

SEMESTER - V
FUNDAMENTALS OF AI AND ML

1. Course Description**Programme: B.Sc./B.Com.****Max. Hours: 60****Course Code: U24/CSC/GE/501****Hours per week: 4****Course Type: GENERIC ELECTIVE****Max. Marks: 100****No. of credits: 4****2. Course Objectives**

- To understand AI fundamentals, including data types and processing tools.
- To learn Machine Learning principles and algorithms for various tasks.
- To gain practical skills in Deep Learning, NLP, and implementing AI solutions.

3. Course Outcomes

On completion of the course the student will be able to:

CO1: *Demonstrate* a comprehensive understanding of AI fundamentals. (Cognitive level – 3)

CO2: *Classify* the Machine Learning processes and algorithms, including supervised, unsupervised, reinforcement, and semi-supervised learning techniques.
(Cognitive level – 4)

CO3: *Develop* a comprehensive understanding of Deep Learning principles, applications, and drawbacks, including distinctions from Machine Learning and insights into neural networks and hardware requirements. (Cognitive level - 6)

CO4: *Apply* natural language processing (NLP) techniques and effectively implement AI systems. (Cognitive level – 3)

4. Course Content

MODULE I: AI FOUNDATIONS (15 Hrs)

Introduction- Turing Test, Neural Networks and Deep Learning, Structure of AI; Data-Basics, Types of data: Databases and other Tools, Data Process, More Data terms and Concepts.

MODULE II: MACHINE LEARNING (15 Hrs)

Introduction: Standard Deviation, Normal Distribution, Bayes' Theorem, Correlation, Feature Extraction, Uses of Machine Learning, Machine Learning Process, Supervised Learning, Un-Supervised Learning, Reinforcement Learning, Semi-Supervised Learning, Common Types of Machine Learning Algorithms- Naïves Biased Classifier, K-Nearest Neighbour, Linear Regression, Decision Tree, Ensemble Modeling, K-Means Cluster.

MODULE III: DEEP LEARNING (15 Hrs)

Introduction to Deep Learning, Difference between Deep learning and Machine Learning, The Brain and Deep Learning, Artificial Neural Networks, Back Propagation, Various Neural Networks, Deep Learning Applications, Deep Learning Hardware, Draw Backs with Deep Learning.

MODULE IV: NLP (15 Hrs)

NLP- The Challenges of NLP, Understanding How AI Translates Language, Voice Recognition, NLP in the real world-Use Cases, Voice Commerce, Virtual Assistance, Chat Bort, Implementation of AI-Approaches to implementing AI, The Steps of AI Implementation, Forming a Team, The Right Tools and Platforms, AI Frame-works, Deploy and Monitor the AI System

5. References

1. Artificial Intelligence in the 21st Century - 2E by Stephen Lucci, Danny Kopec., Mercury Learning and Information, 2016
2. Artificial Intelligence: Building Intelligent Systems by Parag Kulkarni, Prachi Joshi, PHI Learning Yashwant Kanetkar, Let Us C 13E, BPS Publications.
3. Artificial Intelligence: A New Synthesis by Nils J Nilsson, Morgan Kaufmann Publishers Inc.
4. Introduction to Machine Learning with Python, 1st Edition by Andreas C. Müller & Sarah Guido, O'Reilly Media.2016.
5. Machine Learning for Absolute Beginners, by Oliver Theobald, 2020.

6. Syllabus Focus**a) Relevance to Local, Regional, National and Global Development Needs**

Local/Regional/National /Global Development Needs	Relevance
Global Development	AI and ML revolutionize industries by enabling data-driven decision-making, automation, and personalized experiences, ultimately shaping the future of technology and society.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 2 and 4	ML and NLP empower individuals to analyze language patterns, extract insights from text data, and develop intelligent systems for natural language understanding and generation.
EMP	Modules 1,2,3 and 4	Enables individuals to meet the growing demand for data-driven decision-making, automation, and innovation across various industries.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars/ Presentations
2.	Experimental	Data Analysis exercises
3.	Problem solving	Case studies

8. Course Assessment Plan**a) Weightage of Marks in Continuous Internal Assessments and Written Exam**

CO	Continuous Internal Assessments CIA -40%	End Semester Examination- 60%
CO1	CIA 1 – Written Test	Written Exam
CO2	CIA 2 – Written Test	
CO3	CIA 2 –Written Assignment /Presentation/Case Study	
CO4	CIA 3 – Written Assignment /Presentation/Case Study	

b) Model Question Paper- End Semester Exam**FUNDAMENTALS OF AI AND ML****Course Code: U24/CSC/GE/501****Max Marks: 60****Credits:4****Time: 2hrs****Section- A****I. Answer any Four:****4 x 10 = 40 M**

1. Explain the relevance of AI and discuss about different types of data.

OR

2. Explain CRISP-DM Process.
3. Define Supervised Learning Algorithm. Explain in detail about k-nearest neighbours and Naive Bayes' classification.

OR

4. Describe in detail about Decision Trees.
5. Explain various Neural networks in detail.

OR

6. Explain the advantages and disadvantages of Deep Learning.
7. What is NLP? Explain how AI translates a language.

OR

8. Explain the steps of AI implementation in detail.

Section- B**II. Answer any Four:****4 x 5 = 20 M**

9. Explain structure of AI.
10. Give an overview of Neural Networks.
11. Differentiate between classification and Regression.
12. Explain Reinforcement learning with example.
13. Explain the difference between Deep learning and Machine Learning.
14. Explain briefly voice commerce and Virtual Assistance.

c)Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	10	6	20
II	15	2	2	10		
III	15	3	2	10		
IV	15	4	2	10		

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(hrs)
1	1	3	15
2	2	4	15
3	1	6	15
4	2	3	15

Prepared by	Checked & Verified by	Approved by
Afeefa Noorain Teaching Faculty	Ms. D. Sowjenya HOD	Dr. Uma Joseph Principal