

## **GRAPH THEORY**

### **UNIT I**

Definition of a Graph – finite & infinite graphs – incidence, degree isolated & pendent Vertices – isomorphisms –sub graphs – walks , paths & circuits –Connected & disconnected graphs – components –Euler graphs - Operations on Graphs –More on Euler graphs –Hamiltonian paths & circuits .

### **UNIT II**

Trees –properties of trees –pendent vertices in a tree – distances & centres in a tree – Rooted & binary trees – Spanning trees –Fundamental circuits – Finding all spanning trees of a Graph –Spanning trees in a weighted graph .

### **UNIT III**

Cut sets – Properties of a Cut set – all Cut sets in a graph – Fundamental circuits & Cut sets –Connectivity & separability.

### **UNIT IV**

Vector Space of a Graph – Sets with one , two operations –modular arithmetic - Galois Fields –Vectors-Vector Spaces –Basis vectors of a graph – circuit & cutset subspaces –Orthogonal vectors & spaces.

### **UNIT V**

Matrix representation of a graph – Incidence matrix –Circuit Matrix - Fundamental Circuit Matrix and rank of the circuit matrix – Cut set matrix – adjacency matrix – Chromatic Number - Chromatic partitioning – Chromatic polynomial.

### **TEXT BOOK(S)**

- [1] Narsingh Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India ,New Delhi, 1997.  
UNIT – I -Chapter 1 Section 1.1 to 1.5 & Chapter 2 Sections 2.2, 2.4 to 2.9  
UNIT – II - Chapter 3 Sections 3.1, 3.3 , 3.6, 3.9, 3.9.1, 3.10, 3.10.1  
UNIT – III-Chapter 4 Sections 4.1 to 4.5  
UNIT –IV -Chapter 6 Section 6.1 to 6.8  
UNIT – V -Chapter 7 Sections 7.1, 7.2, 7.3, 7.4, 7.6, 7.9 and Chapter 8 Sections 8.1, 8.2, 8.3

### **REFERENCE(S)**

- [1] Dr.S. Arumugam & Dr. S. Ramachandran, Invitation to Graph Theory, Scitech Publications India Pvt Limited, Chennai, 2001.  
[2] K.R. Parthasarathy, Basic Graph Theory, Tata McGraw Hill Publishing Company, New Delhi, 1994.  
[3] G.T. John Clark, Derek Allan Holten, A First Look at Graph Theory, World Scientific Publishing Company, 1995.