ESE 344 SOFTWARE TECHNIQUES FOR ENGINEERS
Stony Brook University, ECE, Prof. Murali Subbarao, Spring 2020

(Subject to minor changes)

Description (revised):
This course covers software techniques for solving electrical and computer engineering problems in the C++ Programming language. Design, implementation, and application to engineering problems, of non-linear data structures and related advanced algorithms are covered. This includes binary trees, trees, graphs, and networks. OOP features such as Polymorphism, templates, Exception handling, File I/O operations, as well as Standard Template Library, are used in the programming projects.
Credits 3, Prerequisites: ESE 118; ESE 224 or CSE 230.

Text book:

1. M. A. Weiss, Data Structures and Algorithm Analysis, Pearson, 4th Edition, 2014, ISBN-13: 978-0132847377.

   Author website: http://users.cs.fiu.edu/~weiss/
   Source code: http://users.cs.fiu.edu/~weiss/dsaa_c++4/code/

http://iips.icci.edu.iq/images/exam/DataStructuresAndAlgorithmAnalysisInCpp_2014.pdf

2. Datastructures and Program Design in C++,
   R. L. Kruse and A. J. Ryba, Prentice-Hall, Inc., 1999, ISBN 0-13-768995-0
   Download at:
   ftp://ftp.borg.moe/yarr/Gentoomen%20Library/Data%20Structures/Data%20Structures%20and%20Program%20Design%20in%20C++%20-%20Robert%20L.%20Kruse.pdf

References: Online resources.

Syllabus:

1. C++ programming basics, I/O,
2. C++ classes, inheritance, templates, polymorphism, Exceptions, OOP
3. STL
4. Algorithm analysis
5. Arrays, strings, multi-dimensional arrays
6. Lists

   Test 1

7. Stacks and Queues
8. Searching and Sorting
9. Hashing
10. Binary trees

11. Trees

    Test 2

12. Heaps
13. Sets
14. Graphs 1
    Depth-first and Breadth-First traversals, Topological sorting
15. Graphs 2
    Minimum Spanning Trees, Shortest Paths

    Test 3

16. Network Flow problems

    Test 4

This course will have about five programming projects in C++. On average, a student may have to spend about 10 hours per week on this course.

GRADING

Part I: Assignments
Programming projects : 35 %
Homeworks: 10 %

Part II : Tests
Test 1: 1 hr. 15 mins. : 20 %
Test 2: 1 hr. 15 mins. : 20 %
Test 3 : 1 hr : 10%
Test 4 : 30 mins. : 5 %

Late submission policy: Projects submitted 1 to 2 days late will be graded out of 75% of the maximum. Homeworks are not accepted late as each homework carries a very small weight.

Grading Policy

In the written tests part, out of a maximum of 55 points, you must get at least 30 points to pass the course. Final grades are assigned based on absolute percentage of total marks as below.

A : 91—100 , A- : 86—90 , B+ : 81—85, B : 76—80, B- : 71--75
C+ : 68—70, C : 64—67, C- : 61—63, D+ : 56—60, D : 51—55, F : 0--50