COP 3503 Honors – Computer Science II - Fall 2022 Syllabus

Instructor: **Joseph J. LaViola Jr.**
Classroom: **ENG1 383**

Office: **Engineering III Room 321**
Hours: **Mon. 4:00pm – 6:00pm – Zoom only**
Or by appointment
Email: jjl@cs.ucf.edu

If you want to email me, MAKE SURE to enter in the subject line "**cop3503h**" followed by **your name**.

Web page
http://www.cs.ucf.edu/courses/cop3503h/fall2022/

Some material may also be available on Webcourses

Course Details

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, Fourth Edition, by Cormen, Leiserson, Rivest, and Stein, MIT Press, 2022.

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	25
Final Exam	30
Homework Assignments	45

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. To ensure safety and to minimize risk it is recommended that any collaboration conducted when working on Collaborative homeworks is done remotely or at a safe distance (3 feet). If you need assistance with a particular homework problem, please see the instructor. Note that Take-Home Exam 1 is NONCOLLABORATIVE!!

Required Statement Regarding COVID-19

University-Wide Face Covering Policy for Common Spaces and Face-to-Face Classes

To protect members of our community, everyone is recommended to wear a facial covering inside all common spaces including classrooms.

COVID-19 and Illness Notification

Students who believe they may have a COVID-19 diagnosis should contact UCF Student Health Services (407-823-2509) so proper contact tracing procedures can take place.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19, have tested positive for COVID, or if anyone living in their residence has tested positive or is sick with COVID-19 symptoms. CDC guidance for COVID-19 symptoms is located here: (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)

Students should contact their instructor(s) as soon as possible if they miss class for any illness reason to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) before missing class.

In Case of Faculty Illness

If the instructor falls ill during the semester, there may be changes to this course, including having a backup instructor take over the course. Please look for announcements or mail in Webcourses@UCF or Knights email for any alterations to this course.

Course Accessibility and Disability COVID-19 Supplemental Statement

Accommodations may need to be added or adjusted should this course shift from an on-campus to a remote format. Students with disabilities should speak with their instructor and should contact sas@ucf.edu to discuss specific accommodations for this or other courses.

Tentative Lecture Schedule

Week	Topic
Aug 22-26	Syllabus, Role of Algorithms, Mathematical preliminaries, Getting started with algorithm design and analysis (Chapters 1, 2, Appendix A,C,D)
Aug 29- Sep 2	Growth of Functions, asymptotic notation, standard notations (Chapter 3), Recurrence relations – substitution, iteration, recursion-tree and master method (Chapter 4.3 - 4.5, 4.7) **Homework #1**
Sep 5-9	Divide-and-Conquer – Matrix multiplication, Strassen's algorithm, (Chapter 4.1 - 4.2) **No Class - Labor Day – Sept. 5th**
Sep 12-16	Sorting – Heapsort, QuickSort (Chapter 6, 7) Sorting in Linear time – counting sort, bucket sort, radix sort (Chapter 8) **Homework #2**
Sep 19-23	Order Statistics – min and max, selection (Chapter 9) Start Dynamic Programming – Rod cutting, matrix chain multiplication (Chapter 14.1-14.2) **Homework #3**
Sep 26-30	Dynamic Programming – elements of dynamic programming, longest common subsequence, optimal binary search trees (Chapter 14.3 –14.5)
Oct 3-7	Greedy Algorithms – activity selection, greedy strategy elements, Huffman codes (Chapter 15) **Homework #4**
Oct 10-14	**Take Home Midterm Exam** Graph Algorithms – Notation, BFS, DFS, Topological sort. Strongly connected components (Chapter 20)
Oct 17-21	Minimum Spanning Trees – Kruskal and Prim algorithms (Chapter 21)
Oct 24-28	**Withdrawal Deadline – Oct. 28th** Single Source Shortest Paths – Bellman-Ford, Dijkstra's algorithm (Chapter 22) **Homework #5**
Oct 31- Nov 4	All-Pairs Shortest Paths – Floyd-Warshall, Johnson's algorithm for sparse graphs (Chapter 23) **Homework #6**
Nov 7-11	Maximum Flow – Flow networks, Ford-Fulkerson, Maximum Bipartite Matching (Chapter 24)

Nov 14-18	Randomized Algorithms (Chapter 5.3) Parallel Algorithms (Chapter 26) **Homework #7**
Nov 21-25	**No Class – Thanksgiving – Nov. 23rd** Parallel Algorithms (Chapter 26) **Homework #8**
Nov 28 - Dec 2	Parallel Algorithms (Chapter 26)
Nov 30	**Last Day of Class – Exam Review**
FINAL EXAM	**Monday, Dec 5th** **10:00am – 12:50pm**