📌 **Topic Overview:**

- **Graph Coloring** is the assignment of colors to vertices of a graph such that no two adjacent vertices share the same color.

- Used in **map coloring, scheduling problems, and resource allocation**.

📌 **Key Concepts:**

✅ **Chromatic Number (χ)** – The minimum number of colors needed to color a graph.

✅ **Four-Color Theorem** – Any planar map can be colored using at most **four colors**.

✅ **Greedy Coloring Algorithm** – A simple approach that assigns the smallest available color to each vertex.

✅ **Applications** – Used in **scheduling, register allocation, and network frequency assignments**.

📌 **Example Problem:**

- Given a graph, determine its **chromatic number** and apply a **greedy coloring strategy** to find a valid coloring.