INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURE CONTENT

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE							
IV Semester: MBA							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		

Course Code	Category	L	T	P	C	CIA	SEE	Total
CMBD57	**Elective**	4	-	-	4	40	60	100

Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**	**Total Classes: 45**
Prerequisite: Business Analytics			

I. COURSE OVERVIEW:

The aim of this course provides a comprehensive exploration of machine learning algorithms, recommender systems, decision tree classification, and the foundations of artificial intelligence. Participants will delve into the types of machine learning, recommendation techniques, decision tree modeling, and the principles of artificial intelligence, including problem-solving strategies.

II.OBJECTIVES:

The students will try to learn:

I.   The various Machine Learning Algorithms.
II. The various classification techniques and recommender systems.
III. The students acquainted with the concepts of different searching techniques of AI systems.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1   Discuss about the machine learning concepts, types of algorithms (supervised, unsupervised, and reinforcement learning), and specific supervised learning algorithms (K Nearest Neighbors, Random Forest, and Boosting).

CO2   Illustrate the user-based and item-based similarity in recommender systems, calculate cosine similarity, and address challenges with similarity measures.

CO3   Summarize the decision trees, building classifiers using gini criteria and entropy criteria. Measure test accuracy, display decision trees, find optimal criteria,

CO4   Demonstrate the decision tree classification in a case study on German credit data.

CO5   Explore the meaning and foundations of artificial intelligence, the history of AI, and the concept of rationality.

CO6   Apply delve into local search algorithms, optimization problems, adversarial search, constraint satisfaction problems, and the introduction of chatbots.

IV. COURSE CONTENT:

MODULE-I-MACHINE LEARNING (08)
What is Machine Learning; Types of Machine Learning Algorithms-Supervised, Unsupervised and Reinforcement Learning. Supervised Learning-K Nearest Neighbors, Random Forest and Boosting Case Study: Predicting Employee Churn Using KNN, RF and Boosting.

MODULE -II-RECOMMENDER SYSTEMS USING MACHINE LEARNING (10)
User Based Similarity-Calculating Cosine Similarity Between Users, Filtering Similar Users, Challenges with User Based Similarity. Item Based Similarity-Calculating Cosine Similarity between Movies, Finding Most Similar Movies. Matrix Factorization.

MODULE -III-DECISION TREE CLASSIFICATION (09)
Introduction to Decision Tree; Building Decision Tree Classifier using Gini Criteria; Measuring Test Accuracy; Displaying the Tree; Building Decision Tree Classifier using Entropy Criteria.

Finding Optimal Criteria; Maximum Depth of the Tree and Benefits and Disadvantages of Decision Tree Case Study: Applying Decision Tree Classification on German Credit Data.

MODULE -IV-ARTIFICIAL INTELLIGENCE (10)
Introduction-Meaning and Foundations of AI, History of AI. Intelligent Agents-Agents and Environments, Concept of Rationality, Nature of Environments, The Structure of Agents, AI: The present and Future.
Problem Solving-I: Solving Problems by Searching-Problem Solving Agents, Searching for Solutions, Uninformed Search Strategies, Informed Search Strategies, Heuristic Functions.

MODULE -V-PROBLEM SOLVING (08)
Beyond Classical Search-Local Search Algorithms and Optimization Problems, Beyond Classical Search, Adversarial Search, Constraint Satisfaction Problems, Chabot –Introduction, Characteristics and its importance.

V. TEXT BOOKS:
1. Sergio's Theodoratos, Elsevier "Machine Learning A Bayesian and Optimization Perspective ", 1st edition, 2020.
2. Dr. Dheeraj Mehrotra "Basics of Artificial Intelligence & Machine Learning ", 3rd edition, 2019.
3. Wei- Meng Lee, "Python Machine Learning", Weily, 3rd edition, 2019.
4. David L. Poole, Alan K. Mackworth "Artificial Intelligence", 2nd edition, 2018.
5. Steven W Knox, JOHN WILEY "Machine Learning a Concise Introduction ", 4th edition, 2018.
6. Richard E. Neapolitan, Taylor &Francis "Artificial Intelligence with an Introduction to Machine Learning" 2nd edition, 2018.

VI. REFERENCE BOOKS:
1. Paul Deitel, Harvy Deitel, "Python for Programmers- with introductory AI Case Studies", 1st edition, Pearson Education, 2019.
2. Puneet Mathur, "Machine Learning Applications Using Python: Cases Studies from Healthcare, Retail, and Finance", 1st edition, Apress, 2019.
3. Joshua Eckroth, "Python AI Projects for Beginners", 1st edition, Packt Publishers, 2018.
4. Shalev-Shwartz, Ben-David, "Understanding ML from Theory to Algorithms", 1st edition, Cambridge University Press, 2014.
5. Stephen Marsland, Machine Learning - An Algorithmic Perspective, 2nd edition, CRC Press, 2014.
6. Saroj Kaushik, "Artificial Intelligence", 1st edition, Cengage Learning India.

VII.WEB REFERENCES:
1.   https://www.amazon.in/dp/b00lpgbv60/ref=cm_sw_r_apan_glt_ms59jpftkscvqmhfg9pf.
2.   https://www.amazon.in/dp/b07f63rmsw/ref=cm_sw_r_apan_glt_1tzmkkbj2rdbmzy2j2sx

VIII.E-TEXT BOOKS:
1.   https://www.amazon.in/dp/b00lpgbv60/ref=cm_sw_r_apan_glt_ms59jpftkscvqmhfg9pf