COMPE 323 Algorithms (3-0) 3
Course Syllabus
2011-2012 Fall

Instructors:
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Catalog Data:
Design and analysis of algorithms. O-Notation. Divide and Conquer algorithms. Dynamic Programming. Backtracking and Branch and Bound. Lower bound theory. Complexity of sorting, and searching algorithms. Graph algorithms. NP-Hard and NP-Complete problems. Basic NPC problems. Proving problems to be NPC. Analysis of some string processing algorithms.

Text Book(s):
Introduction to Algorithms (Second Edition), Thomas Cormen, Charles Leiserson, Ronald Rivest and Clifford Stein. The MIT Press, 2001

References:
1. MIT Opencourseware: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-introduction-to-algorithms-sma-5503-fall-2005/
2. E.Horowitz, S.Sahni, S.Rajasekeran, Computer Algorithms, ISBN: 978-0-929306-41-4, Silicon Press, 2008.
3. J.Kleinberg, E.Tardos, Algorithm Design, Addison – Wesley, ISBN: 0-321-29535-8, 2006.
4. A.V.Aho, J.E.Hopcroft, J.D.Ullman, The Design and Analysis of Computer Algorithms, Addison-Wesley Series in Computer Science and Information Processing, 1979.
5. S.S. Skiena, The Algorithm Design Manual, Springer – Verlag, NewYork, 1998.

Prerequisite by Topic:
The student should know a programming language (pref. C language), and be familiar with the basic data structures and the recursion concept.

Goals:
This course is designed to teach students how to analyse and design algorithms and measure their complexities. In addition, students will be able to develop efficient algorithms for the solution of real life computational problems.

Objectives:
By the end of the course the student should :

- Analyze and design algorithms and measure their complexities
- Recognize the theoretical foundations of the algorithms
- Develop efficient algorithms for the solution of real life computational problems
- Implement algorithms

Topics Covered:

Week	Topics	Pre-study Pages
1	Introduction	Chapter 1 (main text)
2	Insertion Sort, Analyzing algorithms	Chapter 2
3	Growth of Functions	Chapter 3
4	Recurrences	Chapter 4
5	Quicksort	Chapter 7
6	Red-Black trees	Chapter 13
7	Dynamic Programming	Chapter 15
8	Dynamic Programming	Chapter 15
9	Greedy Algorithms	Chapter 16
10	Elementary Graph Algorithms	Chapter 22
11	Minimum Spanning Trees	Chapter 23
12	Single-Source Shortest Paths	Chapter 24
13	Linear Programming	Chapter 29
14	NP-Completeness	Chapter 34

Grading Scheme:
Midterm I : 25%
Midterm II : 25%
Final : 40%
Homeworks : 10%