MTH 5051: Applied Discrete Mathematics
Fall 2019

Textbook: *Discrete and Combinatorial Mathematics (Classic Version) 5th edition*, by Ralph P. Grimaldi, Pearson. ISBN-13: 9780321385024

Course Description:
The main emphasis of this course will be on logic fundamentals, induction, recursion, combinatorial mathematics, and graph theory. The first half of the semester covers the counting techniques, combinatorics, and combinatorial proof techniques, including math induction and pigeonhole principle. The second half is dedicated to the fundamentals of graph theory, where the graph theoretical approaches to solve optimization problems such as shortest path, minimum spanning tree, network flows, minimum vertex cover, and graph coloring are covered in depth. Applications from several fields of science and engineering, including computer science, operations research, and computer and electrical engineering are introduced.

Course Topics:
This course will cover the following chapters from Grimaldi:
- Chapter 1: Fundamental Principles of Counting
- Chapter 2: Introduction to Logic
- Chapter 4: Properties of the Integers: Mathematical Induction
- Chapters 5 and 7: Relations and Functions
- Chapter 8: The Principle of Inclusion and Exclusion
- Chapter 9: Generating Functions
- Chapter 10: Recurrence Relations
- Chapter 11: An Introduction to Graph Theory
- Chapter 12: Trees
- Chapter 13: Optimization and Matching

Grading Policy:
Project	→	20%
Homework	→	20%
Midterm Exam	→	30%
Final Exam	→	30%
TOTAL	→	100%

Grading Scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: below 60

Assignments:
There will be a written homework assignment for each chapter. Each homework assignment you submit must be neat, legible, stapled, with name written clearly on top. Students are permitted, and in fact encouraged to work together. However, each student must write-up and submit an independent solution in his/her own words. The list of homework problems will be announced on CANVAS. Please cite the external references that you use to improve your understanding of the course material.

Project:
A final project will be given based on the student's interests and background.
The project report is due the last day of classes.

Suggested Additional Readings:
- *Introduction to Graph Theory*, by Douglas West (2nd edition, Prentice-Hall, 2001).
- *Graph Theory*, by R. Diestel (3rd edition, Springer).
- *Applied Combinatorics*, by F. Roberts and B. Tesman (2nd Edition, Pearson Prentice Hall, 2004).
- *Combinatorics and Graph Theory*, by J.M. Harris, J.L. Hirst and M.J. Mossinghoff (2nd edition, Springer, 2008).

Additional Resources:
- Graph Theory Tutorials: http://www.utm.edu/departments/math/graph
- Graph Theory Glossary (by West) http://www.math.uiuc.edu/~west/openp/gloss.html
- Open Problems { Graph Theory and Combinatorics http://www.math.uiuc.edu/~west/openp
- Planar Graph Java Applet Game: http://www.planarity.net
- Combinatorics Net: http://www.combinatorics.net
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Academic Honesty: All students are expected to be in complete compliance with Florida Tech's Academic Honesty Policy. Any form of academic dishonesty can result in an **F** grade for this course.

Please read the Academic Honesty standards in https://policy.fit.edu/student-handbook

What is Title IX?

Title IX of the Educational Amendments Act of 1972 is the federal law prohibiting discrimination based on sex under any education program and/or activity operated by an institution receiving and/or benefiting from federal financial assistance. Behaviors that can be considered "sexual discrimination" include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. You are encouraged to report these behaviors.

Reporting: Florida Tech can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise – for example, if more than one complainant reports having been assaulted or harassed by the same individual.

Florida Tech is committed to providing a safe and positive learning experience. To report a violation of sexual misconduct or gender discrimination, please contact Linda Jancheson, Title IX Coordinator at 321-674-7277 or ljancheson@fit.edu.
* Please note that as your professor, I am required to report any incidents to the Title IX Coordinator. *Confidential support for students is available by contacting the Student Counseling Center at 321-674-8050.*