CS217-002 Discrete Information Structures
Fall 2004, TR 4:00–5:15pm, PHY 145
http://www.cs.uwm.edu/classes/cs217

1 Prerequisite
C or better in MATH 221(P), 226(P) or 231(P); CS152(P) or CS 201(P).

2 Instructor Info
Instructor: Christine Cheng, EMS 1045, 229-5170, ccheng@cs.uwm.edu.
Office Hours: TR 3:00-4:00pm or by appointment.

3 Textbook:
K. Rosen, Discrete Mathematics and its Applications \(^1\), Fifth Edition, McGraw-Hill. Check the
website http://www.mhhe.com/rosen for additional resources.

4 Objectives:
CS 217 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.

\(^1\)According to the author, his previous edition was used in about 500 universities. Read it – it’s a good book!
• PROOFS
  1.5 Methods of Proof
• SETS, FUNCTIONS, and RELATIONS
  1.6 Sets, 1.7 Set Operations, 1.8 Functions, 7.1 Relations and their properties, 7.5 Equivalence Relations, (7.2 n-ary Relations and their applications)
• PROOFS CONTINUED
  3.1 Proof strategy, 3.3 Mathematical Induction
• BASIC COUNTING
  4.1 Basics of Counting, 4.3 Permutations and Combinations, 4.5 Generalized Permutations and Combinations, 4.4 Binomial Coefficients
• OTHER COUNTING TECHNIQUES
  4.2 The Pigeonhole Principle, 6.5 Principle of Inclusion/Exclusion
• DISCRETE PROBABILITY
  5.1 Introduction to Probability, 5.2 Probability Theory
• GRAPHS and POSETS
  8.1 Introduction to Graphs, 8.2 Graph Terminology, 8.3 Representing Graphs and Graph Isomorphism, 8.4 Connectivity, 8.5 Euler and Hamiltonian Paths, 8.8 Graph Coloring, 7.6 Posets.

6 HWs, Exams, and Grading Scheme

*Homeworks.* Homework problems will be assigned every week but will be collected every two weeks. 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 final exam.

*A tentative Grading Scheme.* Homeworks 20%, Exam I 25%, Exam II 25%, Final 30%. 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 quizzes or exams unless these rules are followed, and an acceptable evidence of legitimate emergency is submitted.

7 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

[www.uwm.edu/CHS/administrationinfo/acadmisc.html](http://www.uwm.edu/CHS/administrationinfo/acadmisc.html).