

Detailed Syllabus

Subject Code	19M12CS111	Semester odd	Semester: First Session: 2020- 2021 Month from July to December
Subject Name	Web Intelligence		
Credits	3	Contact Hours	3
Faculty (Names)	Coordinator(s)	1. Dr. Anuja Arora	
	Teacher(s) (Alphabetically)	Dr. Anuja Arora	

Course Outcomes:

At the completion of the course, students will be able to,

CO#	CO Description	COGNITIVE LEVELS
C121.1	Outline the various web technologies, methods, and models used to design an intelligent web.	Understand (Level-2)
C121.2	Make use of web caching strategies at varied level: user, web server, and gateway server.	Apply Level (Level-3)
C121.3	Analyze and Model the users' browsing behavior on web.	Analyze (Level- 4)
C121.4	Evaluate various Web content mining algorithms, Web language models and learning to rank models to handle complex Web.	Evaluate Level (Level-5)
C121.5	Design and develop the computational intelligent web algorithms to handle complex real problems	Create Level (Level-6)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Web Content Feature Engineering	Frequency Filter, POS Tag, Unigram, Ngram, Collocation, Levenstein Distance, KL-Divergence, T-Test.	4
2	Web Language Models	Vector Space Models: TF-IDF, SGRank, SGRank-IDF, Single Rank, Word-Word occurrence matrix; Word Embedding with GloVe, Word2Vec, CBoW, Skip Gram Model Probabilistic models: Bayes model, BM25 Ranking model;	8
3	Web Content Searching	Link Based Search Algorithm, Power Iteration Method for ranking nodes on web, Handling Spider Traps and Dead ends, Topic Sensitive Page Ranking.	4
4	Ranking Algorithm and performance measures	Point wise ranking, Pair wise Ranking, Listwise ranking.	4

		Metrics for Learning to rank : CG, DCG, NDCG, P@K, MAP, AP	
5	Web caching Algorithm	LRV, FIFO, LRU, Random, OPT, Size based, PSS	4
6	Matrix Factorization Techniques	Matrix decomposition, Eigenvalue decomposition, Non-Negative matrix factorization, Singular value decomposition, objective functions , UV decomposition, CUR decomposition	5
7	Tensor Factorization	Multidimensional Matrix Factorization, Matricization, Tucker decomposition, High Order SVD, clustHOSVD, other methods	4
10	Collective Intelligence	Crowd Sourcing, Local-Global Behavioral Interactions, Self-Organizing Systems, Self-Adaptive Evolutionary Systems, Information Extraction from Deep Web, Decision Making Under Uncertainty	4
11	Graph Structure in the Web	Social Network Analysis, Google Patent Algorithm, News Feed Algorithm, Edge Rank Algorithm, Web of Things, Situational Awareness	5
Total number of Lectures			41

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Attendance/ Class Assignments/Quiz/ Internal assessment & Mini-Project)
Total	100

Project Based Learning: Students will develop small size project in order to build an intelligent web concept in a group of 2-3. Basically, small size projects are given to students in form of assignments to provide solution out of topics discussed in the course. Understanding usage of appropriate methodology, then implementation of those selected methodology to handle real scenario intelligent web problem and evaluation of applied methodology using various performance measures is the prime concept to enhance students' knowledge towards intelligent web.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1	Web Intelligence Journal: https://www.iospress.nl/journal/web-intelligence-and-agent-systems/
2.	Soumen Chakrabarti,. Mining the Web: Discovering knowledge from hypertext data. Morgan Kaufmann, 2003.
3.	Scime, Anthony, ed. Web mining: applications and techniques. IGI Global, 2005.
4.	Hitzler, Pascal, Markus Krotzsch, and Sebastian Rudolph. Foundations of semantic web technologies. CRC Press, 2011.

5.	Sponder, M., & Khan, G. F. (2017). Advanced Web Analytics and Web Intelligence. In Digital Analytics for Marketing (pp. 115-144). Routledge.
6.	Symeonidis, P., & Zioupos, A. (2016). Matrix and Tensor Factorization Techniques for Recommender Systems (Vol. 1). New York: Springer International Publishing.
7.	Aggarwal Charu.C, Social Network Data Analytics, Springer Science+Business Media, LLC 2011
8.	Velásquez, J. D. (2010). Advanced techniques in web intelligence (Vol. 311). L. C. Jain (Ed.). Springer.
9.	Zhong, N., Liu, J., & Yao, Y. (2003). Web intelligence. Springer Science & Business Media.
10	Borgatti Stephon. P., Everett Martin G and Johnson Jeffery C , Analyzing Social Networks, Sage Publications, 2013