

New Beginnings – Practical/Programming

Summer 2018

Course Outline: (7th(ish) Edition of Malik)

WEEK #1-2 : Getting started with C++

Date: Topic:

WK1-2 Topic #1

Reading:

- **Overview and/or Review of C++**

Malik: 1, 2, 3

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

- **Continue with C++ (Loops and Arrays)**

Malik: 4, 5

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

Demonstration: Creating a complete program in C++

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

WEEK #3: Functions(Arrays from WK2)

Date: Topic:

WK3 Topic #2

Reading:

Overview of C++ Functions

Malik: 6, 7

- Prototypes vs. Function Definitions
- Pass by value, by reference, by const
- Passing fundamental types and array
- Demonstration: Designing using modularity
- Demonstration: Writing programs using functions with arguments

- Explore C++ functions, pass by reference, pass by value, and returning values
- Practice C++ arrays of characters, creating, reading, manipulating
- Gain experience with cstring and ctype libraries

WEEK # 3/4: Structures, External Files

Date: Topic:

WK3 Topic #2: Structures

Reading:

Malik: 9

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

Date: Topic:

WK4 External Files and Structs

Reading:

- Lecture: External Data Files
- Demonstration: Writing programs using structs and external files
- Explore C++ functions working with structs
- Experience external data files

WEEK #5: Pointers and Dynamic Memory

Date: Topic:

WK5 Topic #3 C++ Class Construct, Data Abstraction and Abstract Data Types

Reading:

Malik: 10

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

Pointers and Dynamic Memory

Malik: 12

- Introduce pointer variables, memory allocation and deallocation
- Examples manipulating pointers
- Pointer Arithmetic
- Pointers to structs (learn about the . versus ->)

WEEK #6: Linear Linked Lists

Date: Topic:

WK6 Topic #4

Reading:

Malik: 17

Dynamic Data Structures

- Review of Pointers and the new Operator
- Pointer Arithmetic
- Introduction to Linked Lists
- Demonstration: Using pointers and linked lists
- Insert Algorithms for Linear Linked Lists
- Insert and Removal Algorithms
- Demonstration: Inserting and Removal
- Explore writing functions to traverse and modify a linear linked list
- Explore Classes and dynamic structures
- Intro to Recursion using a recursive destructor

WEEK #7: Recursion

Date: Topic:

WK7 Topic #5 Recursion

Reading:

Malik: 15

- 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
- Demonstration: Recursion and LLL
- Explore writing recursive functions

<WILL PROBABLY START TO LOOK AT OTHER ABSTRACT DATA TYPES – Trees, Stacks and Queues>

WEEK #8: Advanced Pointers

| <u>Date:</u> | <u>Topic:</u> | <u>Reading/Projects:</u> |
|--------------|--|--------------------------|
| WK8 | Topic #6 Arrays with Structured Elements Arrays of Arrays: Multidimensional Arrays, Creating Arrays of Arrays, Arrays of Structs, and Arrays of Class Elements. | Malik: 8 |

WEEK #9: Object Oriented Programming

TBD