

# Course general Description of Math 431-1

August 30, 2025

**This course is offered: (Eleventh level/ Fourth year)**

## **Part 1**

Basic concepts in graph theory.

Trees.

Eulerian and Hamiltonian graphs.

Planar graphs.

Coloring graphs. Color polynomials.

## **Part 2**

Basic counting methods.

The principle of inclusion and exclusion.

The pigeon-hole principle.

Normal and exponential generating functions.

Homogeneous and nonhomogeneous recurrence relations.

### **Essential References**

A First Course in Graph Theory and Combinatorics, Second Edition (2022), by Sebastian M. Cioabă and M. Ram Murty.

### **Supportive References**

1. Introduction to combinatorics(in Arabic), A. Sharary and M. Alzohairi.
2. Introduction to graph theory( in Arabic), A. Sharary and M. Alzohairi.