

# CS 530 - Mathematical Foundations in Computer Science

Fall 2018

## Course Description

This course covers mathematical foundations of Computer Science focusing on basic mathematical structures, mathematical logic and probability theory. It is designed to provide students with proficiency in applying these concepts to problem solving and formal reasoning. To achieve this, the course provides students with significant hands-on practice with the use of computational tools.

## Instructor

Dmitri Kaznachev, Ph.D.  
Adjunct Professor, Computer Science Department  
Senior Director, Trading Technology, Freddie Mac  
[dkaznach@gmu.edu](mailto:dkaznach@gmu.edu)  
Office hours: by appointment

## Teaching Assistant

TBD

## Class

Nguyen Engineering Building, Room 1101  
Monday, 7:20 PM - 10:00 PM (see exceptions below)

## Prerequisites

- MATH 125 or INFS 501
- STAT 344

## Text Book

*Mathematics for Computer Science* by E. Lehman, F.T. Leighton and A.R. Meyer; see <https://courses.csail.mit.edu/6.042/spring18/mcs.pdf>, or the full text on the Blackboard

## Grading

- 6 Homeworks (5 points each) - 30%
- Midterm exam (30 points) - 30%
- Final exam (40 points) - 40%
- Bonus points:
  - Class participation - 3
  - Midterm exam - 3
  - Final exam - 4

100+ points: A+; [93, 100): A; [88, 93): A-; [83, 88): B+; [78, 83): B; [73, 78): B-; [65, 73): C; [0,65): F

## Tentative Schedule

Date	Topic	Test
Aug 27	Foundations 1. Set theory - sets, relations and functions, composition, inversion. Algebra of sets and Boolean relations.	HW1 assigned
Sep 3	Labor Day - no class	
Sep 10	Foundations 2. Induction.	HW1 due
Sep 17	Foundations 3. Recursion.	HW2 assigned
Sep 24	Foundations 4. Directed graphs.	HW2 due
Oct 1	Foundations 5. Number Theory.	HW3 assigned
Oct 9	Mathematical Logic 1. Propositional logic.	
Oct 15	Mathematical Logic 2. Propositional algebra.	HW3 due
Oct 22	Midterm Exam	Midterm
Oct 29	Mathematical Logic 3. Predicate algebra.	
Nov 5	Mathematical Logic 4. Practice with computing applications	HW4 assigned

Nov 12	Probability Theory 1. Classical probability.	HW4 due, HW5 assigned
Nov 19	Probability Theory 2. Probability spaces.	HW5 due
Nov 26	Probability Theory 3. Conditional probability.	HW6 assigned
Dec 3	Probability Theory 4. Random variables.	HW6 due
Dec 10	Reading Day - NO CLASS (office hours)	
Dec 17	Final Exam - 7:30 PM	Final

## Communication

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com).

Find our class page at: <https://piazza.com/gmu/fall2018/cs530/home>

## Policies

Please note that all coursework should be done independently. Plagiarizing the homework and cheating on the exam will be penalized; see Honor Code at <http://cs.gmu.edu/resources/honor-code>.