

# Syllabus for CIS 1166

<b>Course Number/Sections:</b>	CIS 1166 / 006
<b>Course Title:</b>	Mathematical Concepts in Computing I
<b>Instructor:</b>	Amitangshu Pal
<b>Office:</b>	SERC 372
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<b>Office Hours:</b>	Mondays and Wednesdays 2:00pm-3:20pm
<b>TA:</b>	Peng Chu

**Course Text:** Kenneth H. Rosen, “Discrete Mathematics and Its Applications”, McGraw Hill, 7th Edition.

**Course Objective:** CIS 1166 is an introductory course on discrete mathematics with a broad range of topics. In this course, students learn a particular set of mathematical facts and how to apply them. More importantly, this course teaches students how to think critically, logically, and mathematically. The learning objectives of CIS 1166 include an understanding of mathematical foundations of the following basic concepts: introduction to predicate and propositional calculus; sets and set operations, functions, sequences and matrices; number theory; basics of counting, permutations and combinations, and binomial coefficients; probability; relations. Students will also learn formal methods for writing mathematical proofs.

**Learning outcome:** Upon successful completion of this course, students will be able to

- Perform mathematical reasoning to read, comprehend, and construct mathematical arguments;
- Conduct combinatorial analysis to solve counting problems;
- Understand discrete structures to represent discrete objects and relationships between these objects; and
- Employ algorithmic thinking to understand, create, execute, and evaluate algorithms.

## Topics Covered:

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
  - 1.7. 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
- 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
- 7. Discrete Probability
  - 7.1. Introduction to Discrete Probability
- 9. Relations
  - 9.1. Relations and their Properties
  - 9.3. Representing Relations
  - 9.4. Closure of Relations

**Grading:**

- Exams: 60% (mid-term 30%, final 30%, and closed book);
- Quizzes: 30% (in recitation classes, and closed book);
- Assignment: 10%.

**Policies:**

- Students with 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. Please contact Disability Resources and Services at 215–204–1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities.
- Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02) which can be accessed through the following link.
- Students should also be familiar with the university statement on academic honesty.
- For the last days to drop or withdraw, please check the Academic Calendar.