[CS 18200] Foundations of Computer Science

Spring 2025

Sections

- LE1 (20866): TR 10:30 am - 11:45 am, CL50 224
- LE2 (20867): TR 04:30 pm - 05:45 pm, Max W & Maileen Brown Hall 129
- LE3 (10663): TR 05:30 pm - 06:45 pm, CL50 224

Course Prerequisites: CS 18000 and MATH 16100
Course Brightspace link: https://purdue.brightspace.com/d2l/home/1217389

Course Director

- Mr. Justin D. Gillingham
- E-Mail: CS-18200-COOR@LISTS.PURDUE.EDU

Instructors of LE1 and LE2

- Professors Ananth Grama and Wojciech Szpankowski
- E-Mail: CS-18200-COOR@LISTS.PURDUE.EDU
- Online Office Hours: Monday 5:00 PM - 6:00 PM, Zoom details on Brigthspace

Instructor of LE3

- Professor Sarah Sellke
- E-Mail: CS-18200-COOR@LISTS.PURDUE.EDU
- In-person Office Hours: Monday 3:00 PM - 4:00 PM, details on Brightspace

Head-TA (Your First Point of Contact)

- Arun Narayanan Hariharan
- E-Mail: CS-18200-COOR@LISTS.PURDUE.EDU
- In-person Office Hours: Monday 4:00 PM - 5:00 PM, details on Brightspace

See Brightspace for the listing of graduate and undergraduate TAs and TA office hours.

Channels of Communication

- Questions related to lectures and homework problems should be directed to the teaching assistants of your PSO session and the teaching staff during office hours. You may post questions of general interest on **Ed Discussion**. The response time for Ed is typically under 4 hours.
- You may e-mail the CS 18200 Coordinators. Please note that the standard response time for email is 24-48 business hours. Do not email instructors directly – the course coordinators will refer matters to your instructor if necessary.
- If you are seeking accommodations/extensions due to an emergency, you must contact the Office of the Dean of Students (ODOS). You may e-mail CS 18200 Coordinators to let us know about the situation, but the final approval of any extension/accommodation is conditional on ODOS confirmation and approval.
- **Do not send us any medical documentations**. The university policy states: "*Instructors are expected to* **not** *ask students for any medical documentation or information. Should it be provided without a request, instructors are encouraged to return the documents or destroy them in a manner compliant with all legal and Purdue policy protections.*" ODOS will communicate with us on your behalf.

- To ensure equitable treatment of all students, suitable accommodations will only be provided to students who have secured approvals from ODOS or DRC.
- To comply with FERPA, we cannot respond to emails from your parents.

Course Description

The course gives a broad introduction on how to apply fundamental discrete mathematical tools, facts, and reasoning relevant to computer science. The topics covered include logic; proof methods; functions, sums and sets; relations; number theory; algorithms and growth functions; induction, recursions, and recursive algorithms; counting; basic probability theory; trees and graphs; finite state automata, regular expressions and context-free languages; Turing machines, computable and uncomputable.

Learning Expectation

You will be successful in this course if you are motivated, responsible, and keep up with the course material and assigned work. This includes regular class attendance, active participation in PSO sessions, utilizing office hours, promptly reviewing slides and related textbook material after class, and initiating work on homework assignments early. The lectures, readings, and associated problems are essential for mastering the material. You need to log into the course websites daily to check for messages, important information, and updates. Please be aware that Brightspace goes down for maintenance on a regular basis (the Brightspace Maintenance Schedule is on the Brightspace home page where your courses are listed).

Learning Resources, Technology and Texts

Required Texts

- K. Rosen, Discrete Mathematics and Its Applications, McGraw-Hill; 7th or 8th edition.
- The Student Site of the textbook contains resources for students including more examples, self assessment, a guide to common misconceptions and mistakes, and a guide to writing proofs.

The course will use Brightspace, Gradescope, and Ed Discussion

Homework requirements

- Students are expected to type their homework (MS Word, LaTeX or equivalent).
- Students are expected to strictly follow Gradescope submission directions.

Learning Outcomes

Students who complete the course will have demonstrated the ability to do the following:

- Foundations of Discrete Mathematics: Students will apply principles of logic, functions, sequences, number theory, counting, probability, and proof techniques to analyze and solve complex problems.
- Algorithm Analysis: Students will be able to analyze and evaluate the complexity of algorithms using asymptotic notation (Big O, Big Θ, and Big Ω).
- Graph Theory and Algorithms: Students will be able to apply graph theory concepts and algorithms to solve real-world problems, including network design, shortest path analysis, and connectivity.

Grading scheme

Course Component	Overall Weight	Tentative Period
Individual Homework	25%	Week 1-15
Individual Quizzes	10%	Week 1-15
Exam		
Midterm	30%	Tuesday March 11, 8 - 9:30 PM
Final Exam	35%	TBD

- The lowest homework score and the lowest quiz score are dropped.
- The date of the final exam is set by the university and it could be scheduled for Saturday, May 10th, 2025. Do not make travel plans before the University has released the final exam schedule.

Grading Scale

The following final grade distribution is provided as a guideline.

Grade	Score	Grade	Score	Grade	Score
A+	[99-100]	A	[93-99)	A-	[90-93)
B+	[86-90)	B	[83-86)	B-	[80-83)
C+	[75-80]	C	[70-75)		
D+	[66-70)	D	[63-66)	D-	[60-63)

The course will award a minimum number of letter grades as follows: A: Top 15%, B: Next 25%, C: Middle 30%.

Homework

There will be 10-11 graded homework assignments. Homework assignments are posted on Brightspace and must be submitted via Gradescope before the stated deadline. We do not accept any homework through E-Mail.
Unless specified at the top of the homework header that you can handwrite some questions, everything in a homework assignment **must be typed** using LaTeX, MS Word, or any text editor of comparable quality; this includes diagrams, tables, and figures. Hand-written homework will not be graded. You must submit one PDF file with each problem starting on a new page.

Submission on Gradescope

Before uploading your homework as one .pdf file to Gradescope, check that every problem starts on a new page. Then, follow the directions for matching problems to page numbers on Gradescope. You are responsible for correctly uploading your homework assignment to Gradescope and following the instructions. Failure to do so will result in a point reduction. You may submit your homework solution multiple times on Gradescope. Keep in mind that only your most recent submission will be graded. For more information,

please take a look at the tutorial video uploaded on Brightspace (Course Content → Gradescope → Homework Submission Tutorial).

Homework Late Policy

Homework will typically be due at 11:00 pm on Friday, unless otherwise indicated. Homework submitted after the actual due date is considered late. We strongly recommend submitting your homework 60 minutes before the deadline to avoid late penalties. One (1) day late, defined as a 24-hour period from the deadline (weekday or weekend), will result in **15%** of the total points for the assignment deducted. For example, if a 100-point assignment is due on a Friday 11:00 p.m., and it is handed in between Friday 11:01 p.m. and Saturday 11:00 p.m., **15** points will be deducted. We do not accept any homework after one day.

Quizzes

There will be 10 - 12 quizzes on recent material covered in class. Most quizzes will be taken on Brightspace. A student who keeps up with the covered material should be able to complete a quiz in 30 minutes. For online quizzes, questions are drawn from question pools and questions within a pool are considered equivalent. One retake is allowed, and your final score will be the highest of the two scores. The questions in a retake quiz are again drawn at random from the question pool. Retakes must be started within the time frame of the quiz.
Online quizzes open for 24 hours from Sunday at 11:00 am to Monday 11:00 am unless stated otherwise. Once started within this period, a student has 1 hour to complete the quiz.

PSO (Practice/Study/Observation)

The goal of the PSOs is to practice the material covered in class. All PSO sessions will cover the same material and the focus is on students solving additional problems. PSOs are typically led by a graduate TA and undergraduate TAs provide additional help. A student is expected to attend PSOs. The course will have in-person PSOs and virtual PSOs. Weekly PSO problems will be posted on Brightspace. **No solutions to PSO problems will be posted**.

Exams

The course has one evening exams and one comprehensive final exam. The exams cover the material in the lectures, PSO's, homework, and quizzes. All exams are in-person exams taken on paper.

* All exams are closed book and closed notes.
* The use of electronic devices (e.g., laptops, calculators, smart phones) is not allowed and is considered cheating.
* The material covered on midterm exam will be announced in class.
* The final exam is a comprehensive exam that covers all course material.

Missing an exam results in a score of zero in that exam unless you have a valid excuse covered by university policies. If you are unable to attend an exam, you must notify the course coordinators and the course director in advance.

Regrade Requests

For a regrade on a homework or an exam you may submit a regrade request on Gradescope. The request will be handled by the TA who graded that question. You are not allowed to submit more than two regrade requests per question.

You must submit the regrade request within 5 days from the date when the exam or the homework was returned. There will be no regrading after this period.

We expect that a student has read and comprehended the solution sketch posted for the problem a regrade is requested. A regrade request will re-evaluate the entire solution for that problem. The score for the problem may thus go up or down.

Any regrade request (homework or exam) should only be submitted when you are confident that the grader made a mistake or misunderstood your solution. Regrade requests deemed to be excessive/frivolous may result in a penalty.

* When making a regrade request, you should clearly explain what you think the grader missed (the explanation is not an opportunity to expand upon the answer you already submitted).
* We generally recommend that you talk with a TA or with a knowledgeable classmate before submitting a regrade request.

Expect that a regrade request may take a couple of days to complete. If you disagree with the result of a regrade request, you may appeal in a timely manner to CS 18200 Coordinators of the course. The decision made by the coordinators is final.

Attendance Policy

Students are expected to take all exams in-person and attend all classes in-person unless they are ill or need to be absent for reasons excused by University regulations: grief/bereavement, military service, jury duty, parenting leave or certain medically excused absences (go to the Office of the Dean of Students (ODOS) website for details on how to submit those requests).

Only the course coordinators can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the course coordinators of the situation as far in advance as possible.

Conduct and Courtesy

Students are expected to maintain a professional and respectful classroom environment. This includes: no talking during lectures, silencing personal electronics, arriving on time and staying for the entire class, treating others with respect (even in jest). You may use non-disruptive personal electronics during class.

The course will use Ed Discussion for discussion and communication. Because online communication generally lacks visual cues common to face-to-face interactions, you are expected to meet the Netiquette standards listed

below. Netiquette is a combination of Network Etiquette. Please abide by the stated netiquette rules when communicating with your instructor and peers in this class:

* Be polite and courteous in asking questions.
* Be sensitive and reflective to what others are saying.
* Don't use all caps. It is the equivalent of screaming.
* Don't flame - These are outbursts of extreme emotion or opinion.
* Think before you hit the post (enter/reply) button.
* Don't use offensive language.
* Use clear subject lines.
* Don't use abbreviations or acronyms unless the entire class knows them.
* Be forgiving. Anyone can make a mistake.
* Keep the dialog collegial and professional.
* Do not post inappropriate material. Posts deemed inappropriate will be removed and may result in you being suspended or banned from posting.
* Do not post solutions to HW/exam problems.

Ed Discussion is intended for clarification on topics of general interest. It is not the forum for complaints about homework, exams or the class. Please bring your concerns to the attention of the course director.

CS182 specific policies

AI Policy

Students are encouraged to use AI as a tool for learning, similar to how they would use instructors, teaching assistants, or peers. AI can assist with understanding concepts, generating additional exercises, and creating self-quizzes. However, students are not permitted to use AI to complete homework assignments, and it is not permitted for use during quizzes.

Academic Integrity

Departmental and University academic honesty policies are described at http://spaf.cerias.purdue.edu/cpolicy.html and Departmental Academic Integrity Policy. The departmental policies will be followed unless written documentation of exceptions is provided. We expect that you have read these policies.

The solutions you submit for homework problems must be **your own work**. It must be expressed and explained in **your own words**.

The line between discussing a problem with other students and using an idea developed by others and expressing your solution in your own words can at times be blurred. In addition, using a similar or related solution or an idea found online has significant potential for submitting something as your own that is easily detected as being copied. To be able to better assess academic honesty, we expect all students to provide for **every problem** on **every homework** information on the use of online material.

The following are considered **cheating** on homework.

* Sharing or copying solutions is unacceptable and is considered cheating.
* When using material or adapting ideas found online, you are required to give credit and proper references. Failure to do so is considered cheating.
* Anyone working with a tutor on homework or a project must disclose this information. Failure to do so is considered cheating.
* Making an online post or asking someone to make a post on a site like StackExchange, Chegg, Coursehero, or Reddit to get hints is considered

cheating.
* You are expected to take reasonable precautions to prevent others from using your work. Failure to do so is considered cheating.

On midterms and the final exam, any use of course and online resources is considered cheating. Any communication with others is considered cheating. Communication asking clarification questions made to TAs and the instructors are allowed as specified before the exam.

Penalties

- ☞ A first instance of academic dishonesty on an assignment or a quiz will result in a zero for that assignment plus a letter grade deduction at the end of the semester. A second instance of academic dishonesty will result in a course grade of F.
- ☞ The instance of academic dishonesty on an exam will result in a course grade of F.
- ☞ Any instance of academic dishonesty on an exam, an assignment, or a quiz will be reported to the Dean of Students Office.

Copyright Expectations

Lectures and course materials, including slides, homework assignments, PSO problem sets, tests, and other course materials, are the instructor's property and are protected by copyright. As a student in the class, you may make copies of course materials for your own use. You may not allow others to reproduce or distribute lecture notes and course materials publicly without my written consent. Violations will be dealt with as permitted by law under Section 512(c) of the Digital Millennium Copyright Act.

Netiquette

Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea, but you are not to attack an individual. Our differences, some of which are outlined in the University's nondiscrimination statement, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the Netiquette rules for this course:

* Monitor how much space/time you are taking up in any discussion. Give other students the opportunity to join in the discussion.
* Do not use offensive language. Present ideas appropriately.
* Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
* Avoid using vernacular and/or slang language. This could lead to misinterpretation.
* Keep an "open-mind" and be willing to express even your minority opinion.
* Think and edit before you push the 'Send' button.
* Seek and take in feedback from others; learning from others is an important life skill.

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. More details are available on our course Brightspace table of contents, under University Policies.

Accessibility

Purdue University is committed to accessibility. If you anticipate or experience barriers due to a disability, contact the Disability Resource Center at drc@purdue.edu or 765-494-1247. Accommodations can only be arranged with confirmation from the DRC. Students must notify the DRC (purdue.edu/drc) of any conditions that require accommodations.

Mental Health Statement

- If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack. Sign in and find information and tools at your fingertips, available to you at any time.
- If you need support and information about options and resources, please contact or see the Office of the Dean of Students. Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.
- If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@purdue.edu.
- If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your Purdue email on a frequent basis.

Disclaimer

This syllabus is subject to change. Changes will be announced on Brightspace.