

As Per NEP 2020

University of Mumbai



Syllabus for Basket of OE Vertical 3

Faculty of Science

Board of Studies in Data Science

Second Year Programme

Semester

III

Title of Paper

Credits

Introduction to AIML

2

From the Academic Year

2025-26

Title of Paper: Introduction to AIML

Sr. No.	Heading	Particulars
1	Description of the course: Including but not limited to:	Artificial Intelligence is used to develop computer systems that make machines to perform tasks like human being problem solving, thinking, learning, reasoning. Machine learning is a subset of artificial intelligence. AI enables computer machines to learn from data without explicit programming, improving their performance over time by analyzing patterns and making predictions based on that data. ML makes computers learn by experience.
2	Vertical:	Open Elective
3	Type:	Theory
4	Credit:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	Hours Allotted:	30 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives (CO): CO1: To understand and familiarize the principles of Artificial Intelligence. CO2: To learn the machine learning basics and fundamentals. CO3: To learn the techniques involved in AI and Machine learning. CO4: To study different applications of AI and Machine learning. CO5: To learn various methods of problem searching in Artificial Intelligence.	
8	Course Outcomes (OC): OC1: Understand the working of AI and Machine learning. OC2: Learn to process problems by searching methods. OC3: Students will be able to identify problem and solution by AI method OC4: Learn to use machine learning concepts in their projects. OC5: Learn to understand the applications of AI and Machine Learning.	

9	Modules:	
	Module 1:	15 Hrs
	Introduction to Artificial Intelligence: What Is AI, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, Applications of Artificial Intelligence. The State of the Art, Intelligent Agents, Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents, Solving Problems by Searching: Problem-solving Agents, Formulating problems, Example problems, and searching for Solutions, Search Strategies, Avoiding Repeated States, and Constraint Satisfaction Search. Informed Search Methods: Best-First Search, Heuristic Functions, Memory Bounded Search, and Iterative Improvement Algorithms. Domain specific AI Case studies from the following (Any 2): Artificial Intelligence Trailblazers Retail, Consumer Goods and Food and Beverage Companies Media, Entertainment and Telecom Companies Services, Financial and Healthcare Companies Manufacturing, Automotive, Aerospace and Industry 4.0 Companies	
	Module 2:	15 Hrs
	Introduction to Machine Learning: What is machine learning? Need for machine learning, Machine learning Roadmap, Important of Machine learning, machine learning, Types of Machine learning: Supervised learning, Unsupervised learning, Semi-supervised learning and Reinforcement learning, Identifying Problems Suitable for Machine learning, Advantages of Machine learning, Disadvantages of Machine learning, Characteristics of Machine learning, Areas of influence of Machine Learning, Machine learning in relations with other fields, Machine learning process. Basics of Learning Theory and Feature Engineering: Applications of machine learning, Challenges of Machine Learning Machine learning and statistics, Introduction to learning and its types,, Introduction to Computational learning theory, Design of a learning system, Introduction of Concept learning, What is feature?, Feature Engineering, Feature Transformation, Feature Extraction, Feature construction, Feature selection process. Domain specific ML Case studies from the following (Any 1): Artificial Intelligence Trailblazers Retail, Consumer Goods and Food and Beverage Companies Media, Entertainment and Telecom Companies Services, Financial and Healthcare Companies Manufacturing, Automotive, Aerospace and Industry 4.0 Companies	

10	Textbooks: 1. Artificial Intelligence A Modern Approach Third Edition Stuart J. Russell and Peter Norvig 2010 2. Machine Learning Concepts, Techniques and Applications, T V Geetha, S Sendhilkumar CRC Press, Taylor and Francis, 1st Edition, 2023 3. Machine Learning, S Sridhar, Oxford University Press, 1st Edition, 2021.	
11	Reference Books: 1. Introduction to Artificial Intelligence, Marc Toussaint February 4, 2019 2. Artificial Intelligence, Elaine Rich, Kevin Knight, & Shivashankar B Nair, McGraw Hill, 3rd ed.,2009 3. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI.,2010 4. Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011. 5. Rich, Knight, Nair, Artificial Intelligence, Tata McGraw Hill, 3rd Edition, 2009. 6. Artificial Intelligence In Practice Bernard Marr 2019 John Wiley & Sons Ltd (For Case Studies)	
12	Internal Continuous Assessment: 40%	Semester End Examination: 60%
13	Continuous Evaluation through: Class test of 15 marks Case study submission of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	Format of Question Paper: External Examination (30 Marks) – 1 hour duration
14	Format of Question Paper: (Semester End Examination: 30 Marks. Duration:1 hour) Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks) Or Q1: Attempt any three (out of five) from Module 1 (15 marks) Q2: Attempt any three (out of five) from Module 2 (15 marks)	

Sd/-
Sign of the BOS
Chairman
Dr. Srivaramangai R
BOS in Data Science

Sd/-
Sign of the Offg.
Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology

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Sign of the Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology