Course Overview

This is an introductory course in discrete mathematics. The goal of this course is to introduce students to ideas and techniques from discrete mathematics that are widely used in science and engineering. This course teaches the students techniques in how to think logically and mathematically and apply these techniques in solving problems. To achieve this goal, students will learn logic and proof, sets, functions, as well as algorithms and mathematical reasoning. Key topics involving relations, graphs, trees, and formal languages and computability are covered in this course.

Goals:

• Understand and construct mathematical arguments
• Prove simple arguments
• Develop recursive algorithms based on mathematical induction
• Know basic properties of relations
• Know essential concepts in graph theory and related algorithms
• Understand basic concepts in formal languages and computability
• Apply knowledge about discrete mathematics in problem solving

List of course topics:

• Propositional Logic
• Predicate Logic and Quantification
• Methods of Proof
• Sets and Functions
• Arithmetic Algorithms
• Growth of Functions
• Computational Complexity of Algorithms
• Integer properties and Matrices
• Mathematical Induction
• Recursion
• Sequences and Summations
• Program Correctness
• Graphs and its Applications
• Trees and its Applications
• Languages and Grammars
• Finite-State Machines
• Automata and Language Recognition
• Turing Machines

Course Information
Instructor Dr. Mohammad H. Awedh
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Office Hours Saturday, Wednesday 9:30 to 11:00 or by Appointment
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Meeting Lectures: Saturday, Monday 11:00 – 12:20
Tutorial: Wednesday 11:00 – 12:50
Building 22, Room 103

We will cover the following chapters/sections:
Assignments

Prior to each lecture, a reading assignment is assigned for that lecture. Students are expected to have read the sections assigned for the class before the class. In class I will talk about elements from the reading assignment and solve some related problems. We will be exploring the material together, your participation and engagement are critical.

Homework will be assigned on every week. You will turn in your work at the beginning of the tutorial class. During the tutorial class, we will solve together some problems from the homework. Students will be selected to present solutions of these problems. Your grade for that homework will be based on being prepared to present a correct solution to these problems.

The list of problems which has been assigned is only a minimal list. You should do additional problems whenever possible, especially in an area that you find challenging.

Exams and Quizzes

There will be two 1.5-hour exams and the final. Each exam will cover a specified amount of material, while the final will be cumulative. In addition, in case of certain events (e.g., cell phone rings in class, finish before the end of the tutorial class, feel like doing it), there may also be a one-problem pop quiz during the tutorial class. They will all be open book and open notes.

Prerequisite

EE202, IE202, MATH 204

Textbook


This is an excellent and well written book. It is used in a large number of universities in engineering, computer science and mathematics courses. In addition, there are excellent resources available online – see www.mhhe.com/math/advmath/rosen/r5/.
References

Grading
• Assignments 15%
• Participation 10%
• Quizzes (in class quizzes, pop quizzes or online quizzes) 10%
• Writing Project 5%
• Midterm Exams 30%
• Final Exam 30%

Class Web Page
We shall use Moodle for this class. Moodle is a Course Management System (CMS) which helps to communicate outside of the classroom. Students in this class should visit the site http://inonezero.com/moodle/ and create an account. This site contains information about the class - syllabus, homework list, due dates for assignments, links to other web sites, etc. In addition, We shall also use it for discussion and questions about the material covered in the course.

For each course, students should register for that course on the moodle site. Registration is enabled by a key that will be given to students in class during the first lecture. You have to notice that registration for the course does not automatically entail registration on the moodle site and vice versa.

Policies
• All assignments will be due at the beginning of the class on the due date. No late submissions will be accepted unless a valid excuse is given to the instructor by the day prior to the due date.

• You are expected to attend all classes. If you miss a class, you are responsible for finding out the material covered in that class. If you miss an exam, a grade of zero will be assigned, unless a valid excuse is given.

• All assignments are expected to be done by each student individually. Verbal and informal exchange of ideas is permitted, indeed encouraged. However, written solution should NOT be shown to another student or copied from another student. Any act of academic dishonesty will result in an F grade.