UNIT – 4

**Topology:**


**Elements of Functional Analysis:**

Metric completion, Banach’s contraction mapping theorem and applications, Baire’ category theorem,


**Graph Theory:**

Graphs, Vertices of graphs, Walks and connectedness, Degrees, Operations on graphs, Blocks, Cut points, Bridges, Cut point graphs, Sub-graphs, Paths and cycles, Connected graphs, Connected components, Adjacency and incidence matrices. Properties of trees, Center, Connectivity, Connectivity and line connectivity, Menger’s theorem, Partitions, Coverings and independence number. Euler tours, Euler graphs, Hamiltonian paths, Hamiltonian graphs, Closure of a graph, Planar graphs, Euler’s formula, Vertex colouring, Chromatic number, Chromatic polynomial, R - Critical graphs.