes and dynamic structures

Lab #8 – Topic 4 - Manipulating Linear Linked Lists

- Bring your Pre-Lab exercise completed!
- Building and removing from linear linked lists
- Continue exploring the use of classes

WEEKS #9 and 10:

Date: **Topic:** **Reading/Projects:**

3/3 **Topic #5 Recursion** **Malik: 17**
Shk: 4.10, 6

- The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array Arguments
- Work through examples of recursion in class
- Problem solving with Recursion

3/4 6pm Program #4 Due - Submit to the D2L Dropbox

3/5 Recursion and LLL: Practicing

- Demonstration: Recursion and LLL
- Explore writing recursive functions

Lab #9 – Topic 5 - Recursion

- Bring your Pre-Lab exercise completed!
- Build recursion solutions
- Practice Linear Linked lists

3/10 Topic #6 Arrays with Structured Elements **Malik: 9**

- Arrays of Arrays: Multidimensional Arrays, Creating Arrays of Arrays, Arrays of Structs, and Arrays of Class Elements. **Shk: 8**

3/11 6pm Written Homework #5 Due - Submit to the D2L Dropbox

3/11 6pm EXTRA CREDIT (+5 points) for turning in Program #5 early

3/12 Prepare for the Final Exam

Lab #10 – Prepare for Final Proficiency Demo

- Practice Linear Linked lists

3/18 6pm Program #5 Due - Submit to the D2L Dropbox * NO LATE PROGRAM #5's**

Final Exam Time: **Thursday March 19th 10:15-12:05**

******IMPORTANT – ALL FINAL EXAMS MUST BE COMPLETED BY March 19th, no exceptions.***

Final Proficiency Demonstrations take place by appointment. *An appointment calendar link will be emailed to your pdx.edu email!*