

CS 116 Introduction to Computer Science II in C++

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Office Hours: Friday 2:40 pm – 3:40 pm

## **I. COURSE DESCRIPTION:**

A study of advanced programming topics with logical structures of data, their physical representation, design, and analysis of computer algorithms operating on the structures, and techniques for program development and debugging. Course covers program specifications, correctness and efficiency, data abstraction, basic aspects of simple data structures, internal searching and sorting, recursion and string processing. Algorithmic analysis is also discussed.

Prerequisite: CS 115

## **II. INSTRUCTIONAL MATERIALS:**

Required Textbook: Data Structures & Other Objects Using C++, 4<sup>th</sup> edition.

ISBN: 0-13-212948-5, 978-0-13-212948-0. Authors: Michael Main, Walter Savitch

Reference Book: C++ How to Program, H.M.Deitel and P.J.Deitel, tenth edition, Prentice Hall (Pearson), 2017.

## **III. METHODS OF INSTRUCTION**

Lectures, labs, projects, exams are used.

## **IV. METHODS OF EVALUATING STUDENT ACHIEVEMENT/ PROGRESS:**

There will be **six programming projects** distributed roughly every two weeks in the first twelve weeks (counted 55% of your final grade). There will be **one final exam** (35% of your final grade). Attendance is mandatory (10% of your final grade)

## V. CLASS SCHEDULE

Topics	Planned Lecture Topics	Read/Project
Topic 1	Introduction & Software Development	Ch.1
Topic 2	ADT & C++Classes	Ch.2.1-2.3, Project 1
Topic 3	More Classes and Operator Overloading	Ch.2.4-2.6
Lab 1	Project 1 Help Session	
Topic 4	Container Classes.	Ch. 3
Topic 5	Container Classes(cont.)	Ch.3, Project 2
Topic 6	Pointers and Dynamic Arrays(I)	Ch. 4.1-4.2
Lab 2	Project 2 Help Session	
Topic 7	Pointers and Dynamic Arrays (II)	Ch. 4.2-4.5
Topic 8	Dynamic Classes and the Big Three	Project 3
Topic 9	Linked Lists	Ch. 5.1-5.2 Project 4
Lab 3	Project 3 Help Session	
Topic 10	Building & Using the Linked List Toolkit	Ch. 5.3-5.6
Topic 11	Software Development Using Templates and Iterators	Ch.6
Topic 12	Stacks and Queues	Ch. 7, Ch. 8
Lab 4	Project 4 Help Session	
Topic 13	Introduction to Recursion	Ch. 9.1 Project 5
Topic 14	Using and Reasoning about Recursion	Ch. 9.2-9.3
Topic 15	Trees and Traversals	Ch. 10.1- Ch. 10.4
Lab 5	Project 5 Help Session	
Topic 16	Binary Search Trees and the Bag Class with a BST	Ch. 10.5,
Topic 17	Heaps and Priority Queues	Ch. 11.1, 11.2
Lab 6	Project 6 Discussion	Ch. 11.3
Topic 18	In Class Exercise for Tree	
Topic 19	Searching	Ch.12.1-12.2
Topic 20	Hashing	Ch 12.2-12.4
Topic 21	Quadratic Sorting	Ch 13.1
Topic 22	Recursive Sorting, Heap sort	Ch. 13.2- Ch 13.4
Final	Final Exam	

## VI. Academic Integrity Policy

All course work, including exams, assignments, labs, projects must be done by student themselves. Sharing materials with classmate, especially programming work including logic, and/or modifying the materials to fabricate and reproduce other versions is very seriously treated based on the NJIT University Policy on Academic Integrity.