Social Networking Analysis – Syllabus

Text Books/ Reference Books :
1. M.E.J. Newman: Networks : An Introduction, OUP, 2012
2. Network Data Analytics, Ed. Charu C.Aggarwal, Springer, 2011
3. David Easley, Jon Kleinberg: Networks, Crowds and Markets: Reasoning about a highly connected world, Cambridge Univ Press 2010
4. S.Wasserman, K.Faust: Social Network Analysis: Methods and Applications, Cambridge Univ Press, 1994

Graph Preliminaries
Graphs, Types of graphs, Representation, Bipartite graphs, Planar networks, The graph Laplacian, Random Walks

Maximum Flow and Minimum Cut Problem

Introduction to Approximation Algorithms
Definitions. Approximation algorithms for vertex cover and TSP.

Social Networks : An Introduction
Types of Networks: General Random Networks, Small World Networks, Scale-Free Networks; Examples of Information Networks; Network Centrality Measures; Strong and Weak ties; Homophily

Walks
Random walk-based proximity measures, Other graph-based proximity measures. Clustering with random-walk based measures

Community Detection
Algorithms for Community Detection: The Kernighan-Lin algorithm, Agglomerative/Divisive algorithms, Spectral Algorithms, Multi-level Graph partitioning, Markov Clustering; Community Discovery in Directed Networks , Community Discovery in Dynamic Networks, Community Discovery in Heterogeneous Networks, Evolution of Community.

Link Prediction
Feature based Link Prediction, Bayesian Probabilistic Models, Probabilistic Relational Models, Linear Algebraic Methods: Network Evolution based Probabilistic Model, Hierarchical Probabilistic Model, Relational Bayesian Network. Relational Markov Network.

Event Detection
Classification of Text Streams, Event Detection and Tracking: Bag of Words, Temporal, location, ontology based algorithms. Evolution Analysis in Text Streams, Sentiment analysis..

Social Influence Analysis
Influence measures, Social Similarity - Measuring Influence, Influencing actions and interactions. Influence maximization.

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Evaluation:

    Internal (40 Marks):

    Best of Minor 1 & Minor 2 (15 Marks)

Minor 3: Assignments + Mini-Project: (Evaluated for 25 Marks)
Major Examination : 60 Marks

Tentative Schedule for SNA during Jan- April 2017

Date		Topic	Remarks
January	11	Introduction	
	12	Graph Preliminaries	
	18	Max Flow Min Cut	
	19	Intro to Approx Algorithms	
	25	Types of Networks	Assignment-1
	26		Holiday
February	1	Centrality Measures	
	2	Centrality Measures	
	8	Community Detection	
	9	Community Detection	Assignment-2
	15	Community Detection	
	16	**Minor-1**	<mark>rescheduled</mark>
	22	Proximity Measures	
	23	Proximity Measures	Assignment-3
	24	**Minor-1**	Saturday
March	1	Link Prediction	
	2	Link Prediction	A4-Identification of Mini-Project
	8	Network Formation	
	9	Network Formation	
	15	Event Detection	
	16	Event Detection	
	17	Social Influence Analysis	Saturday (Extra class)
	22	Social Influence Analysis	
	23	Social Influence Analysis	
	24	**Minor-2**	Saturday
	29		Holiday
	30		Holiday
April	5	Wrap-up	
	6	Student Presentations	
	7	Student Presentations	Extra Class

12	Student Presentations	
13	Student Presentations	