CS 228: Discrete Structures II

James Madison University, Fall 2013 Semester, 3 Credits

Home Page:
http://w3.cs.jmu.edu/mayfiecs/cs228

Class Time:
Mon/Wed/Fri, 9:05 AM – 9:55 AM
HHS 2208 (Classroom)

Prerequisite:
CS/MATH 227

Instructor Information

Dr. Chris Mayfield
mayfiecs@jmu.edu

Office: ISAT/CS 208
Phone: 540-568-3314

Office Hours:
Tue/Thu, 2:00 PM – 4:30 PM
or by appointment (please email)

Goals and Objectives

The CS 227–228 series lays the foundation for students to succeed in upper-level CS courses, most of which require an advanced understanding of discrete mathematical concepts. This course is designed for students to learn how to think logically and mathematically, as well as practice fundamental techniques for solving problems in computer science. Our main goals are based on the five themes of the textbook (see pages vii–viii). By the end of this course, you should be able to:

1. Read, comprehend, and construct mathematical arguments. *(Mathematical Reasoning)*
2. Solve arithmetic and counting problems; not just apply formulas. *(Combinatorial Analysis)*
3. Demonstrate how abstract mathematical ideas like graphs, trees, and finite-state machines relate to real-world objects. *(Discrete Structures)*
4. Illustrate basic mathematical techniques for specifying, verifying, and analyzing computer algorithms. *(Algorithmic Thinking)*
5. Identify a variety of natural and relevant uses of discrete math in the real world. *(Applications and Modeling)*

In addition, this course will introduce students to typesetting documents using LaTeX and writing programs in Python. Both of these technologies are easy to learn and reinforce the theoretical concepts we study throughout the semester.

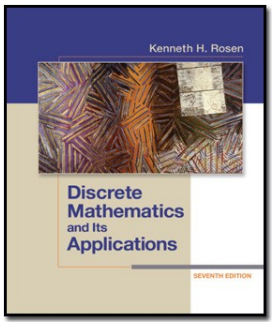
Nature of Course Content

Catalog Description

CS 227–228: *An introduction to discrete mathematical structures including functions, relations, sets, logic, matrices, elementary number theory, proof techniques, basics of counting, graphic theory, discrete probability, digital logic, finite state machines, integer and floating point representations.*

NOTE: The word **discrete** means "constituting a separate entity or part" (not to be confused with **discreet** which means "careful or secretive"). In math and science, it is the opposite of continuous. For example, integers are discrete and real numbers are continuous.

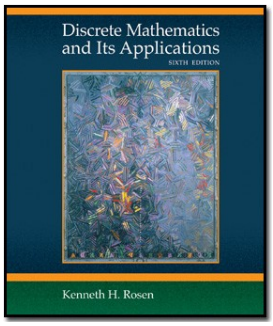
Required Textbook



7th Edition, 2012
(ISBN: 0073383090)

Discrete Mathematics and Its Applications
by Kenneth H. Rosen
http://www.mhhe.com/math/advmath/rosenindex.mhtml

This textbook is used extensively in both CS 227 and CS 228. Previous editions (such as the 6th edition) are acceptable, but you will be responsible for material covered in class that may not appear in older editions. **All homework assignments will refer to problems in the 7th edition.**



6th Edition, 2007
(ISBN: 0072880082)

Course Schedule

We will briefly review the proof techniques and structures introduced in CS 227 and then focus our study on the second half of the textbook. A detailed schedule with applicable readings and assignment due dates will be maintained on the course home page as the semester progresses. You are strongly encouraged to read the textbook and other assigned readings, even if material is not covered in the lectures.

Piazza Q&A

For questions related to the course content and assignments, we will use http://piazza.com/ to facilitate online class discussion. This system is highly catered to getting you help fast and efficiently, both from classmates as well as myself. Rather than emailing questions directly to the instructor, I encourage you to post your questions on Piazza for all to benefit. If however you would like to schedule an appointment or have a personal inquiry, don't hesitate to email me directly.

Software Tools

All assignments must be written in LaTeX and submitted electronically via Canvas. LaTeX is the standard language for typesetting professional work in Computer Science, Mathematics, Physics, and other fields. For homework problems that require programming, we will use Python (version 2.7). Python is a powerful dynamic programming language that is gaining tremendous popularity, particularly in scientific domains. Becoming familiar with these two technologies will serve you well throughout your university studies and technical careers.

Methods of Evaluation

Assignments

Weekly homework assignments will be due on Fridays before 9:00 AM. **Late work will NOT be accepted.** I will drop your lowest two homework scores to allow for unforeseen circumstances. Please do not interpret this policy as two free days! You should submit every assignment, even if incomplete. The purpose of the homework is to give you feedback on your learning and help prepare you for the exams.

Participation

Students are expected to attend all classes and actively participate by taking notes, asking questions, and answering questions. Each week, several students will be called upon to **present solutions** for selected homework problems on the whiteboard. Learning to communicate mathematical ideas clearly is an essential part of your computer science education.

Written Exams

In-class exams will be held on Sep 23rd and Oct 28th. If you must be absent during an exam for a legitimate reason (very rare), you need to contact me *at least one week* beforehand to make special arrangements. **Missed exams CANNOT be made up** except in extreme circumstances (e.g., hospitalization) with reasonable documentation.

Grading

Your final grade will be based on:

40% Assignments + 10% Participation + 30% In-class Exams + 20% Final Exam

Letter grades will be assigned on the scale A=90–100, B=80–89, C=70–79, D=60–69, F=0–59, with potential minor adjustments after considering the overall performance of the class and actual distribution of numeric scores. I will use "+" and "–" grades at my discretion. I do not assign WP or WF grades except under extraordinary circumstances.

University Requirements

Academic Honesty

Students are expected to comply with the JMU Honor Code, available from the Honor Council website: http://www.jmu.edu/honor/code.shtml. Simply put: **don't cheat**, and report anyone you think has cheated. You might be tempted to copy another student's LaTeX or Python code and submit it as your own. Academic dishonesty or plagiarism in any form will not be tolerated, and will result in an automatic zero for the assignment or exam.

Adding/Dropping

You are responsible for registering for classes and verifying your schedule on MyMadison. The deadline for adding a fall semester class is Thursday, 09/12/2013 (signatures required after Tuesday, 09/03/2013). The last day to withdraw from a course with a W grade is Thursday, 10/24/2013.

Disability Services

If you have a documented disability and will be requesting accommodations in this course, please register with the Office of Disability Services (http://www.jmu.edu/ods, Wilson Hall, Room 107, 540-568-6705). They will provide you with an Access Plan Letter to verify your need for services and make recommendations for the course. I will be happy to discuss your access plan with you.

Excused Absences

Students who are unable to attend class due to JMU sponsored activities (such as sports, band, academic competition, field trips, etc) or personal religious observances may request reasonable accommodations. Please notify me during the first week of class regarding potential absences so that we can determine alternative methods for you to complete the required work.

University Closings

For severe weather and other unexpected circumstances, watch for announcements relating to make-up work. See http://www.jmu.edu/JMUpolicy/1309.shtml for JMU's cancellation policy. Although the schedule may adapt to canceled classes, assignment deadlines generally do not change.