DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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CSXX2021 ***Recommendation Systems*** **L-T-P-Cr: 3-0-0-3**

Pre-requisites: Fundamental knowledge of algorithms and AI

Objectives/Overview:

- Explaining the importance and working of the recommendation system.
- The course focuses on the applicability of the recommendation system in various areas like items, books, research papers, tourist places, television programs etc.
- The course explains major techniques of recommendation system like content based filtering, collaborative filtering, knowledge-Based recommender systems, demographic recommender systems, hybrid and ensemble-based recommender systems, evaluation of recommender systems, etc.

Course Outcomes:

At the end of the course, a student should:

Sl. No.	Outcome	Mapping to POs
1.	Applicability of recommendation system in various domains.	PO1, PO2
2.	Usage of content based recommendation system in different domains.	PO1, PO2, PO3
3.	Understanding of memory based collaborative recommendation techniques and its usage.	PO1, PO2, PO3
4.	To gain knowledge of model based collaborative filtering techniques and its usage in recommendation system	PO1, PO2, PO3
5.	To develop skills of ensemble and hybrid recommendation systems.	PO1, PO2, PO3, PO5
6.	Understanding of the evaluation of the recommendation system.	PO1, PO2, PO3

Syllabus

UNIT I: **Lecture: 4**

Recommender Systems Function, Recommendation Techniques, Recommender Systems as a Multi-Desciplinary Field,Challenges.

UNIT II: **Lecture: 10**

Basic Components of Content-Based Systems, Preprocessing and Feature Extraction, Learning User Profiles and Filtering, Nearest Neighbor Classification.

UNIT III: **Lecture: 10**

User-Based collaborative filtering, Similarity Function Variants, Variants of the Prediction Function, Item-Based Collaborative filtering, Comparing User-Based and Item-Based Methods, Strengths and Weaknesses of Neighborhood-Based Methods.

UNIT IV: **Lecture: 8**

Rule-Based Collaborative Filtering, Association Rules, Naive Bayes Collaborative Filtering, Neural Network, Singular Value Decomposition, Stochastic Gradient Descent, Regularization.

UNIT V: **Lecture: 5**

Weighted Hybrids, Switching Hybrids, Cascade Hybrids, Feature Augmentation Hybrids, Meta-Level Hybrids, Feature Combination Hybrids.

UNIT VI: **Lecture: 5**

General Goals of Evaluation Design: Accuracy, Coverage, Confidence and Trust, Novelty, Serendipity, Diversity, Scalability, Segmenting the Ratings for Training and Testing, Accuracy Metrics in Offline Evaluation.

Text/Reference Books

1. *Recommender Systems: The Textbook.* Charu C. Aggarwal, Springer.
2. *Recommender Systems Handbook.* Francesco Ricci, Lior Rokach, Bracha Shapira, Paul B. Kantor, Springer.