

COP 4516: Problem Solving Techniques and Team Dynamics Syllabus

Course Website: <https://www.cs.ucf.edu/~dmarino/progcontests/cop4516/spr2026>

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Class Times/Locations: T 10:30 – 11:20am (VAB-111),
F 9:00 – 11:50am (BA2-208, BA2-210)

Office: HEC – 240

Office Hours: Posted on Webcourses and course web page

Teaching Assistant: Jackson Simoneau

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Teaching Assistant OfficeHours: Posted on Webcourses and course web page

I do NOT check my WebCourses email. Please email me at dmarino@ucf.edu to contact me.

This course requires Friday participation from 9 am - 12 pm and for students to provide their own laptop. I have some power strips so most students will be able to plug in.

Course Description: This course covers training similar to that given to UCF's programming team. Lectures will cover classical algorithms, most 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)

Competitive Programming 3 - Halim and Halim (cpbook.net)

Guide to Competitive Programming - Laaksonen (ISBN: 978-3-319-72546-8)

Grading

This course will have five components

Item	Quantity	Total Percentage
USACO Contest Participation	2	10
Kattis Contest in Class	1	5
Codeforces Contest in Class	1	5
Team Contests	5	25
Team Contest Exam	1	10
Individual Contests	3	15
Chat GPT Contest Experiment	2	5
Chat GPT Written Reflection	1	5
Course Goals and Reflection	2	5
Individual Contest Exam	1	15

Note: Even though I specifically allowed ChatGPT for an assignment last year, several students chose to use it when they weren't supposed to. This culminated in me spending lots of time trying to figure out what occurred and several students dropping the course (instead of incurring the grade penalty I was going to enforce.)

To this end, I am adding the following critical component to the class:

If I suspect that a student has used ChatGPT or any generative AI or any aids I don't approve for a specific assignment, I reserve the right to do a live coding interview with the student and use that to replace any of the student's grades as I see fit. Unfortunately, due to the near impossible nature of truly figuring out who has used what aids, this is the only recourse I have to try to assign fair grades to students which doesn't trivialize the work of the honest hard-working students in the class.

Method of Awarding Final Grades

Unlike other courses, final grades aren't awarded solely on the basis of the percentage in the course. Since this is a contest class and I have to award grades to individuals, even though a bulk of the grade comes from teamwork, I don't want to award a grade to someone that was largely earned due to the excellence of a teammate. To that end, for each letter grade cut-off, I'll set a minimum number of problems solved **in the six individual contests** in addition to the usual percentage cut-off. In order to earn a letter grade for the course, a student must meet **BOTH** cut-offs. I won't announce these cut-offs until the end of the semester. In the past, I've changed my cut-offs for individual contests (made them lower) because I've seen some individuals work extremely hard in the team phase of the class. **Note: Plus/Minus grades will be awarded when deemed appropriate.**

Contest Rules – All non-Chat GPT Competitions

Students will be able to use language APIs and any printed materials as aids for these competitions. **Students who are proven to break these rules will be automatically given a failing grade in the class and reported to UCF.** If there are suspicions of not following the rules, a portion of the class grade may be replaced with a live coding interview.

USACO Contest Participation

There are two USACO online contests during the semester: one in Jan 30 – Feb 2 and the other is Feb 20 – 23. **You MUST participate in both of them.** (Note: The exception is if you participated in the contest that was before the semester began on Jan 9 – 12.)

To earn credit, you must compete for a minimum of 2 hours and MEET WITH ME TO DISCUSS the contest. Before I award the grade to you, you must come to my office hours, screen share the scoreboard from your computer during my office hours. The deadline to share your first contest's results with me is February 27th, 2026. The deadline to share your second contest's results with me is March 27th, 2026. I may choose to move these deadlines back if I miss some office hours, but **please make every effort to meet with me in a timely matter after the contest.** Note that I will only start the meetings AFTER USACO has released the problems so that I can work on them myself. The credit I assign for this will be based on how you perform in the contest and my impression of your effort level based on our conversation.

(Note: for those of you with past contest experience, I may place the bar a bit higher for you to get full credit based on what I know about your performances in past contests. For students who intentionally underperformed in the past, I gave 60% or 80% for this grade.)

Kattis Contest In Class

This competition will be the first Friday of class. The competition will last three hours. Afterwards, you'll be able to **upsolve** any problems you don't get in class for a period of five days. To get credit, you must submit your code separately in Webcourses. Your grade will be based on how you perform in contest as well as the code you submit. Instead of using a straight simple quantitative scale here (which will occur for all contests on our contest management system), I will be awarding relative grades based on my perception of how students did and the quality of the code they wrote. Your submission to Webcourses should contain both solutions to questions you solved correctly in contest and those you upsolved. (Note: Upsolving is correctly solving a problem that you weren't able to solve during a contest, after the fact.)

Codeforces Contest In Class

This competition will be the second Friday of class. The competition will last ??? hours. Afterwards, you'll be able to **upsolve** any problems you don't get in class for a period of five days. To get credit, you must submit your code separately in Webcourses. Your grade will be based on how you perform in contest as well as the code you submit. Instead of using a straight simple quantitative scale here (which will occur for all contests on our contest management system), I will be awarding relative grades based on my perception of how students did and the quality of the code they wrote. Your submission to Webcourses should contain both solutions to questions you solved correctly in contest and those you upsolved. (Note: Upsolving is correctly solving a problem that you weren't able to solve during a contest, after the fact.)

Team Contests

For weeks 3 – 8, each Friday competition will be in teams. Based on how students perform in the first two competitions (week 1, 2) and other factors, **I WILL ASSIGN TEAMS.** Grading will be determined as follows: teams which solve a problem correctly during the contest will get 100% for that problem, teams which solve a problem after the contest has ended but before I post data on Monday 10 am will get 80% for that problem and teams that solve a problem before Wednesday 10 am but after Monday 10 am will get a 60% for that problem. 0% is awarded for problems not solved by Wednesday at 10 am. The same grade will be assigned to each team member, regardless of who solves which questions. **Note: It's rarely the case on a good team that team members split up the work equally. Trying too hard to split up the work equally will likely worsen your team's performance and grade.**

Team Contest Exam

The details for how this will be graded will be released in class. The key difference for this competition versus previous ones is that no submissions will be allowed after the contest has ended.

Individual Contests

After Spring Break, students will compete individually. For the first three Fridays after Spring Break there will be traditional Individual Contests on Fridays, each with 4 problems. The grading will be the same as the grading for the Team Contests.

Chat GPT Contest Experiment

Each student will be allowed to use Chat GPT in one competition for the course. The goal of this experiment is to gather data on its use in a contest setting.

Chat GPT is strictly forbidden for all other assignments in the course. If a student is caught using it or any other aids not approved, they will be reported to UCF and given a failing grade in the course with a Z designation.

There will be two competitions for this portion of the course. For the first of the two competitions, a randomly selected group of students will be chosen to be in the experimental group. These students will be allowed to use **the free version of ChatGPT** in addition to the usual aids (any printed materials and searching language APIs online.) for that competition. The other half of the students will compete normally.

In the second competition, the two groups will flip. The reason for this is for fairness in grading and also to provide a baseline of performance for each student.

Each of these competitions will be worth 2.5% of the course grade and will be held during the last two weeks of class.

ChatGPT Written Reflection

All students will be required to write a reflection about their work on both weeks during the ChatGPT contest. This reflection should include the **exact prompts** given to ChatGPT, as well as a reflection on how useful it was as a tool and how it affected your learning. (The specific detailed prompts and questions for the reflection will be given in Webcourses.)

Course Goals and Reflection

We often get better at competitions through self-analysis. Near the beginning of the course, I will have each student submit a document stating their goals for the course. Later, at the end of the semester, before the Final Individual Contest, I'll ask you to write a reflection piece on how you think you performed in all class competitions, focusing on what you did well and what you could improve upon and how you might be able to achieve that improvement. The idea here is to help you prepare for the Individual Contest Exam. Both of these will be due over Webcourses.

Individual Contest Exam

During the final examination period of the class, a more comprehensive contest will be given for individuals. The only differences are that no submissions will be allowed after the contest is over, that this contest counts towards 15% of the final grade instead of 5% and all of the questions in this contest will be newly created for the contest itself. Grading details will be discussed in class.

Policy for Absences from Friday Contests

For individual contests, if you are absent for a significant portion (more than 1 hour) of the contest **without prior approval**, then **NO PARTIAL CREDIT CAN BE EARNED FOR SOLVING PROBLEMS AFTER THE CONTEST.** (Naturally, if you solve all of the problems in the contest early, you are immediately free to go! But, if you show up very late or leave very early and leave problems unsolved, then you can't later earn 80%/60% credit on those questions.)

Since many of you are busy (whether it be lining up interviews for potential jobs or working current jobs), if you know in advance that you'll have to miss on a particular Friday for an individual contest, then **please notify me in advance.** I will let you make up the grade by running a specified online contest in real time. (**I will give you a short selection of options and you must choose one of them.**) This is in addition to the two online contests you'll have to run during the semester. Based on your performance and the code you show me, I'll assign a grade that I feel is appropriate. I need to leave myself full discretion here due to the differences in difficulty of various contests and the limited availability of online contests during short time frames.

If you need to miss a team contest Friday **and tell me in advance**, you have two options: (a) If your team agrees, they can pick up your slack and I'll give you the grade they earn for the week without you. (b) I can assign you an additional individual online contest to run.

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, the course webpage 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 the ChatGPT competitions, if you are in the experimental group for that competition, you may use **the free version of ChatGPT** in addition to the usual resources allowed. If you are NOT in the experimental group for a competition, then the rules from #1 apply.
- 3) During team contests, you may only talk to your team members (use any means of virtual communication you find useful) 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.

Live Lectures (Tuesdays 10:30 am - 11:20 am)

Each week, I'll lecture on a topic, usually reviewing material from CS1 or CS2. Since students have seen this material before, I won't teach it from the ground up as it is taught in those classes. Instead, I'll just highlight some key points for review and spend more time on implementation details and other tips about how to apply the topic to solving contest problems. During some lectures I'll live code solutions to problems (as a way of modeling how to compete and also to show you that I make lots of mistakes!) and during others I'll go over pre-written code examples to show you a standard way I code a particular algorithm. Most contestants either compete in C++, Java or Python. Currently, my website has Java support code and some C++ support code. These sessions will not be taped.

In addition, the course web page will be used to maintain a great deal of the content:

<http://www.cs.ucf.edu/~dmarino/progcontests/cop4516/spr2026>

Tentative Schedule

Week	Tuesday Class	Friday Class
Jan 12	Java/C++ API and Kattis	Kattis Contest (Ind)
Jan 19	Team Dynamics, Codeforces, USACO	CF Virtual Contest (Ind)
Jan 26	Brute Force	Team Contest #1
Feb 2	Take it or leave it DPs (Knapsack, LCS, Neighbor)	Team Contest #2
Feb 9	DP – Edit Distance, MCM, World Series	Team Contest #3
Feb 16	Binary Search	Team Contest #4
Feb 23	2D Geometry	Team Contest #5
Mar 2	Cumulative Sums, Binary Index Trees	Team Contest Exam
Mar 9	Number Theory	NO CONTEST!
Mar 16	SPRING BREAK	
Mar 23	Unweighted Graph Algorithms	Ind Contest #1
Mar 30	Weighted Graph Algorithms	Ind Contest #2
Apr 6	Graph – Network Flow	Ind Contest #3
Apr 13	Trees	Chat GPT #1
Apr 20	Tries	Chat GPT #2
Apr 27	NO CLASS	
May 4	Team Contest Exam (10 am – 1 pm), Tuesday May 5th	

I may change this schedule, thus coming to class is very important. This is a general time frame only and is subject to the needs of the class. 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.