Form (H)
Short course description

Course title: Combinatorics and Graph Theory (1)	Course number and code: MATH 431
Previous course requirement: MATH 246	Language of the course: Arabic
Course level: 7th	Effective hours: 4 (3+2+0)

Course description

Basic counting principles. The inclusion-exclusion principle. The pigeonhole principle. Ordinary generating functions. Exponential generating functions. Homogeneous recurrence relations. Non-homogeneous recurrence relations. Basic concepts in graph theory. Eulerian graphs. Hamiltonian graphs. Trees. Planar graphs. Coloring. Chromatic polynomials.

Course objectives

To introduce students to:
1- Basic counting principles,
2- Generating functions,
3- Recurrence relations,
4- Basic concepts in graph theory,
5- Some classes of graphs,
6- Coloring of graphs.

Learning outcomes (understanding, knowledge, and intellectual and scientific skills)
After studying this course, the student is expected to be able to:

1- Prove identities combinatorially,
2- Use the inclusion-exclusion principle to solve a variety of combinatorial problems,
3- Solve recurrence relations using characteristic roots and generating functions,
4- Use generating functions to solve some counting problems,
5- Characterize Eulerian graphs, Hamiltonian graphs, trees, and planar graphs,
6- Use coloring theorems and chromatic polynomials to find the chromatic number of a graph.

Textbook adopted and supporting references

Title of the book	Author's name	Publisher's name	Date of publication
Introduction to Combinatorics (in Arabic)	Sharary A. and Alzohairi M.		1424H
Introduction to Graph Theory (in Arabic)	Sharary A. and Alzohairi M.		1434H
Introductory Combinatorics	Richard A. Brualdi	Prentice- Hall, New Jersey, 1999.	1999
A First Look at Graph Theory	John Clark and Derek Allan Holton	World Scientific Publishing Company, Singapore	1991