COP 3503 Honors – Computer Science II - Fall 2018 Syllabus

Instructor: **Joseph J. LaViola Jr.**

Office: **Engineering III Room 321**
Hours: **Mon. 4:00pm – 6:00pm**
Wed. 5:00pm – 6:00pm
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If you want to email me, MAKE SURE to enter in the subject line "**cop3503h**" followed by **your name**.

Web page

http://www.eecs.ucf.edu/courses/cop3503h/fall2018/

Course Objective: This course is about problem solving and devising efficient algorithms for a variety of problems in computer science. This course explores specific algorithmic techniques in more detail than CS1 and applies these to some new problems not explored in CS1. Also, more technical algorithmic analysis will be done in order to verify the efficiency of the algorithms discussed. Finally, some new data structures will be introduced.

Primary Textbook: Introduction to Algorithms, Third Edition, by Cormen, Leiserson, Rivest, and Stein, MIT Press, 2009.

Secondary Textbook: The Algorithm Design Manual, Second Edition, by Steven Skiena, Springer, 2010.

Grading: The final letter grade will be based upon the four items listed below. There will be 8 assignments that will contain written problems and programs. Each assignment will be introduced in class and then posted on the class web page. All programming assignments are to be done in Java. The grading scale will be based on the class average, standard deviation and overall difficulty of the assignments and exams. Note: plus/minus grades will be issued, when deemed appropriate.

Item	Percentage
Take Home Exam #1	20
Final Exam	25
Homework Assignments	45
Teach Me Fridays	10

In order to pass the class (get a C or higher) you must earn at least 50% on the final exam.

All sections listed in this chart refer to sections of the primary textbook. Typically, lectures will follow the material in the text, but occasionally material will be added into lectures that is NOT in the text. For this reason, class attendance is important. This is a general time frame only and is subject to the needs of the class. It will be altered without notice, but will generally follow the same progression. At the end of each class you will be told what we will be discussing during the next class period.

Late homework assignments will be accepted but will be assessed a late penalty. In particular, assignments will be accepted up to 48 hours after the due date of the assignment. If an assignment is less than 24 hours late, a 10% penalty will be assessed. If an assignment is in between 24 and 48 hours late, a 20% penalty will be assessed.

No late assignments will be accepted on the last homework assignment.

Collaboration Policy: Homework assignments will be of two types, collaborative and not collaborative and they will be clearly designated. Collaborative homeworks are intended to foster interaction in problem solving; noncollaborative homeworks are intended to test individual knowledge and are like take-home exams. If you need assistance with a particular homework problem, please see the instructor. Note that Take-Home Exam 1 is NONCOLLABORATIVE!!

Tentative Lecture Schedule

Week	Topic
Aug 20-24	Syllabus, Role of Algorithms, Mathematical preliminaries, Getting started with algorithm design and analysis (Chapters 1, 2, Appendix A,D)
Aug 27-31	Growth of Functions, asymptotic notation, standard notations (Chapter 3), Recurrence relations – substitution, iteration, recursion-tree and master method (Chapter 4.3 - 4.6) **Homework #1**
Sep 3-7	**No Class - Labor Day – Sept. 3rd** Divide-and-Conquer – Strassen's algorithm, maximum-subarray problem (Chapter 4.1 - 4.2)
Sep 10-14	Sorting – Heapsort, QuickSort (Chapter 6, 7) Sorting in Linear time – counting sort, bucket sort, radix sort (Chapter 8) **Homework #2**
Sep 17-21	Order Statistics – min and max, selection (Chapter 9) Start Dynamic Programming – Rod cutting, matrix chain multiplication (Chapter 15.1-15.2) **Homework #3**
Sep 24-28	Dynamic Programming – elements of dynamic programming, longest common subsequence (Chapter 15.3 –15.4)
Oct 1-5	Greedy Algorithms – activity selection, greedy strategy elements, Huffman codes (Chapter 16) **Homework #4**
Oct 8-12	**Take Home Midterm Exam** Graph Algorithms – Notation, BFS,DFS, Topological sort. Strongly connected components (Chapter 22)
Oct 15-19	Minimum Spanning Trees – Kruskal and Prim algorithms (Chapter 23)
Oct 22-26	**Withdrawal Deadline – Oct. 30th** Single Source Shortest Paths – Bellman-Ford, Dijkstra's algorithm (Chapter 24) **Homework #5**
Oct 29 – Nov 2	All-Pairs Shortest Paths – Floyd-Warshall, Johnson's algorithm for sparse graphs (Chapter 25) **Homework #6**
Nov 5-9	Maximum Flow – Flow networks, Ford-Fulkerson, Maximum Bipartite Matching (Chapter 26)

Nov 12-16	**Veterans Day, Nov. 12th – No class** Probabilistic Analysis and Randomized Algorithms – hiring problem, indicator random variables (Appendix C, Chapter 5.1-5.3) **Homework #7**
Nov 19-23	**No Class – Thanksgiving – Nov. 21,23** Randomized Algorithms (Chapter 5.4) **Homework #8**
Nov 26-Nov 30	Multithreaded Algorithms (Chapter 27)
Nov. 30	**Last Day of Class – Exam Review**
FINAL EXAM	**Wednesday, Dec 5** **10:00am – 12:50pm**