CSC 2105: Discrete Mathematics

J. Kizito

Makerere University

e-mail:	john.kizito@mak.ac.ug
www:	https://www.socnetsolutions.com/~jona
materials:	https://www.socnetsolutions.com/~jona/materials/CSC2105
e-learning environment:	http://muele.mak.ac.ug
office:	block A, level 3, department of computer science
alt. office:	institute of open, distance, and eLearning

Overview

Overview

Introduction

Course Description

The course applies mathematics to finite or discontinuous quantities in order to master the process of problem-solving, communication, reasoning, and modeling. It gives a basic understanding of mathematical structures that are fundamentally discrete. Objects studied in discrete mathematics are largely countable sets such as integers, finite graphs, and formal languages. Applications of such concepts to computer science are to be studied. Concepts and notations from discrete mathematics are useful in studying and describing objects and problems in computer algorithms and programming languages

Aims

The aim of this course is to provide the student with:

- A basic understanding of mathematical objects that assume only distinct, separate values, rather than values on a continuum
- The main ideas studied in the broad area of Discrete Mathematics especially clear algorithmic aspects
- An understanding of what the relation between problems is

Content Overview

Modules – 45 CH

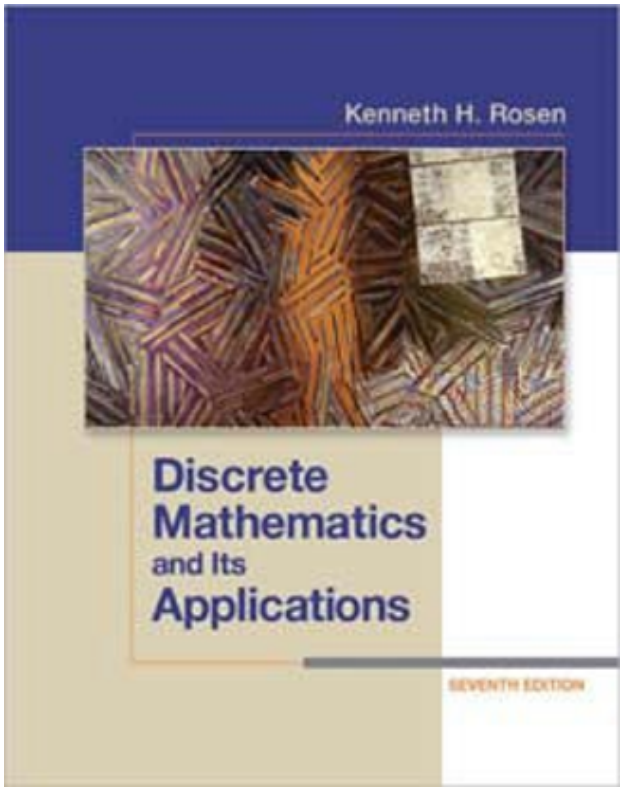
1. Module 1 (6 hours) – **Logic**: Propositional and First Order Logic
2. Module 2 (6 hours) – **Functions** and The Set Theory. Basic set operations, one-to-one, onto, inverses, composition and graphs.
3. Module 3 (6 hours) – **Relations** and the Number Theory
4. Module 4 (9 hours) – **Methods of Proof**: Direct Proofs, Implications, Contraposition, Contradiction, Proof by Cases, Induction
5. Module 5 (6 hours) – **Counting**: Sum Rule, Product Rule, Permutations, Combinations, Combinatorial Proofs
6. Module 6 (3 hours) – **Recursion**: Recursive definitions, Recursive algorithms, Solving recurrences.
7. Module 7 (9 Hours) – **Graphs and Trees**: Terminology, Representing Graphs, Isomorphism, Eulerian and Hamiltonian Graphs, Bipartite Graphs and Matchings, The Stable Marriage Problem, Graph Colorings.

Assessment

- Assignments
- Written tests
- Written Examination
- Assignments and tests, 40% while examination contributes 60%

References

Reading List



i Discrete Mathematics and Its Applications by Kenneth H. Rosen, 7th Edition, McGraw Hill, 2012.

ii Discrete Mathematics, by Kenneth A. Ross and Charles R. B. Wright, Fourth Edition.

iii Discrete and Combinational Mathematics: An Applied Introduction, by Ralph Grimaldi, 4th Edition.

iv Discrete Mathematics with Applications, by Susanna S. Epp.

Timetable

Staggered blended

CS-2 Day, LLT 3B

- Mondays 10:00–12:00
- Wednesdays 10:00–11:00

CS-2 Evening, LLT 3B

- Mondays 17:00–19:00[a]
- Wednesdays 19:00–20:00

[a] Online?

Questions? Comments? Discussion?