Course Information

**Course staff**
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  Office Hours: W 10AM-12PM
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**Webpage:** [http://www.cse.psu.edu/~sofya/cmpsc360/](http://www.cse.psu.edu/~sofya/cmpsc360/)

**Questions and class discussion:** We will use Piazza for class discussion. Rather than emailing questions to the teaching staff, you are encouraged to post your questions on Piazza. Top participants will get bonus points at the end of the course. Our class page is at: [https://piazza.com/psu/spring2015/cmpsc360](https://piazza.com/psu/spring2015/cmpsc360)

**Angel:** We will use Angel for posting reading materials, assignments, solutions and grades.

**Prerequisite:** CMPSC 122.

**Honors option:** Will be supported. Please see Prof. Raskhodnikova if you are interested.

**Lectures:** MWF 12:20 PM - 1:10 PM in 111 Wartik Lab OR MWF 1:25 PM - 2:15 PM 108 Sackett Bld.

**Recitations:** The TAs will run weekly recitation (interactive problem solving sessions) to help with the material.

**Textbook:** There is no book covering all the material in this course. Instead we will follow the Berkeley CS70 Lecture notes.


**I-clickers:** We will use I-clickers during lectures to encourage active participation. You will be able to earn participation points (5% of your final grade) by answering questions with your clicker. Register your clicker at: [http://clickers.psu.edu/](http://clickers.psu.edu/)

Every time your clicker is turned on, set the frequency: hold down the ON/OFF button; enter B, C; if you see a green light on your clicker, it successfully connected to the base.

**Syllabus:** Concepts and techniques used in computer science and their applications. Topics include logic, proofs, modular arithmetic, polynomials, graphs, counting, probability, countability, computability. Applications include RSA, error-correcting codes, secret sharing, hashing, load balancing, limits of computation.
Course outline: I Logic and Proofs (2-3 weeks). Propositions and quantifiers, direct proofs, proofs by contradiction and contraposition, induction, strong induction, the stable marriage problem.

II Modular Arithmetic (2-3 weeks). Congruence relations, Euclid’s GCD algorithm and multiplicative inverses, the RSA cryptosystem, polynomials over finite fields, error-correcting codes.

III Graphs (1-2 weeks). Trees, Euler tours, hypercubes.

IV Counting and Discrete Probability (5-6 weeks). Combinatorics and combinatorial proofs, probability spaces and events, conditional probability and Bayes’ rule, hashing, load balancing, random variables and distributions, expectation, variance.

V Diagonalization and Self-Reference (1-2 weeks). Cardinality of infinite sets, Cantor’s diagonalization proof, uncomputability and the halting problem.

Homework: There will be an assignment due every Wednesday. You can hand in your homework on Wednesday strictly before your lecture or between 1:15PM and 4:30PM in the homework box in 342E IST Building. After 4:30pm Wednesday, no homeworks will be accepted. The two lowest homework scores will be dropped.

You should be as clear and concise as possible in your write-up of solutions. Understandability of your answer is as desirable as correctness, because communication of technical material is an important skill. A simple, direct analysis is worth more points than a convoluted one, both because it is simpler and less prone to error and because it is easier to read and understand. Points might be subtracted for illegible handwriting and for solutions that are too long.

Optional problems: Some homework assignments will include optional problems, marked by *. Later, if you ask an instructor for a recommendation or express an interest in working on a research project with her, she will definitely check how well you did on the optional problems.

Collaboration and Honesty Policy: Collaboration on homework problems is permitted. No collaboration whatsoever is permitted on optional problems and exams. You must read and sign Collaboration and Cheating Policy. Please keep one copy of the handout for your records. Violations of this policy will be dealt with according to University regulations (see Senate Policy 49-20 on Academic Integrity).

Exams and Grading: The grade will be calculated as follows:

Class participation lectures, recitations, piazza 10%
Homework weekly 30%
Midterm 1 Wed, Feb 18, 8:15-10:15pm, 119 Osmond 20%
Midterm 2 Wed, Apr 1, 8:15-10:15pm, 119 Osmond 20%
Final exam finals week 20%

Disability: Penn State welcomes students with disabilities into the University’s educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY) and request a letter identifying appropriate adjustments. Please share this letter and discuss the adjustments with the instructor as early as possible. For further information regarding ODS, please visit the Office for Disability Services Web site at [http://equity.psu.edu/ods/]