

CS317-001 Discrete Information Structures  
Fall 2009, MW 11:00–11:50pm, EMS E145  
<http://www.cs.uwm.edu/classes/cs317>

## 1 Prerequisite

Passing grades in Calculus 1 (MATH 221, 226 or 231) and Introductory Programming (CS152 or CS 201).

## 2 Instructor Info

Instructor: Christine Cheng, EMS 1011, 229-5170, [ccheng@uwm.edu](mailto:ccheng@uwm.edu).  
Office Hours: M 1:00-2:00pm, T 10:30-11:30am or by appointment.

## 3 Textbook:

K. Rosen, *Discrete Mathematics and its Applications, Sixth Edition*, McGraw-Hill.

## 4 Objectives:

CS 317 is one of the foundational classes in your CS curriculum. It is a direct or indirect prerequisite to courses in Algorithms, Theory of Computation/ Compilers, Artificial Intelligence, Data Security, Computer Graphics, Operating Systems. The class has three major themes:

1. *Mathematical Reasoning*. You will learn logic and proof techniques so you can show that a mathematical statement is true.
2. *Discrete Structures*. You will learn important mathematical structures – used to represent objects and their relationships – in Computer Science. These discrete structures include sets, functions and relations, graphs, etc.
3. *Counting and Probability*. Yes, you will learn how to count! And once you know how to count, you will be able to compute the probabilities of many events. Both skills are important for designing algorithms.

## 5 An Outline

- LOGIC  
1.1 Logic, 1.2 Propositional Equivalences, 1.3 Predicates and Quantifiers, 1.4 Nested Quantifiers.
- PROOFS  
1.5 Rules of Inference, 1.6 Introduction to Proofs
- SETS, FUNCTIONS, and RELATIONS  
2.1 Sets, 2.2 Set Operations, 2.3 Functions, 8.1 Relations and their properties, 8.5 Equivalence Relations

- PROOFS CONTINUED  
1.7 Proof strategy, 4.1 Mathematical Induction
- BASIC COUNTING  
5.1 Basics of Counting, 5.3 Permutations and Combinations, 5.5 Generalized Permutations and Combinations, 5.4 Binomial Coefficients
- DISCRETE PROBABILITY  
6.1 Introduction to Probability, 6.2 Probability Theory, 6.3 Bayes' Theorem
- GRAPHS  
9.1 Graphs and Graph Models, 9.2 Graph Terminology and Special Types of Graphs, 9.3 Representing Graphs and Graph Isomorphism, 9.4 Connectivity, 9.5 Euler and Hamiltonian Paths, 9.8 Graph Coloring

## 6 Discussion Sections

You must be enlisted in one of the two discussion sections for this class held every Wednesday:

DIS 601	12-1:50pm	EMS W120
DIS 602	2-3:50pm	PHY 120

On almost all weeks, **there will be an easy short quiz at the beginning of the section** based on that week's lectures.

## 7 HWs, Exams, and Grading Scheme

*Homeworks.* Homework problems will be assigned every week. *No homeworks will be accepted after the deadline.*

You are allowed to collaborate with your peers. However, you must write up the solutions on your own and cite your collaborators. **If you obtained your solution from a book, website, etc., you must indicate the title of the book and page no., the address of the website, etc.** Deductions will be made if this policy is violated.

*Exams and Finals.* There will be two exams and a comprehensive final exam.

*A tentative Grading Scheme.* Quizzes 5%, Homeworks 20% , Exam I 25%, Exam II 25%, Final 25%. Active participation in class will be taken into account when your final score is in between two letter grades (e.g., between a B and a B-, etc.).

In case of an emergency, contact the instructor at the earliest possible opportunity via e-mail or phone. No arrangements will be made for missed exams unless these rules are followed, and an acceptable evidence of legitimate emergency is submitted.

## 8 Academic Misconduct

Copying someone else's work in a homework or an exam is academic dishonesty. It will be dealt with severely. For more information, check the website

[www4.uwm.edu/acad.aff/policy/academicmisconduct.cfm](http://www4.uwm.edu/acad.aff/policy/academicmisconduct.cfm).