

COP 4516: Problem Solving Techniques and Team Dynamics Syllabus

Contest Website: <http://cop4516.ucfprogrammingteam.org/>

Class Times/Location: R 9:30 – 10:20am (ENG2-205),
Lab Time/Locations: F 9:00 – 11:50am (HEC-202, HEC-308)

Lecturer: Nicholas Buelich **Email:** Nicholas.Buelich@ucf.edu
Office Hours: R 10:30 – 11:59am, F 8:00 – 9:00am (HEC-202)

Teaching Assistant: Kyle Martin **Email:** kyle.martin@knights.ucf.edu
Office Hours: T 3:00 – 5:00pm, F 12:00 – 1:00pm (HEC 250)

**Note: I do NOT check my WebCourses email. Please email me at
nickbuelich@knights.ucf.edu to contact me.**

Course Description: This course covers training similar to that given to UCF's programming team. Lectures will cover classical algorithms, some of which are taught in Computer Science 2, that tend to be useful in solving programming contest problems. Emphasis will be placed on implementation issues. The general topics covered are: number theory, brute force search, greedy algorithms, graph algorithms, dynamic programming algorithms and geometry algorithms.

Note: There is NO course textbook. Rather, course notes and websites will be used as primary sources. If one strongly desires a book, here are a few that would suffice:

Introduction to Algorithms – Cormen, Leiserson, Rivest, Stein (ISBN: 978-0-262-03384-8)

Programming Challenges – Skiena, Revilla (ISBN: 0-387-00163-8)

Algorithms – Dasgupta, Papadimitriou, Vazirani (ISBN: 0-07-352349-2)

The Design and Analysis of Algorithms – Levitin (ISBN: 0-321-35828-7)

Grading

This course will have five components

Item	Quantity	Total Percentage
Hackpack	1 (in teams)	20
Individual Contests	6	30
Team Contests	6	30
Individual Contest Exam	1	10
Team Contest Exam	1	10

Hackpack

Each team will be responsible for producing one hackpack. Minimal requirements will be given for the hackpack. If these are met, 80% will be awarded. The last 20% will be unspecified and based on exceeding the minimum requirements. Each team will make a single submission of their hackpack towards the end of the course, but it's strongly suggested that each team create weekly internal deadlines for the hackpack.

Individual Contests

For the first six weeks of the course, individual contests will be held on Fridays, each with three problems. 100% will be given to any question correctly submitted during the contest. 90% will be given to any question correctly submitted after the contest, but before judge input/output data is posted. 80% will be given for questions answered correctly after the data is posted and before the contest closes at 11:59pm Wednesday. For any submissions that don't work, a maximum of 80% will be awarded, depending on the number of test cases the submission solves correctly, but at least a 50% will be awarded.

Team Contests

For the second half of the course, each Friday competition will be in teams. Grading will be determined in the same manner as the individual contests and the same grade will be assigned to each team member, regardless of who solves which questions.

Individual Contest Exam

After the first six weeks of the course, a more comprehensive contest will be given for individuals, graded in the same manner as the regular individual contests. The only difference is the amount that this contest counts towards the grade in the course. (It counts as 10% of the course grade instead of 5%.)

Team Contest Exam

During the final exam period of the course, the teams will compete in a final contest, which will be designed to be easily solvable with a good hackpack. No submissions will be allowed after the contest has ended but more generous partial credit will be given to incorrect submissions (up to 90% instead of 80%.) As usual, any problems completed during the contest will automatically receive 100%.

Academic Misconduct Policy

Since this is an elective (you don't have to be here, so I assume you are here because you WANT to be), I will be more harsh with academic misconduct than usual. **In particular, if there are any clear violations of the academic misconduct policy, I will make official documentation with the necessary witnesses, record the transgression with UCF and fail you from the course.**

The rules for the course are as follows:

- 1) During any individual contests, individuals may **ONLY** look at language APIs online and no other electronic materials. Students may look at any printed materials. Students **may not** talk to any other students during the individual contests about any items that I might think may be helpful in solving the problems. I reserve my right to use my discretion on whether or not a topic of conversation may be helpful in solving a problem. You are safe in telling someone where the bathroom is or describing where a restaurant is located, for example. You are **NOT** safe in explaining the steps of any algorithm or pointing out a restriction in a problem, for example.
- 2) During team contests, you may only talk to your team members about problem related issues and you may **ONLY** look at language APIs online and no other electronic materials. You may look at any printed materials. Communication with non-team members in the course is limited as previously described.
- 3) Backpack – you may look at algorithmic descriptions in print or electronically in developing your team's backpack, but **ALL** of the code must be written originally by a combination of your team members. It is perfectly fine if some or all of the code is written individually, or if all the code is produced with each team member present. It's likely that some code will be written individually and that teams will meet to "finalize" algorithms in their backpack periodically so that each team member is comfortable using any part of the backpack.
- 4) The input/output files posted on Tuesday are intended to help you debug your program and implement the correct algorithm. Do not abuse this information. Do not wrap the output file in a print statement and submit that as your solution. Students doing so will receive a 0% for that problem.

Tentative Schedule

Week	Thursday Class	Friday Class
Jan 12-16	Syllabus/Contest Overview	Ind Contest #1
Jan 19-23	GCD, Perm, Combos	Ind Contest #2
Jan 26-30	Greedy	Ind Contest #3
Feb 2-6	Binary Search	Ind Contest #4
Feb 9-13	Graph – DFS, BFS, MST	Ind Contest #5
Feb 16-20	Graph – Shortest Distance, Top Sort	Ind Contest #6
Feb 23-27	Exam Review	Ind Contest Exam
Mar 2-6	Team Dynamics, Team Selection	Hackpack Planning/Make-up Contest
Mar 9-13	Spring	Break!!!
Mar 16-20	Graph – Network Flow	Team Contest #1
Mar 23-27	DP – LCS, Edit Distance, Knapsack	Team Contest #2
Mar 30-Apr 3	DP – World Series, MCM	Team Contest #3
Apr 6-10	Geometry – Areas, etc.	Team Contest #4
Apr 13-17	Coordinate Geometry – Intersections	Team Contest #5
Apr 20-24	TBD	Team Contest #6
Apr 27-May 1	Team Contest Exam (7am – 10 am)	

I may change this schedule, thus 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 I will tell you what we will be discussing during the next class period. I may not post formal notes from the lectures, so please take all necessary notes during lectures. Good notes for most of the topics I will cover can be found online. I will make whatever notes to which I have access available online for students.