राष्ट्रीय प्रौद्योगिकी संस्थान पटना / NATIONAL INSTITUE OF TECHNOLOGY PATNA
संगणक विज्ञान एंव अभियांत्रिकी विभाग / DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
अशोक राजपथ, पटना-८००००५, बिहार / ASHOK RAJPATH, PATNA-800005, BIHAR
Phone No.: 0612-2372715, 2370419, 2370843, 2371929 Ext- 200, 202 Fax-0612-2670631 Website: www.nitp.ac.in

No:- Date:

CSX4180: Social Networks

L-T-P-Cr: 2-0-2-3

Pre-requisites: Fundamental knowledge of data mining

Objectives/Overview:

- To familiarize with social networks
- To learn networks measures and networks models
- To learn various data mining techniques.
- To understand community and behavioural analysis techniques.

Sl. No.	Outcome	Mapping to POs
1.	Use of social networks for business and professional purposes	**CO5, CO6, C10**
2.	Analyse social networks to solve business issues.	**CO1, CO4**
3.	Describing the public sector media and privacy	**CO2, CO3, CO4**
4.	Develop social network developer tools for solving real-world social network issues.	**CO2, CO12, CO9**

UNIT I: Introduction to social network: **Lectures: 5**

What is Social Media Mining, New Challenges for Mining, Book Overview and Reader's Guide. Graph Essentials: Graph basics: nodes, edges, degree and degree distribution; graph representation, types of graph, connectivity in graphs, special graphs, graph algorithms.

UNIT II: Network Measures: **Lectures: 5**

Centrality: Degree centrality, Eigenvector Centrality, Katz Centrality, PageRank, Betweenness Centrality, Closeness Centrality, Group Centrality; Transitivity and Reciprocity, Balance and Status, Similarity.

UNIT III: Network Models: **Lectures: 7**

Properties of Real-World Networks**,** Degree Distribution, Clustering Coefficient, Average Path Length, Random Graphs, Evolution of Random Graphs, Properties of Random Graphs, Modeling Real-World Networks with Random Graphs, Small-World Model, Properties of the Small-World Model, Modeling Real-World Networks with the Small-World Model, Preferential Attachment

Model, Properties of the Preferential Attachment Model, Modeling Real-World Networks with the Preferential, Attachment Model.

UNIT IV: Data Mining Essentials: **Lectures: 7**

Data, Data Quality, Data Pre-processing, Data Mining Algorithms, Supervised Learning, Decision Tree Learning, Naive Bayes Classifier, Nearest Neighbour Classifier, Classification with Network Information, Regression, Supervised Learning Evaluation, Unsupervised Learning, Clustering Algorithms, Unsupervised Learning Evaluation .

UNIT V: Community Analysis: **Lectures: 5**

Community Detection, Community Detection Algorithms, Member-Based Community Detection, Group-Based Community Detection, Community Evolution, How Networks Evolve, Community Detection in Evolving Networks, Community Evaluation, Evaluation with Ground Truth, Evaluation without Ground Truth.

UNIT VI: Information Diffusion in Social Media: **Lectures: 7**

Herd Behaviour, Bayesian Modeling of Herd Behaviour, Intervention, Information Cascades, Independent Cascade Model (ICM), Maximizing the Spread of Cascades, Intervention, Diffusion of Innovations, Innovation Characteristics, Diffusion of Innovations Models, Modeling Diffusion of Innovations, Intervention, Epidemics, Definitions, SI Model, SIR Model, SIS Model, SIRS Model, Intervention.

UNIT VII: Influence and Homophily **Lectures: 3**

Measuring Assortativity, Measuring Assortativity for Nominal Attributes, Measuring Assortativity for Ordinal Attributes, Influence, Homophily, Distinguishing Influence and Homophily.

UNIT VIII: Recommendation in Social Media: **Lectures: 2**

Challenges, Classical Recommendation Algorithms, Recommendation Using Social Context, Evaluating Recommendations.

UNIT IX: Behaviour Analysis: **Lectures: 3**

Individual Behaviour, Collective Behaviour, Collective Behaviour Analysis, Collective Behaviour Modeling, Collective Behaviour Prediction.

Text/Reference Books:

1) Social Media Mining: An Introduction by Reza Zafarani, Mohammad Ali Abbasi, Huan Liu