

# CIS-1066: Mathematical Concepts In Computing I

## Spring 2016 – Prof. Crotty

### 1 General Information

Instructor	Edward T. Crotty
Office	SERC 317
email	<a href="mailto:ecrotty@temple.edu">ecrotty@temple.edu</a> ; alternate: <a href="mailto:ecrotty@me.com">ecrotty@me.com</a> <b>Please put the course number in the subject line of any email you send me</b> so my mail program can sort out your message for quick attention; e.g. : Subject: 16a-CIS1066: <your subject here>
Office Phone	Note: 16a- designates the spring semester of 2016 so I know this is a current request (215) 204-4307
Website	<a href="https://blackboard.temple.edu/">https://blackboard.temple.edu/</a>
Office Hours	TR 12-1PM; by appointment; <b>any time you can find me and I have a few minutes free</b>
Lecture Time	TR 9:30-10:50
Location	Tuttleman 0401B
Recitation Time	W 2-3:50 PM
Location	Tuttleman 0401B
Recitation Leader	TBD
Required Text	Discrete Mathematics and Its Applications, 7th Edition, Kenneth H. Rosen, McGraw Hill Student Solutions Guide, 7th Edition (recommended), Kenneth H. Rosen, McGraw Hill

### 2 Goals

The goal of the course is for students to become more comfortable with practical mathematical ideas relevant to Computer Science, particularly in the areas of mathematical logic, set theory, functions, proof and generating proofs and other topics (see the list in the Course Content document posted separately)

### 3 Grades

Quizzes	10%
Projects	20%
Midterms (average of all)	40%
Final Exam (cumulative)	30%

If, for some reason, any part of this grading scheme is deleted, the grades will be computed as a weighted average of the remaining categories using the weights given here.

### 4 Quizzes

Quizzes may be announced or unannounced and will usually be given during recitation. One question “attendance” quizzes may be given near the end of any lecture. Quizzes will be brief, typically 2-3 problems, at least one of which will be *directly* from the current assignment and other(s) will be similar to problems from the current assignment. **No makeup quizzes will be given.** Your 2 lowest quiz grades will be ignored; **missed quizzes will count as 0 and will not be dropped.**

### 5 Exams

All midterm exams will be given during a recitation period (see schedule). Exams are closed book, but you *are* permitted a one page (8.5x11”, both sides) “cheat sheet” with formulas, notes and any other material of your choice. The cheat sheet must be of your invention. Exam problems will, for the most part, closely parallel the assignments and class examples. There will be some problems that require you to synthesize several ideas to produce a solution.

The final exam is cumulative.

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Attendance at all exams is mandatory. If you have an urgent personal situation that makes attendance at a scheduled exam impossible, you *must* discuss the situation with the instructor as long as possible *before* the exam. ***No makeup exams will be given.*** Students with an unexcused, undocumented absence from any exam will be given a 0 for that exam.

### 6 Attendance

Attendance is required. If you miss more than 6 classes without a documented reason, your final grade will be lowered by 1 grade level for each 3 additional absences.

### 7 Assignments

You will be given several assignments and projects, upon which quizzes and exams will be based (see above).

### 8 Leaving the Course

The last day to drop the course is 22 January 2016. The last day to withdraw is 15 March 2016. These are strict deadlines. Incompletes will only be given in the most unusual of circumstances. Please note that students who have previously withdrawn from this course, or who have already withdrawn from 5 courses since September 2003 may not withdraw.

### 9 Academic Freedom

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy 03.70.02) that can be accessed at <http://policies.temple.edu>.

### 10 Academic Honesty

Please review Temple's page on academic honesty and other student responsibilities in the undergraduate bulletin: [http://www.temple.edu/bulletin/Responsibilities\\_rights/responsibilities/responsibilities.shtm](http://www.temple.edu/bulletin/Responsibilities_rights/responsibilities/responsibilities.shtm)

Cheating on exams/quizzes/projects or *any* graded work will have serious consequences: a grade of  $-\text{[maximum score]}$  (and yes, that *is* a minus sign) will be given if you are detected cheating. Please note that the instructor is judge, jury, court of appeals and (academic) executioner under such circumstances. While you may get away with cheating, you cause the most damage to yourself for only minimal gain.

### 11 Special Needs

Any student who has a need for accommodation based on the impact of a disability should contact me privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at (215)204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities.

### 12 Topics

Below is a short list of general topics that we'll cover this semester. A detailed (text referenced) list of follows. The lecture schedule (subject to frequent revision) and current readings/problem sets will be posted online.

1. Logic and Proof
2. Sets, Functions, Sequences and Sums
3. Algorithms
4. Number Theory
5. Counting
6. Discrete Probability
7. Relations

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The following is a detailed listing of the topics covered in the course. The section numbers refer to the Rosen text.

1. The Foundations: Logic and Proof
  - 1.1 Propositional Logic
  - 1.2 Applications of Propositional Logic
  - 1.3 Propositional Equivalences
  - 1.4 Predicates and Quantifiers
  - 1.5 Nested Quantifiers
  - 1.6 Rules of Inference (optional)
  - 1.7 Introduction to Proofs
  - 1.8 Proof Methods and Strategy (pp. 92-97, 99-102)
  
2. Basic Structures: Sets, Functions, Sequences, and Sums
  - 2.1 Sets
  - 2.2 Set Operations
  - 2.3 Functions
  - 2.4 Sequences and Summations (optional)
  - 2.6 Matrices
  
4. Number Theory
  - 4.1 Divisibility and Modular Arithmetic
  - 4.2 Integer Representations and Algorithms
  - 4.3 Primes and Greatest Common Divisors
  
6. Counting
  - 6.1 The Basics of Counting
  - 6.2 The Pigeonhole Principle
  - 6.3 Permutations and Combinations
  - 6.4 Binomial Coefficients and Identities
  
7. Discrete Probability
  - 7.1 An Introduction to Discrete Probability
  - 7.2 Probability Theory
  
9. Relations
  - 9.1 Relations and their Properties
  - 9.2  $n$ -ary Relations and Their Applications
  - 9.3 Representing Relations
  - 9.4 Closure of Relations (optional)
  - 9.5 Equivalence Relations