1 Course Link

You can access this course at [this link](#) if it is available and you are enrolled in it.

2 Catalog Description

What this course is about: *Mathematics for computer science.*

This course continues the mathematical topics needed to provide a solid theoretical foundation for computer science. The following topics will be covered:

- **Discrete Probability**
  - Finite Probability Space, Events, Probability Measure
  - Conditional Probability, Independence, Bayes’ Theorem

- **Advanced Counting Techniques**
  - Recurrence Relations
  - Solving Recurrence Relations
  - Divide-and-Conquer Algorithms and Recurrence Relations
  - Generating Functions
  - Inclusion-Exclusion

- **Relations**
  - Relations and Their Properties (reflexivity, symmetry, transitivity)
  - n-ary Relations and Their Applications
  - Representing Relations
  - Equivalence Relations
  - Partial Orderings

- **Trees**
  - Tree Applications
  - Tree Traversal
  - Spanning Trees
  - Minimum Spanning Trees

- **Boolean Algebra**
3 Objectives

- Master the basic terminology and operations of probability, recurrences, relations, trees and Boolean algebra.
- Demonstrate discrete mathematical reasoning through solving problems.
- Discern between effective and ineffective approaches to problem solving.
- Solve problems using limited or constrained resources.
- Recognize the relative importance of different elements of a mathematical or computer science problem.
- Make connections between discrete mathematics and real-world applications.

4 Course Materials

Required Text:

*Discrete Mathematics and its Applications*

Kenneth H. Rosen


5 Prerequisite

- CS 237 Discrete Mathematics I

6 Requirements

You are required to...

- attend class, as attendance and participation factor into your grade.
- read assigned portions of the course materials _before_ the class meeting when they will be discussed.
• take quizzes to make sure your reading is effective.
• take tests to reinforce the concepts you have learned.
• do homework assignments to enhance your understanding of selected topics.
• take a comprehensive two-part final exam.

7 Assignments

Homework assignments are of two types: Exercises and Explorations.

7.1 Exercises

Exercises are of two types: book and non-book. Book exercises are assigned for each section of the book (at
a rate of about one per class meeting). They are found at the end of the section, and the odd numbered ones
have the answers in the back of the book. These exercises will be graded by you after a grading key is made
available.

Non-book exercises are individual and group learning activities that will require either a small amount of
preparation before class, or participation during class, or both. These will also be self-graded.

7.2 Explorations

Explorations are programming assignments that invite you to explore certain topics in discrete mathematics,
as well as increase your C++ programming prowess. All involve some writing in the form of a report on what
you learned. There will be five explorations, about one every two weeks.

7.3 Late Policy

Work is due on the day indicated in the schedule. Late work is accepted only if the reason is extraordinary,
and acceptance is reached through private and prolonged negotiation. And you must come talk to me in
person — no emails, phone calls, nor texts.

8 Assessments

Assessments come in two flavors: Quizzes and Tests.

There will be frequent preparation-assessment (take-before-class mostly, but some take-during-class) quizzes.
These consist of multiple choice, multiple answer, true/false, fill in the blank or matching type questions for
the online quizzes, and write-on for the in-class quizzes. These quizzes are open book, open notes, but you
should try to take them without using book or notes (or google, etc.)

Five tests will be given during this course, one after each chapter covered (except Chapter 12). These are like
the quizzes, except they are longer (in fact, they may be cumulative), and are time-limited to 120 minutes
each. The tests will be closed book, closed notes, (closed google, closed wikipedia, etc.) and will be proctored
by the Testing Center.
Lastly, a comprehensive two-part final exam will be given at the end of the semester, per the schedule. These exams will be administered in the classroom or the Linux lab, **NOT** in the testing center.

### 9 Grading

- **Assignments:** 50%
  - Exercises: 15%
  - Explorations: 35%
- **Assessments:** 50%
  - Quizzes: 10%
  - Tests: 20%
  - Finals: 20%

Your weighted percentage will determine your final grade as output from the following function:

```lisp
(defun convert-to-letter-grade (weighted-percentage)
  (let* ((number (ceiling weighted-percentage))
         (tensDigit (/ number 10))
         (onesDigit (mod number 10))
         (index (min (max (- tensDigit 5) 0) 4))
         (letter (substring "FDCBA" index (+ index 1))))
    (sign (if (<= onesDigit 2) "-" (if (>= onesDigit 7) "+"))))
  (concat letter (if (and (< number 95) (>= number 60)) sign))
)
)```