17HS055 GRAPH THEORY

Course Description and Objectives:
This course is created for student to be familiar with the most fundamental Graph Theory topics and results and exposed to the techniques of proofs and analysis.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Appreciate the definition and basics of graphs along with types and their examples.
2	Understand the definition of a tree and learn its applications to fundamental circuits.
3	Know the applications of graph theory to network flows.
4	Understand the notion of planarity and coloring of a graph.
5	Relate the graph theory to the real-world problems.

Skills:

1. Be able to grasp features, properties of special graphs.
2. Discuss the concept of graph, tree, Euler graph, cut set and Combinatorics.
3. Be able to use graph theory as a modelling tool.

UNIT – I (12 hrs) Graphs and Sub Graphs :
Graphs , Simple graph, graph isomorphism, the incidence and adjacency matrices, sub graphs, vertex degree, Hand shaking theorem, paths and connection, cycles.

UNIT – II (12 hrs)
Applications, the shortest path problem, Sperner's lemma.
Trees :
Trees, cut edges and Bonds, cut vertices, Cayley's formula.

UNIT – III (12 hrs) :
Applications of Trees - the connector problem.
Connectivity
Connectivity, Blocks and Applications, construction of reliable communication Networks,

UNIT – IV (12 hrs):
Euler tours and Hamilton cycles
Euler tours, Euler Trail, Hamilton path, Hamilton cycles , dodecahedron graph, Petersen graph, hamiltonian graph, closure of a graph.

UNIT – V 12 hrs)

Applications of Eulerian graphs, the Chinese postman problem, Fleury's algorithm - the travelling salesman problem.

Reference Books:

1. Graph theory with Applications by J.A. Bondy and U.S.R. Murthy, Mac. Millan Press

2. Introduction to Graph theory by S. Arumugham and S. Ramachandran, Scitech Publications, Chennai-17.

3. A Text Book of Discrete Mathamatics by Dr. Swapan Kumar Sankar, S.Chand & Co. Publishers, New Delhi.

4. Graph Theory and Combinations by H.S. Govinda Rao, Galgotia Publications.