CMPSC 464 Young Kun Ko Introduction to the Theory of Computation

Course Information Fall 2021

Time and Place : TuTh 3:05 pm – 4:20 pm; Ag Science & Industries 101

Professor:

		Office hours:
Young Kun Ko	ykk5167@psu.edu	Tue 4:30 – 5:30 pm

TAs:

	Recitation Section	Office hours:
TBA		

LAs:

	Office hours:
TBA	

Prerequisite: CMPSC 465

Syllabus:

≈ 30% **Computability Theory**
Turing machines, the Church-Turing thesis, decidability, the halting problem, reducibility.

≈ 10% **Automata and Language Theory**
Deterministic and nondeterministic finite automata.

≈ 60% **Complexity Theory**
Time complexity, complexity classes P, NP, NP-completeness, P versus NP, space complexity, PSPACE. Probably not: L, NL.

Some modifications might happen.

Recitiations: Students of each section meet with their TA to solve problems.
Recitations start during the second week, i.e., on the week of 8/30/21.

Canvas: Homeworks and recitation problems will be posted on Canvas.
Occasionally, I want to contact the class by email to the Canvas account. If you don't regularly check email on Canvas, you should forward it to your usual email account.

Textbook: Michael Sipser, Introduction to the Theory of Computation, 3rd Edition. Cengage Learning. ISBN-13: 978-1-133-18779-0, ISBN-10: 1-133-18779-X, 2013. (See email of 1/12/21.) On reserve in the Engineering Library and the Physical and Mathematical Sciences Library.
https://www.amazon.com/Introduction-Theory-Computation-Michael-Sipser/dp/113318779X
Textbook homepage (including errata): https://math.mit.edu/∼sipser/book.html.

These are supplementary texts for the class.

Sanjeev Arora, Boaz Barak, Computational Complexity: A Modern Approach, Cambridge University Press, 2009.

Christos Papadimitriou, Computational Complexity, Addison Wesley, 1994.

Important: For the first 2/3 of the class, we will follow the textbook relatively closely. The most important homework is to read in the book after each lecture until you understand everything. An even better strategy is to read before the lecture as well. For the later 1/3 of the class, some topics from Arora & Barak will be covered.

Canvas: We will use Canvas for discussions. You are encouraged to respond to questions, if you know the answer. But don't give partial solutions to homework problems. On the other hand, ask if the formulations are not clear.

Gradescope: For homework submission and grading, we will use gradescope as approved by Penn State. We will also use gradescope for grading exams. You will be able to access your graded exams on gradescope.

Homeworks: The homework assignments have to be done individually. Cheating will be handled according to Penn State policy (see below).
You are allowed to discuss the problems and their solutions with one other student, but you have to write up your solution by yourself while not seeing any solutions form anyone else. If two students work together, then both of you have to write with whom you worked together at the top of the first page.

Most problems involve some mathematical reasoning. For a good performance, you will have to study the course material well.

To make the difficult job of the graders a little easier, we use the following rule. If you cannot solve a problem, you just write, "I go for 20%," and you get 20% of the points for that problem. That is, if you leave it empty, you get 20%. Naturally, the better solution is to start early and have time to ask questions and understand the problem. The 20% option is not available on the exams.

Late Homeworks: The regular weekly homeworks have to be submitted to Gradescope by 11 pm on the due day. There is a 50% deduction for late homework submitted by 11pm the following day. No credit will be given afterwards. **Any (well) justified exceptions have to be arranged at least a day before the homework is due.**

Gradiance: We will probably not use Gradiance, as we use the much newer Automata Tutor. [Some homeworks might be done on the Gradiance system developed by Jeffrey Ullman. These homeworks are done interactively on the internet and cannot be done late. You will receive separate information.]

Exams and Grading:

First Mid-Term	25 %	Thursday 09/30/21	in-class
Second Mid-Term	25 %	Thursday 11/04/21	in-class
Final Exam	30 %	during finals week (TBA)	
Homeworks	20 %	about 4 to 5 total	

Most Important:
Send me email now if you have a conflict with the midterm exam dates. For unforeseen circumstances (e.g. COVID), you must have a valid excuse with a supporting document (with a proper date) to reschedule your exam.

Mask Policy: Penn State University requires everyone to wear a face mask in all university buildings, including classrooms, regardless of vaccination status. ALL STUDENTS MUST wear a mask appropriately (i.e., covering both your mouth and nose) while you are indoors on campus. This is to protect your health and safety as well as the health and safety of your classmates, instructor, and the university community. Anyone attending class without a mask will be asked to put one on or leave. Instructors may end class if anyone present refuses to appropriately wear a mask for the duration of class. Students who refuse to wear masks appropriately may face disciplinary action for Code of Conduct violations. If you feel you cannot wear a mask during class, please speak with your adviser immediately about your options for altering your schedule.

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 stat es 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.

The CSE Department is quite specific on Academic Integrity.
(http://www.eecs.psu.edu/students/resources/EECS-CSE-Academic-Integrity.aspx).
Department policy for academic sanctions of academic integrity violations specifies a reduction of score on the submission (typically reduced to a 0 except for minor infractions) and a reduction of up to 1 letter grade for the final course grade. For students with previous academic integrity violations (occurring in any course), the department will recommend to the College of Engineering Academic Integrity Committee that the student receive an F in the course.

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. Student Disability Resources (SDR) website provides contact information for every Penn State campus (http://equity.psu.edu/sdr/disability-coordinator). For further information, please visit Student Disability Resources website (http://equity.psu.edu/sdr/).

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/sdr/guidelines). 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 as early as possible. You must follow this process for every semester that you request accommodations.

Counseling & Psychological Services (CAPS) 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.

Counseling and Psychological Services at University Park (CAPS)
(http://studentaffairs.psu.edu/counseling/): 814-863-0395

Counseling and Psychological Services at Commonwealth Campuses
(https://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400
Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

Educational Equity and Reporting Bias:

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/).

School of EECS Mentor Collective Program:

The Peer Mentor Program connects first and second year students majoring (or intending to major) in electrical engineering, computer science, computer engineering or data sciences with a peer mentor. Participants can sign up for a mentor in their major to help guide them based on the mentor's experiences.

The Career Mentor Program connects juniors and seniors in EECS with alumni mentors. Connecting with an alumni mentor is a great way to build your network by making connections in the largest alumni network in the world and increase your chances for future success. You are also encouraged to sign up as a mentor for the Peer Mentor Program. Both opportunities look great on resumes and LinkedIn profiles.

Sign up here: https://www.eecs.psu.edu/mentor-collective/index.aspx

Questions? Contact Tammy Falls, alumni and events coordinator, at 814-863-8143 or tjf13@psu.edu.