GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering Syllabus

Subject Code : 3174209

Subject Name : Social and Information Network Analysis

WEF Academic Year :	2021 - 22
Semester :	7
Category of the Course :	Open Elective

Prerequisite : Programming language (python etc.), Basic knowledge of algorithm and programming along with AI and graph theory.

Rationale : This course will cover data analysis on social networks, with a particular emphasis on effective methods for managing large-scale networks. It presents the most important theoretical results in social network mining as well as practical experience on the most important challenges pertaining to this field.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Course Content :

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**INTRODUCTION :** Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.	7	20
2	**MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION :** Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.	7	20

3	**EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS :** Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.	7	20
4	**PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES :** Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.	7	20
5	**VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS :** Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.	7	20

Reference Book :

1. "Social Networks and the Semantic Web", Peter Mika, First Edition, Springer 2007.
2. "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", Dion Goh and Schubert Foo, IGI Global Snippet, 2008.
3. "Handbook of Social Network Technologies and Applications", Borko Furht, Springer 1st Edition, 2010.
4. "Mining the Social Web: Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Sites", Matthew A. Russell, O'Reilly Media Inc.
5. "Social Media Analytics", Mathew Ganis, Avinash Koihrkar, IBM Press, 1st Edition
6. "Social Media Metrics", Jim Sterne, Wiley.
7. "Social Media ROI", Oliver Blanchard, Que Publishing.

8. "Digital Analytics for Marketing", Marshall Sponder, Gorah F. Khan, Routledge, 1st edition
9. "Social Media Analytics", Marshall Sponder, McGraw Hill.
10. "Social Media Marketing", Tracy L. Tuten, Michael R. Solomon, Sage, 3rd Edition.

Course Outcome :

After Completion of the Course, Student will able to :

No	Course Outcomes	RBT Level*
01	To understand the concept of semantic web and related applications.	UN
02	To learn knowledge representation using ontology.	RM
03	To understand human behaviour in social web and related communities.	UN
04	Apply visualization concepts to analyse social networks	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List :

Instructor should offer at least 10 practical based on concepts covered in syllabus.

List of Laboratory/Learning Resources Required :

- https://www.latentview.com/blog/a-guide-to-social-network-analysis-and-its-use-cases/
- https://towardsdatascience.com/social-network-analysis-from-theory-to-applications-with- python-d12e9a34c2c7
- https://www.dataminingapps.com/2017/01/5-practical-use-cases-of-social-network-analytics- going-beyond-facebook-and-twitter/
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SITA3005.pdf

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