Code: 1BAIA103/203/BETC105x/205x
Credits: 3
L:T:P - 3:0:0
SEE Hours: 3

Course: Introduction to AI and Applications
CIE: 50 Marks
SEE: 50 Marks
Total Marks:100

Prerequisites if any	NIL
Learning objectives	To understand the fundamentals of Artificial Intelligence, its techniques, and real-world applications. To develop the ability to apply AI methods for problem-solving while analyzing their societal, ethical, and industrial implications.

Course Outcomes:

On the successful completion of the course, the student will be able to

Co's	Course Outcome	Blooms Level
CO1	Explain the fundamental concepts, types, and working principles of Artificial Intelligence.	Understand
CO2	Illustrate real-world applications of Artificial Intelligence across multiple domains such as healthcare, finance, and education.	Understand
CO3	Apply basic machine learning techniques such as regression, classification, and clustering to solve simple problems.	Apply
CO4	Use prompt engineering techniques to design and execute effective prompts for generative AI tools.	Apply

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2
CO1	3	2	1	1	2	1	-	-	-	1	2		2	3
CO2	2	2	2	1	1	3	2	1	1	2	2		2	2
CO3	3	3	3	2	2	1	-	-	2	1	2		3	3
CO4	2	2	3	1	3	1	-	1	2	2	2		3	2

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Course Structure

	Modules	No. of Lecture Hours	No. of Tutorial Hours	No. of Practical Hours
	Module – 1			
1.1	**Introduction to Artificial Intelligence:** Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence.	2	-	-
1.2	Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Limited Memory, Theory of Mind, Self-Awareness, Is Artificial Intelligence Same as Augmented Intelligence and Cognitive Computing.	2	-	-
1.3	**Machine Intelligence:** Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Machine Learning vs Deep Learning.	2	-	-
1.4	**Knowledge Representation:** Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge.	2	-	-
	Module – 2			
2.1	**Principles of Data Science:** What is data science, The data science Venn diagram- The Math, Computer Programming and Domain Knowledge.	2		
2.2	**Types of Data :** Structured versus unstructured data ,Quantitative versus qualitative data.	2		
2.3	The four levels of data	2		
2.4	**Introduction to Prompt Engineering** Introduction to Prompt Engineering, The Evolution of Prompt Engineering, Types of Prompts, How Does Prompt Engineering Work?, Comprehending Prompt Engineering's Function in Communication, The Advantages of Prompt Engineering, The Future of LLM Communication.	2	-	-
	Module – 3			
3.1	**Machine Learning:** Techniques in AI.	2	-	-
3.2	Machine Learning Model, Regression Analysis in Machine Learning	2	-	-
3.3	Classification Techniques	2	-	-
3.4	Naïve Bayes Classification, Neural Network, Support Vector Machine (SVM).	2	-	-
	Module – 4			
4.1	**Trends in AI:** AI and Ethical Concerns, Recent trends in AI.	2	-	-
4.2	AI as a Service (AIaaS)	2	-	-

4.3	Expert System	2	-	-
4.4	Internet of Things, Artificial Intelligence of Things (AIoT).	2	-	-
Module – 5				
5.1	Robotics, Robotics-an Application of AI, Drones Using AI, No Code AI, Low Code AI.	2	-	-
5.2	Industrial Applications of AI: Application of AI in Healthcare, Application of AI in Finance	2	-	-
5.3	Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education	2	-	-
5.4	Application of AI in Transportation, AI in Experimentation and Multi-disciplinary research.	2	-	-
	Total No. of Lecture Hours	**40**	-	-
	Total No. of Tutorial Hours		**00**	-
	Total No. of Practical Hours			**0**

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Text books:

1. Reema Thareja, Artificial Intelligence: Beyond Classical AI, Pearson Education, 2023.
2. Sinan Ozdemir, Principles of Data Science , Packt Publication 4th Edition. 2023
3. Ajantha Devi Vairamani and Anand Nayyar, Prompt Engineering: Empowering Communication, 1st Edition, CRC Press, Taylor & Francis Group, 2024. (DOI: https://doi.org/10.1201/9781032692319).
4. Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti, "AI for Everyone – A Beginner's Handbook for Artificial Intelligence", Pearson, 2024.

Reference books / Manuals:

1. Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th Edition), Pearson Education, 2023.
2. Elaine Rich, Kevin Knight, and Shivashankar B. Nair, *Artificial Intelligence*, McGraw Hill Education.
3. Tom Taulli, *Prompt Engineering for Generative AI: ChatGPT, LLMs, and Beyond*, Apress, Springer Nature.
4. Nilakshi Jain, Artificial Intelligence: Making A System Intelligent, First Edition, Wiley.

1. Web links and Video Lectures (e-Resources):
   i. 1.Elements of AI – https://www.elementsofai.com
2. CS50's Introduction to Artificial Intelligence with Python – Harvard
   i. *https://cs50.harvard.edu/ai/*
3. Google Machine Learning Crash Course – *https://developers.google.com/machine-learning/crash- course*
   i. Learn Prompting (Open-Source Guide) – *https://learnprompting.org*
4. Google AI – Learn with Google AI *https://ai.google/education/*
5. Coursera – Machine Learning by Andrew Ng (Stanford University)
   i. *https://www.coursera.org/learn/machine-learning*
6. OpenAI Prompt Engineering Guide (for ChatGPT)
   i. *https://platform.openai.com/docs/guides/gpt-best-practices*
7. Prompt Engineering for Developers – DeepLearning.AI + OpenAI
   i. *https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/*
8. Ethics in AI – Google Responsible AI Practices
   i. *https://ai.google/responsibilities/responsible-ai-practices/*
   ii. Google Teachable Machine (Train AI models visually without code) https://teachablemachine.withgoogle.com

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- ICT-Enabled Teaching
- Tool Demonstration