University of Waterloo
SYDE 423 - Computer Algorithm Design and Analysis - Fall 2008

Instructor: Hanan Ayad **Contact:** hayad[at]engmail[dot]uwaterloo[dot]ca

Course Home Page:	http://www.eng.uwaterloo.ca/~hayad/syde423
Class Times:	MWF 10:30-11:20, E2 1303E.
Office Hours:	TBA (check web page)
Teaching Assistant:	No TA.
Tutorial Times:	F 09:30-10:20, E2 1303E - As needed.
Text:	**1-** Introduction to The Design and Analysis of Algorithms. Second Edition. Anany Levitin. Addison Wesley, 2007. **2-** Algorithm Design. Jon Kleinberg and Éva Tardos. Addison Wesley, 2006. (Supplementary Reference - Library Reserve QA76.9.A43 K54 2006)
Additional Reference:	Introduction to Algorithms. Second Edition. Cormen, Leiserson, Rivest, and Stein. MIT Press, 2001. (Electronic book available through library)

Course Outline

1. Algorithm Analysis
2. Review of Data Stuctures
3. Fundamental Design Techniques:
   (a) Brute Force
   (b) Divide-and-Conquer
   (c) Dynamic Programming
   (d) Greedy Technique
   (e) Iterative Improvement
4. Limitations, Computational Intractability, and NP Completeness
5. Dealing with Hard Problem:
   Branch-and-Bound, Approximation Algorithms, Local Search, Randomized Algorithms.

Assessment

Assignments	30%
Mid-term exam	20%
Final exam	50%

Programming

Most assignment questions will require only written work, but occasionally, questions may ask for the implementation and timing of algorithms. For programming questions, C, C++ or Java may be used. Guidelines will be posted on the course web page.