

CS317-401 Discrete Information Structures  
Fall 2011, TR 12:00–12:50pm, EMS E145  
<http://www.cs.uwm.edu/classes/cs317>

## 1 Prerequisite

A grade of C or better in Calculus 1 (MATH 221, 226 or 231) and a passing grade in 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: T 1:00-2:00pm or by appointment.

## 3 Discussion Sections

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

DIS 601	3-4:45pm	T	PHY 120
DIS 602	2-3:45pm	W	EMS E160

On most weeks, there will be a short quiz at the beginning of the section based on that week's lectures.

## 4 Textbook:

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

## 5 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! Once you know how, you will be able to compute the probabilities of many events. Both skills are important for designing algorithms.

## 6 An Outline

- LOGIC

1.1 Propositional Logic, 1.2 Applications of Propositional Logic, 1.3 Propositional Equivalences, 1.4 Predicates and Quantifiers, 1.5 Nested Quantifiers.

- PROOFS

1.6 Rules of Inference, 1.7 Introduction to Proofs, 1.8 Proof Methods and Strategy.

- SETS, FUNCTIONS, and RELATIONS

2.1 Sets, 2.2 Set Operations, 2.3 Functions, 9.1 Relations and their properties, 9.5 Equivalence Relations

- PROOFS CONTINUED

5.1 Mathematical Induction

- BASIC COUNTING

6.1 Basics of Counting, 6.3 Permutations and Combinations, 6.5 Generalized Permutations and Combinations, 6.4 Binomial Coefficients

- DISCRETE PROBABILITY

7.1 An Introduction to Discrete Probability, 7.2 Probability Theory, 7.3 Bayes' Theorem, 7.4 Expected Value and Variance

- GRAPHS

10.1 Graphs and Graph Models, 10.2 Graph Terminology and Special Types of Graphs, 10.3 Representing Graphs and Graph Isomorphism, 10.4 Connectivity, 10.5 Euler and Hamiltonian Paths, 10.8 Graph Coloring

## 7 HWs, Exams, and Grading Scheme

Grades will be posted on the D2L page of this class.

*Homeworks.* Weekly homework will be posted on the class webpage every Thursday and is due the following Thursday in class. *No homeworks will be accepted after the deadline.* On the other hand, the lowest two or three homework grades will be dropped at the end of the semester.

You are allowed to collaborate with your peers *but* 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).