

# CMPSC 465 Spring 2021 Syllabus

Please note that the specifics of this Course Syllabus can be changed at any time, and you will be responsible for abiding by any such changes. All changes will be communicated to you via Canvas mail or course announcements.

**Instructors:** Prof. Chunhao Wang and Prof. Paul Medvedev. Contact via Canvas mail. Do not use email.

## Teaching Assistants:

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**Learning Assistants:** To be determined

**Office hours:** Instructor office hours will be posted [here](#) and TA/LA office hours will be posted [here](#).

## Lectures and Recitations:

- Lectures on Tuesdays and Thursdays 1:35 - 2:50
- Recitations are held Wednesdays and will not be recorded.
- Lectures and recitations will be held via Zoom, accessible through Canvas (see [here](#) for help). We will aim to record the lectures and make them available via Canvas afterwards. However, this is not guaranteed as there may be technical issues.

**Required textbook:** Algorithms, by Dasgupta, Papadimitriou, and Vazirani, 1st edition, ISBN 9780073523408

## Additional references:

- Algorithm Design - Kleinberg and Tardos (up to Chapter 8)
- Introduction to Algorithms - Cormen, Leiserson, Rivest and Stein

## Prerequisites:

- CMPSC 132 (Programming and Computation II: Data Structures)
- CMPSC 360 (Discrete Math) or MATH 311W

**Course Goals and objectives:** Introduce general principles and techniques for the design and analysis of algorithms, as well as related data structures. At the end of this course, a successful student will be able to:

- Determine the growth rates of functions and analyze the complexity of various algorithms
- Solve recurrence relations when calculating time and space complexity
- Recall, explain, and utilize a variety of algorithms and design paradigms (including divide-and-conquer, greedy and dynamic programming, and other classic algorithms)
- Design algorithms using the building blocks presented in this class to solve programming problems
- Formulate appropriate and efficient data structures

**Tentative Topics:** Asymptotic analysis and Big-O notation, Divide and conquer, Graph algorithms, Greedy algorithms, Dynamic programming, Network flow, Linear programming, NP completeness

**Grading:**

- Homework assignments, 30%
- Midterms: 40%
- Final exam: 30%

## Logistics

**Schedule:** This class typically has 30 lectures and 15 recitations; however, due to Wellness days, it will have only 27 lectures and 14 recitations this term. Most of these lectures will be delivered live via Zoom during the scheduled lecture time. A few will be pre-recorded and students are required to view them asynchronously.

**Attendance Policy:** **Students are required to attend all lectures live.** In the case this creates a burden for the student (e.g. due to time zones), they may choose instead to listen to a recorded lecture in their own time, provided that there is no exam or other in class assessment scheduled. We will announce such assessments in advance. **Students are required to attend all recitations live.** Recitation sections may cover important material not covered in lecture and provide an opportunity to work on problems in groups and/or with your TA's. This should give you a much better grasp of the course material. The TAs may also review or supplement some of the concepts from lectures. A handout with problems will be provided each week.

**Canvas:** Class announcements, lecture notes, slides, recorded lectures, homework assignments, and recitations notes will be posted on Canvas. All announcements will be posted to Canvas. Students are responsible for staying up-to-date with announcements made on Canvas and emails received through Canvas. Students should set up mail forwarding in Canvas so that they can immediately receive announcements.

**Gradescope:** Homeworks need to be submitted to Gradescope. Our class code is D55DXR. Use this code to join the class in Gradescope. Make sure you use your Penn State email address and your student ID number. If you have not used Gradescope before, please familiarize yourself by watching the "For students:..." videos at [https://www.gradescope.com/get\\_started](https://www.gradescope.com/get_started).

**Piazza:** Discussions and Q&A will be via Piazza: <https://piazza.com/class/khnhf39z5s03bs>. Please post any questions regarding homework problems or course material here. Be careful to not post questions that give away parts of the answers (or the whole answer). When in doubt, make the question private to the TAs and they will make it public if they deem it safe.

## Homeworks and exams

### Homework Assignments

- Every Thursday evening or earlier, a problem set will be posted on Canvas. It will be due the following Thursday by 10:00 PM EST.
- Homeworks submitted late but no later than 11:59 PM EST will receive a 20% penalty. Homeworks not submitted by 11:59 PM EST will receive 0. There will be no exceptions to this policy.
- Students will automatically have their **lowest 3 homework grades dropped**. In other words, if there are 14 homeworks, then only the 11 highest grades will be used to calculate the homework score.

- Homeworks must be submitted as a PDF document to Gradescope. All your solutions must be typed (Latex is preferred: a latex template has been provided on canvas; Microsoft Word is acceptable). Handwritten homework will not be accepted, with the exception of drawn figures. Under no circumstances will we accept homework not submitted through Gradescope. Please submit in advance to leave time for any technical difficulties -- if you encounter an issue at 10:00 PM and Gradescope does not let you submit the homework, it will not count as an excuse.
- A subset of the problems for each assignment will be graded. This may be all of the problems. If any problems will not be graded, this will not be announced before the due date.
- Some homeworks might not be graded. This will not be announced in advance.

### Collaboration on homework

- Students may work on the homework in groups of up to three people. **Each student must write their own solutions** and explicitly acknowledge in on the front page of the write-up everyone whom they have worked with or who has given them any significant ideas about the homework solutions.
- You may also use books or online resources to help solve homework problems. All consulted references must be acknowledged on the front page. We would like to emphasize that you should write your homework solution strictly by yourself. You should never provide your written solutions to anyone, nor should you obtain anyone else's. If you are ever in doubt about what constitutes improper collaboration, ask your Instructors.
- It is a violation of the collaboration policy to submit a problem solution that you cannot orally explain to an instructor or TA. In such cases, the whole assignment will receive a score of 0.
- Students are encouraged to solve the problem sets on their own using only the textbook and lecture notes as a reference. This will give them the best chance of doing well on the exams. Relying too much on the help of group members or on online resources will hinder the students' performance on the exams.

### Exams

- The two midterms will be non-cumulative, i.e. the second midterm will not directly cover the material covered by the first midterm. However, since the concepts tested on the second midterm build upon those on the first midterm, you will still need to understand the material from the first midterm to answer the second midterm questions.
- The final exam will be cumulative and cover the material in the whole course.
- Handwriting needs to be legible. If it is not recognizable, it will be graded as a wrong answer.
- You are allowed to refer to the textbook, your and the instructor's lecture notes, and all other handouts given during the class. However, you may not consult any other materials or people during the exam. For example, it is a violation of this policy to perform an internet search during the exam.
- **Exams will be held during the regular lecture time slots and students are required to attend.** Makeup exams will be given only for University-approved absences. These do not include illness or other emergencies.
- Students will automatically have their **lowest midterm grade dropped**. For example, if a student receives 90% and 80% in the two midterms, then they will receive 36 out of the 40 percentage points allocated for the midterm.

**Re-grading policies:** Regrading requests of homework or exams should only be undertaken in cases where you believe there has been a genuine error or misunderstanding. **Any requests for grade changes or re-grading must be submitted via Gradescope within a week of the grades and solutions (the latest of the two) being published.** The grader will revise your solution carefully and adjust your grade; note that your grade may go up or down after the review. If after review, you still have questions, please first approach your recitation TA about the problem. If questions remain, your instructors will be happy to answer remaining issues.

# Frequently asked questions and other accommodations.

**Accommodations for illness, late homeworks, missing homeworks, and other extenuating circumstances:** We understand that this is a difficult time for many students and **we therefore have made our grading policy substantially more accommodating this term, while still trying to preserve fairness and student learning. This includes dropping the lowest midterm and dropping three lowest homework scores.** However, we wish to stress that out of fairness to all the students, **we will not make any additional accommodations.** For example, if you miss both midterms, even due to reasons such as illness, you will receive a 0 for the midterm fraction of the final grade.

It is highly recommended that you skip turning in homework or miss a midterm only in exceptional circumstances. You may be tempted to decide in advance to skip doing a homework or take one midterm off--however, you do so at your own risk. For example, If you decide to take the first midterm off and then are sick for the second midterm, you will end up with a 0 for the midterm part of the grade. In the case that you believe that your missed assignments have been due to reasons such as illness and they have affected your final grade in an unacceptable way, we recommend that you switch to alternate grading or drop the course.

**Getting help:** The following should help guide you as to which course staff to ask for help

- For questions about the course material, you can post your question on Piazza or check Piazza if other people have a similar question. If you prefer to discuss your question over Zoom, there will be frequent office hours, hosted by a TA or a LA (schedule will be updated [here](#)).
- For questions about your grades on an assignment or exam, please contact your recitation TA by email or come to their office hours
- For general course questions, your recitation TA will be the best point of contact.
- For all other concerns, please contact the instructors through Canvas or come to their office hours. Due to the enrollment count of this course, no guarantees can be made about timeliness of Canvas responses by the instructors. Instructors will redirect questions about course material to Piazza, as that will benefit the most students. However, do contact your instructors for questions about your overall performance in the class, or for other confidential matters.
- **Use Canvas mail to communicate with the instructors (Dr. Medvedev and Dr. Wang). Do not use direct email, as it may not be seen by the instructors.**

## FAQ

- Q: What happens if I have been exposed to someone with COVID and I have to quarantine for an extended period of time?
  - A: Because the class is remote, this should not have an impact on your work in the class
- Q: What happens if I get COVID (or another serious illness) and have to miss lectures/assignments/midterms for an extended period of time?
  - Because you will have three lowest homeworks dropped and one midterm score dropped, this will allow you to not hand in homework assignments and not take any midterms for at least 2 or 3 weeks due to illness. Because of this policy, there will be no make-up midterms or homeworks offered due to illness. Please note that you will still be responsible for catching up on the material missed, as it will be on the final exam.
- Q: If I get COVID or have to quarantine, do I need to tell the course staff?
  - A: No, you do not need to inform us.
- Q: What if I miss the final because I have COVID or another serious illness?

- A: This will be handled on a case by case basis. Please contact the instructors at least 24 hours before the final exam if you are not able to make it.
- Q: What if I already skipped three homeworks but now missed the late submission deadline by one minute and received a zero? Can my work still be accepted?
  - A: No. We strongly discourage anyone from taking homeworks or midterms "off" and doing so is at your own risk.
- Q: What if I am unlucky and have to miss more than one midterm because of illness?
  - A: We strongly suggest dropping the class in this case. For a student to receive a passing grade in the class, the instructors need to certify that they learned the material at a satisfactory level. If a student misses two midterms, they unfortunately cannot do that.
- I am stuck in a different timezone due to travel restrictions and all the scheduled office hours are during my night.
  - Q: Will the course staff be able to move their office hours to a time convenient for me?
    - A: Unfortunately, with the amount of students in this class, the course staff cannot accommodate this. We suggest you use Canvas mail and Piazza in such cases as much as possible.
  - Q: What about if the exam falls during my night?
    - A: We have tried to minimize the cases that you need to be physically present at the scheduled time. However, as the course is synchronous, there may be times where you are required to be present at the scheduled time. No special accommodations can be made in those cases.
  - Q: What about if the recitation falls during my night?
    - A: Because recitations span a wide time-range, you have the freedom to enroll in a recitation that works best for your time zone.

## Technical Requirements

For this course, we recommend the minimum technical requirements outlined on the [Dutton Institute Technical Requirements](#) page, including the requirements listed for same-time, synchronous communications. **Access to a reliable Internet connection and a scanning app or scanner is required for this course.** A problem with your Internet access or scanner or scanning app may not be used as an excuse for late, missing, or incomplete coursework. This includes exams, which will be held in a limited time window. If you experience problems with your Internet connection while working on this course, it is your responsibility to find an alternative Internet access point, such as a public library or Wi-Fi ® hotspot. If you need additional technical assistance at any point during the course, please contact the [IT Service Desk](#) (for students at all other campus locations).

This course must be viewed using the latest version of Firefox, Safari, Chrome, or Edge. Internet Explorer is not supported. If you use any other browser, or if you are not using the latest version of your browser, some pages containing equations will not render properly. In addition, javascript must be enabled for equations to render properly. If you have any issues with equations not rendering properly, please update your browser to the latest version or try using a different browser.

The term "Netiquette" refers to the etiquette guidelines for electronic communications, such as e-mail and bulletin board postings. Netiquette covers not only rules to maintain civility in discussions, but also special guidelines unique to the electronic nature of forum messages. Please review some [general Netiquette guidelines](#) that should be followed when communicating in this course. **Communications which blatantly violate Netiquette will be ignored.**

# Other important statements

**Academic Integrity Statement:** Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Students in this class are expected to write up their problem sets individually, to work the exams on their own, and to write their papers in their own words using proper citations. Class members may work on the homework in groups, but each student must write up the answers separately. Students are not to copy homework or exam answers from another person's paper and present them as their own; students may not plagiarize text from papers or websites written by others. Students who present other people's work as their own will receive at least a 0 on the assignment and may well receive an F or XF in the course. To learn more, see Penn State's [Academic Integrity training](#).

The CSE Department has its own statement on Academic Integrity (<http://www.eecs.psu.edu/students/resources/EECS-CSE-Academic-Integrity.aspx>). Academic sanctions for each violation includes a reduction in score for the submission and optionally a reduction of the final letter grade in the course.

**Class Recording:** Video and audio recordings of class lectures will be part of the classroom activity. The video and audio recording is used for educational use / purposes and only may be made available to all students presently enrolled in the class. For purposes where the recordings will be used in future class sessions / lectures, any type of identifying information will be adequately removed.

**Disability Accommodation Statement:** Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources Web site provides contact information for every Penn State campus (<http://equity.psu.edu/student-disability-resources/campus-contacts>). For further information, please visit the Student Disability Resources Web site (<http://equity.psu.edu/student-disability-resources>). In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines (<http://equity.psu.edu/student-disability-resources/applying-for-services>). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. **Please share this letter with your instructors and discuss the accommodations with them at least one week before it is to affect any assessment. Accommodations will not be made retroactively once an assessment is completed.**

**Counseling & Psychological Services Statement:** Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients'



cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation. Some contact information:

- Counseling and Psychological Services at University Park (CAPS) (<http://studentaffairs.psu.edu/counseling/>): 814-863-0395
- Penn State Crisis Line (24 hours/7 days/week): 877-229-6400
- Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

**Education Equity Statement:** Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias webpage (<http://equity.psu.edu/reportbias/>).

**Course Copyright:** All course materials students receive or to which students have online access are protected by copyright laws. Students may use course materials and make copies for their own use as needed, but unauthorized distribution and/or uploading of materials without the instructor's express permission is strictly prohibited. University Policy AD 40, the University Policy Recording of Classroom Activities and Note Taking Services addresses this issue. For example, uploading blank or completed labs, homework, or other assignments to any study site constitutes a violation of this policy. Students who engage in the unauthorized distribution of copyrighted materials may be held in violation of the University's Code of Conduct, and/or liable under Federal and State laws. **For example, uploading homeworks or exams, either blank or with solutions, to any study site constitutes a violation of this policy.**

**Wellness Days:** Tuesday, 2/9 and Thursday, 3/11, and Wednesday, April 7th have been designated as Wellness Days. No class meeting will happen, either in person or remotely, for those three days, and no assignments will be due on those days. Students are encouraged to use these days to focus on their physical and mental health. Please see [wellnessdays.psu.edu](http://wellnessdays.psu.edu) for university sponsored events focusing on wellness that may be of interest to you. See Canvas and the course syllabus for any work that may be due before the next class meeting.