**Syllabus for COT5405 Design and Analysis of Algorithms in Fall 2010**

Time: Mo We 4:30pm – 5:45pm

Instructor: Dr. Pawel Wocjan Email: [wocjan@eecs.ucf.edu](mailto:wocjan@eecs.ucf.edu) Phone: (407) 823-2844

Office hours: MoWe 16:30PM – 17:45PM

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**Topics to be covered:**

* Reading assignment: Chapter 1, Chapter 2, and Chapter 3 (you have to read these three chapters yourself, we will not cover these topics in class)
* Divide-and-conquer algorithms
  + Mergesort, medians, matrix multiplication (you should know these algorithms)
  + The fast Fourier transform
  + Recurrence relations
* Graph algorithms
  + Depth-first search and breadth-first search in directed and undirected graphs (you should know these algorithms)
  + Dijkstra’s algorithm (proof)
  + Bellman-Ford algorithm (finding shortest paths in the presence of negative weights)
* Greedy algorithms
  + Minimum spanning trees, Huffman encoding (you should know these algorithms)
  + Horn formulas
  + Set cover
* Dynamic programming
  + Knapsack, chain matrix multiplication (you should know these algorithms)
  + Longest increasing subsequences
  + Edit distance
  + Shortest paths
  + Independent sets in trees
* Linear programming and reductions
  + An introduction to linear programming
  + Flows in networks
  + Bipartite matching
  + Duality
  + Zero-sum games
  + The simplex algorithm
* NP-complete problems
  + NP-complete problems
  + Reductions
* Coping with NP-completeness
  + Intelligent exhaustive search
  + Approximation algorithms
  + Local search heuristics
  + Fixed-parameter complexity

**Book:**

The required book is “Introduction to Algorithms” by Cormen, Leiserson, Rivest and Stein.

<http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=11866>

We will also make use of the book “Algorithms” by Dasgupta, Papadimitrou, and Vazirani. The pdf-file of an older version of this book is available for free at <http://www.cs.berkeley.edu/~vazirani/algorithms/all.pdf>

**Grading Policy:**

The final grade will be determined as follows: 25% homework, 25% first midterm exam, 25% second midterm exam, 25% final exam.

First midterm exam: 10/04/2010 (Monday)

Second midterm exam: TBA

Final exam: see UCF schedule

The grades are A/B/C/D/F. You may also receive +/-.

Homework assignments should be turned in at the beginning (first five minutes) of the class on the due date. Late homework and make-up exams will not be accepted.

Please read and understand student rights and responsibilities including conduct rules stated in UCF’s golden rules: <http://www.goldenrule.sdes.ucf.edu/>