

King Saud University
College of Science
Discrete Mathematics
Course Syllabus
Second Semester 2020-2021 (1442H)

1. Course General Information:

Course Title: Discrete Mathematics	Course Code: MATH 151
Course Level: 3	Course Prerequisite: MATH 150 Co-requisites for this course (if any): None
Lecture Time: 13:00- 13:50	Credit Hours: 3

2. Faculty Member Responsible for the Course:

Name	Rank	Office Number and Location	Office Hours	Email Address
Dr. Maamoun TURKAWI	Assistant Professor	Building 4, 2A160	-	mturkawi@ksu.edu.sa

3. Course Description:

Discrete Mathematics is the subject that studies the basic concepts of elementary logic, the relations, graph theory, and the Boolean algebra. In the case of logic, we study the methods of proofs. In the case of relations, we study the equivalence relations and partitions (resp. the order relations and Hasse diagrams). In the case of graph theory, we present the basic concepts, and study the trees and their applications. It is also an aim of this course to teach the student how to simplify of Boolean functions using Karnaugh maps, and to design logic circuits.

4. Course Academic Calendar

Week	Basic material to be covered
(1-3)	Elementary logic; Methods of proof
(4-7)	Relations, basic definitions and properties, special types of relations
(8-10)	Introduction to graph theory, basic definitions and properties, special types of graphs
(11-13)	Trees and their applications
(14-15)	Boolean algebras
(16)	Final Examination

5. Course Objectives:

- Introduce the converse, inverse, and contrapositive of a conditional statement, and the logical equivalence between statements .
- Learning proofs using mathematical induction or contradiction.
- Present the equivalence relations, their equivalence classes, and the order relations.
- Introduce the regular graphs, the bipartite graphs, and the trees.
- Learning how to simplify Boolean functions using Karnaugh maps and to design logic circuits.

6. Course References:

6.1 Textbooks:

1- Discrete mathematics and its applications, K.H. Rosen, McGraw-Hill.

6.2 Essential References Materials (Journals, Reports, etc.)

NA

6.3 Recommended Textbooks and Reference Material (Journals, Reports, etc)

Discrete and combinatorial mathematics: an applied introduction, R.P. Grimaldi ; Addison-Wesley.

6.4 Websites:

Websites relevant to the topics covered in the course. <http://lms.ksu.edu.sa>

6.5 Other learning material such as computer-based programs/CD, professional standards or regulations and software.

Some textbooks are complemented by CDs

7. Teaching Methods:

- Classroom discussion sessions.
- Homework assignments and quizzes.
- Independent study.
- Students' presentations.

8. Learning Outcomes:

8.1 Knowledge and Understanding:

After studying this course, the student will acquire the following knowledge and be able to:

- Outline fundamental concepts of mathematical logic.
- Describe how to represent relations in various ways, and how to perform operations on them.
- Summarize certain basic concepts in graph theory, some special types of graphs, as well as some important typical applications of graph theory.
- Summarize certain notions related to trees, spanning trees and algorithms of find breadth-first and depth-first search trees, as well as typical applications of trees.
- Recognize basic properties of Boolean algebras and Boolean functions.
- Design logic networks and optimize costs using different algorithms and techniques.

8.2 Cognitive Skills (Thinking and Analysis):

After studying this course, the student will be able to:

- Analyze different techniques of sentential calculus, and write down truth tables.
- Represent relations in various ways. Show whether a relation is of equivalence, of partial order or neither.
- Recognize different types of graphs together with their fundamental properties.
- Develop algorithms of find breadth-first and depth-first search trees, as well as typical applications of trees.
- Simplify Boolean functions using Karnaugh maps.
- Design logic networks.

8.3 Interpersonal Skills and Responsibility:

After studying this course, the student is expected to:

- Take part in the classroom discussions.
- Work effectively both individually and within a team.
- Be able to produce simple results using old ones.

8.4 Communication, Information Technology and Numerical Skills

After studying this course, the student is expected to be able to:

- Acquire a working knowledge of basic research methodology, data analysis and interpretation.
- Demonstrate effective written and oral communication skills, especially the ability to explain and prove results.

9. Methods of Assessment:

Course Assessment	Mark
Participation, quizzes and homework assignments	10
Midterm Exam	30
Other Quizzes	20
Final Examination	40
Total	100

10. Course Policies:

- All exams are closed book.
- The final exam is comprehensive.

11. Attendance Policy:

Absence from lectures and/or tutorials shall not exceed 25%. Students exceeding the 25% limit without an accepted medical or emergency excuse are not permitted to take part in the final examination.