

COURSE CODE	COURSE TITLE	L	T	P	C
1152CS123	SOCIAL NETWORK ANALYSIS	3	0	0	3

Course Category: Program Elective

A. Preamble:

This course presents theoretical approaches which have been developed in other areas as a means of understanding how society functions and decisions are made.

B. Prerequisite Courses:

SI No	Course Code	Course Name
1	1151CS111	Computer Networks
2	1152CS101	Cryptography and network security

C. Related Courses:

SI No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

D. Course Educational Objectives:

Students undergoing this course are expected to:

- Basics of computer networks
- Formalize different types of networks
- Plan and execute network communities.
- Network applications.
- Network Implications and cascades.

E. Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO Nos.	COURSE OUTCOMES	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Outline the basic concepts of complex networks and random graphs.	K2
CO2	Illustrate the different types of real networks and random networks.	K2
CO3	Summarize the network community activities.	K2
CO4	Explain about web search in social networks.	K2
CO5	Apply Network Implications and cascades behavior of social	K3

F. Correlation of COs with POs:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	M	L	L					M				L	L		L
CO2	M	L	L					M	L			L	L		L
CO3	M	L	M					M	L			L	L		M
CO4	M	L	M					M	M			L	L		M
CO5	M	L	M					M	M			L	L		M

G. Course Content:

UNIT 1 Introduction to Complex Networks and Random Graphs 9
Networks – face book – terrorist network – Internet – Airline Network – Geo - Social Networks A Network is a Graph Node Degree – Directed & Undirected – Graphs Paths and Cycles Connectivity – Components – Path Length / Distance – Small – world Phenomenon – Milgram’s Experiment Erdos Number Bacon Number Random Graphs - Model – Properties Diameter.

UNIT II 9

Small World and Weak ties- Clustering Co - efficient of Real Networks - Real Networks vs Random Networks – Small World Model-Other Real Networks - Examples-Bridges - Network Centrality and Applications Centrality-Measures-Normalization-Freeman’s Network-Centrality Betweenness-Closeness-Centrality.

UNIT III 9
Communities-Overlapping Communities and Community Detection – Communities-Edge Betweenness – Calculating number of shortest paths - Calculating flows – Modularity- Modularity Optimization.

UNIT IV 9
Structure of the Web-Search and Power Laws Precursor of hypertexts-SCC-Power Law vs Exponent-Reach Ability-Unpredictability -Network Robustness and Applications-Internet as topology-Properties- Robustness Site-Percolation- effect of attacks and failure on WWW and Internet- Effect on Giant Component Scale-free networks

UNIT V 9
Cascades and Behavior Influence – Decision Making and Behavior Influence - Model of Discussion - Network Implications- Chain Reactions Cascades – Viral Marketing – Clusters and Cascades- Epidemic Spreading – Epidemic Spreading and Information Cascades Examples.

TOTAL: 45 Hours

H. Learning Resources

i. TEXT BOOKS:

1. D. Easley, J. Kleinberg. Networks, Crowds, and Markets: Reasoning About a Highly Connected World. Cambridge University Press, 2010.
2. M. Newman. Networks.Oxford University Press. April 2010.

ii. REFERENCE BOOKS:

1. Stanley Wasserman, University of Illinois, Urbana-Champaign, Social Network Analysis Methods and Applications, University of South Carolina, May 1995.
2. Stanley Wasserman, Joseph Galaskiewicz, Advances in Social Network Analysis: Research in the Social and Behavioral Sciences (Google eBook), SAGE Publications, 27-Jul-1994

iii. Online resources

1. <http://lrs.ed.uiuc.edu/tse-portal/analysis/social-network-analysis>
2. http://digitalcommons.usu.edu/itls_facpub/133