



UNIVERSITY OF
CENTRAL FLORIDA

COP 4516C - Problem Solving Techniques and Team Dynamics

Section: 0001

College of Engineering and Computer

Science

Department of Computer Science

Course Information

Term: Spring 2025

Class Meeting Days: T

Class Meeting Time: 10:30AM - 11:20AM

Class Meeting Location: HEC 0118

Modality: P

Credit Hours: 3.00

Syllabus First Page

COP 4516: Problem Solving Techniques and Team Dynamics Syllabus

Course Website: <http://www.cs.ucf.edu/~dmarino/progcontests/cop4516/spr2025>

Lecturer: Arup Guha **Email:** dmarino@ucf.edu

Class Times/Locations: T 10:30 – 11:20am (HEC-118),

F 9:00 – 11:50am (PSY-111, CB1-119)

Office: HEC – 240

Office Hours: Posted on Webcourses and course web page

Teaching Assistant: Justin Almazan

Teaching Assistant Email: justin.almazan@ucf.edu

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. I'll reassign students to the two lab rooms, CB1-119 and PSY-111 after the first day of class. Do NOT use room for which you signed up on Friday!!!

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)

Instructor Information

Arup Guha

Title: Senior Instructor

Office Location: HEC-240

Office Hours:

<https://www.cs.ucf.edu/~dmarino/ucf/OH.html>

Email: dmarino@ucf.edu

Teaching Assistants

Justin Almazan is the course TA. His office hours will be listed here:

<https://www.cs.ucf.edu/~dmarino/progcontests/cop4516/spr2025/>

Course Description

COP 4516C ECS-CS 3(1,3) Problem Solving Techniques and Team Dynamics: PR: COP 3503C with a grade of C (2.0) or better. Design and implement solutions to problems requiring the applications of the different algorithms. Team project format. Occasional.

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.

Course Materials and Resources

No textbook required for this course.

ISBN: 9781716745522

Authors: Steven Halim, Felix Halim, Suhendry Effendy

Publication Date: 2018-12-03

Student Learning Outcomes

After successful completion of this course, students will be able to:

1. Improve their skills in programming competitions hosted on sites such as USACO, codeforces and Kattis.
2. Increase the speed with which they solve problems they've never seen before, but which can be solved with primitives they've learned.
3. Increase the speed in which they convert algorithmic ideas into working code.
4. Hopefully, accomplishing #1, #2 and #3 will help students whiteboard better in job interviews.

Course Assessment and Grading Procedure

Grading

This course will have five components

Item	Quantity	Total Percentage
Online Contest Participation	2	10
Written Reflections	2	4
Chat GPT Contest Experiment	2	6
Individual Contests	5	25
Team Contests	5	25
Individual Contest Exam	1	20
Team Contest Exam	1	10

UCF Practice/Online Contest Participation (USACO)

There are several online websites that run programming contests. In the past I would allow students to use many websites, but ironically, giving students choice reduced the number of students who completed the assignment. (Students would think they had many options and would delay participation, only to realize a few days before the deadline that no actual contests were offered.) Instead, this semester I am only allowing students to participate in USACO contests. There will be three contests: one in January(24th-27th), one in February(21st-24th) and one in March (21st-24th). **You MUST participate in two of them.**

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 28th, 2025. The deadline to share your second contest's results with me is April 18th, 2025. 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. Thus, I'll probably start checking off January's contest on February 3rd, February's contest on March 3rd and March's contest on April 7th. 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.)

Written Reflections on Contest Performance

We often get better at competitions through self-analysis. After the first six Individual Contests are complete, I'll ask you to write a reflection piece on how you think you performed in those contests (and the extra online contests), 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, which is a larger portion of the course grade. Then, after the six Team Contests, I'll ask your team to submit a single reflection piece on the team's performance and what improvements/adjustments can be made to maximize performance for the Final Team Contest. Also, each person on the team will submit an individual reflection about their efforts. Both of these will be due over Webcourses.

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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.

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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 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.

Though not for a grade, I will solicit student feedback about the experiment to try to match my quantitative results with your qualitative feedback.

Each of these competitions will be worth 3% of the course grade and will be held on the fourth and fifth weeks of class.

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Individual Contests

For the portion of the course, individual contests will be held on Fridays, each with 4 problems. 100% will be given to any question correctly submitted during the contest. 80% will be given to any question correctly submitted after the contest, before the test data is posted. 60% will be given to any question correctly submitted after the test data is posted but before 10 am of the Wednesday after the contest has completed. 0% is awarded otherwise.

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.

These competitions will occur on weeks 1, 2, 3, 6 and 7 of the course.

Team Contests

For the latter portion of the course, each Friday competition will be in teams. Based on how students perform in the first half of the class and other factors, **I WILL ASSIGN 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. **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.**

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Individual Contest Exam

After the first seven weeks of the course, 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 20% 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.

Team Contest Exam

During the final exam period for the course, the teams will compete in a final contest. No submissions will be allowed after the contest has ended. Grading details will be discussed in 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 seven 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. To give you an idea where this cut-off might lie, in the past, it's usually been around 12-15 problems for an A, over the seven individual contests, so an average of close to 2 problems correct per contest should be good enough to earn an A in the course. **Note: Plus/Minus grades will be awarded when deemed appropriate.**

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Community Service Option to replace one regular Individual Contest Grade

If you are not happy with one of the **individual contest grades** you have received, then I'll allow you to do five hours of community service with a registered 501(c)(3) organization **BEFORE April 8, 2025** and turn in the required signed form and activity summary (more details on the course web page) by **10:30 am on April 8, 2025**. On the form you will list which grade you would like to replace and that grade will be changed to a 100%. This may be a good option if you are forced to miss class on one of the first six weeks of school. **Please make sure you get the activity approved from me beforehand.**

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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.

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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 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.

Grading Scale

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 seven 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. To give you an idea where this cut-off might lie, in the past, it's usually been around 12-15 problems for an A, over the seven individual contests, so an average of close to 2 problems correct per contest should be good enough to earn an A in the course. ***Note: Plus/Minus grades will be awarded when deemed appropriate.***

Policies for Course Grade

Posted in Course Assessment and Grading Procedure.

Course Accessibility

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need access to course content due to course design limitations should contact the professor as soon as possible. Students should also connect with [Student Accessibility Services \(SAS\)](#) (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course

barriers experienced by the student. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

Academic Integrity

Students should familiarize themselves with UCF's Code of Conduct at [Student Conduct and Integrity Office](#). According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

- a. Academic misconduct is defined as any submitted work or behavior that obstructs the instructor of record's ability to accurately assess the student's understanding or completion of the course materials or degree requirements (e.g., assignment, quiz, and/or exam). Examples of academic misconduct include but are not limited to: plagiarism, unauthorized assistance to complete an academic exercise; unauthorized communication with others during an examination, course assignment, or project; falsifying or misrepresenting academic work; providing misleading information to create a personal advantage to complete course/degree requirements; or multiple submission(s) of academic work without permission of the instructor of record.
- b. Any student who knowingly helps another violate academic behavior standards is also in violation of the standards.
- c. Commercial Use of Academic Material. Selling of course material to another person and/or uploading course material to a third-party vendor without authorization or without the express written permission of the University and the instructor of record. Course materials include but are not limited to class notes, the instructor of record's slide deck, tests, quizzes, labs, instruction sheets, homework, study guides, and handouts.
- d. Soliciting assistance with academic coursework and/or degree requirements. The solicitation of assistance with an assignment, lab, quiz, test, paper, etc., without authorization of the instructor of record or designee is prohibited. This includes but is not limited to asking for answers to a quiz, trading answers, or offering to pay another to complete an assignment. It is considered Academic Misconduct to solicit assistance with academic coursework and/or degree requirements, even if the solicitation did not yield actual assistance (for example, if there was no response to the solicitation).

Responses to Academic Dishonesty, Plagiarism, or Cheating

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, [The Golden Rule](#). UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an "F" letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct and Academic Integrity, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a "Z" designation on one's transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let's avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

Title IX

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can find resources available to support the victim, including confidential resources and information concerning reporting options at [Let's Be Clear](#) and [UCF Cares](#).

For more information on diversity and inclusion, Title IX, accessibility, or UCF's complaint processes contact:

- Title IX – OIE – [Office of Institutional Equity](#) & askanadvocate@ucf.edu
- Disability Accommodation – Student Accessibility Services – [Student Accessibility Services](#) & sas@ucf.edu

- [Access and Community Engagement](#) (including the Ginsberg Center for Inclusion and Community Engagement, Military and Veteran Student Success, and HSI Initiatives)
- UCF Compliance and Ethics Office – [Compliance, Ethics, and Risk Office](#) & complianceandethics@ucf.edu
- The [Ombuds Office](#) is a safe place to discuss concerns.

Reporting an Incident or Issue

If you believe you have experienced abusive or discriminatory behavior by any faculty or staff member, contact the Office of Institutional Equity [online](#) or at 407-823-1336. You can also choose to report using the UCF Integrity Line and can report anonymously or as yourself at 1-855-877-6049 or using the [online form](#). UCF cares about you and takes every report seriously. For more information see the [Reporting an Incident or Issue Webpage](#).

Deployed Active-Duty Military Students

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

Campus Safety

At UCF Public Safety and Police, safety is the top priority. Emergencies on campus are rare, but if one should arise, it's important to be familiar with some basic safety and security concepts.

- In an emergency, always dial 911.
- Every UCF classroom has an **Emergency Procedure Guide** posted on a wall near the door, which will show you how to respond to a variety of situations. This guide can also be found online [here](#).

- In the event of an active threat, remember **AVOID, DENY, DEFEND**. Choose the best course of action and act immediately. Watch the video [here](#) to learn more.
 - **AVOID**. Pay attention to your surroundings and have an exit plan. Get as much distance and as many barriers between you and the threat as quickly as possible.
 - **DENY**. When avoiding is difficult or impossible, deny the threat access to you and your space. Lockdown by creating barriers, turning the lights off and remaining quiet and out of sight. Make sure your cell phone is silenced, but do not turn it off.
 - **DEFEND**. When you are unable to put distance between yourself and the threat, be prepared to protect yourself. Commit to your actions, be aggressive and do not fight fairly. Do whatever it takes to survive.
- For emergencies on campus, UCF will utilize the [UCF Alert](#) system. All UCF students, faculty and staff are automatically enrolled to receive these email and text alerts, however, it's a good idea to frequently ensure your [contact information is up to date](#).

Financial Aid Accountability

All instructors/faculty are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete this activity by the end of the first week of classes or as soon as possible after adding the course. Failure to do so may result in a delay in the disbursement of your financial aid.

Class Schedule

Tentative Schedule

Week	Tuesday Class	Friday Class
Jan 6	Java/C++ API, Brute Force	Ind Contest #1
Jan 13	Java/C++ API, Greedy	Ind Contest #2
Jan 21	Java/C++ API, Trees	Ind Contest #3

Jan 27	Tries	Chat GPT #1
Feb 3	Graph – DFS, BFS	Chat GPT #2
Feb 10	Shortest Distance, Top Sort	Ind Contest #4
Feb 17	Cumulative Sums, Mathematics	Ind Contest #5
Feb 24	Team Dynamics	Ind Contest Exam
Mar 3	Graph – Network Flow	Team Contest #1
Mar 10	Take it or leave it DPs (Knapsack, LCS, Neighbor)	NO CONTEST!
Mar 17	Spring	Break!!!
Mar 24	DP – Edit Distance, MCM, World Series	Team Contest #2
Mar 31	2D Geometry	Team Contest #3
Apr 7	Binary Search Applications	Team Contest #4
Apr 14	Binary Index Trees	Team Contest #5
Apr 21	NO CLASS	
Apr 28	Team Contest Exam (10 am – 1 pm), Tuesday April 29th	

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.