COURSE TITLE	**INTRODUCTION TO PROMPT ENGINEERING**
COURSE CODE	**01AI0305**
COURSE CREDITS	**4**

Objective:

1 To provide an accessible introduction to artificial intelligence and machine learning fundamentals, followed by focused exploration of prompt engineering, enabling students to effectively interact with modern AI systems like ChatGPT and other LLMs.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the basic principles of AI and ML relevant to prompt-based systems. (Understand)

2 Explain the concept of Large Language Models and their architecture. (Understand)

3 Formulate effective prompts to interact with LLMs. (Apply)

4 Analyze the impact of prompt structures on LLM behavior. (Analyze)

5 Design applications using prompt engineering in practical scenarios. (Create)

Pre-requisite of course: None

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to AI/ML** Introduction to Artificial Intelligence and Machine Learning, Real-world applications of AI, Supervised vs Unsupervised Learning, Basics of Classification, Clustering, and Regression, Importance of Natural Language Processing	4
2	**Large Language Models** What are Large Language Models? , Tokenization & Text Representation, Transformer Basics: Attention Mechanism, Pre-training vs Fine-tuning, GPT, BERT, Claude	8
3	**Foundation of Prompt Engineering** What is a Prompt?, Types of Prompts: Zero-shot, One-shot, Few-shot, Role of Instructions and Context, Prompt patterns and templates	5
4	**Prompt Engineering Techniques** Chain-of-Thought Prompts, Role Prompting, Meta Prompting, Prompt Injection and Safety, Evaluating Prompt Effectiveness, Prompt Tuning vs Prompt Engineering, using system prompts vs user prompts, best practices for temperature, top-p, and max tokens	8

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Contents : Unit	Topics	Contact Hours
5	**Content Generation and Specialized Prompting** Generating Text with AI for Content Creation – Writing blogs, articles, and long-form content using prompt strategies; controlling tone, voice, and coherence, Creating Social Media Content – Crafting prompts for tweets, captions, LinkedIn posts, carousel scripts, and hashtag suggestions., . Writing Video Scripts with AI – Structuring introductions, hooks, storyboards, and call-to-actions for educational or marketing videos	8
6	**Applications of Prompt Engineering** Content Creation, Summarization, Translation, Coding, Debugging with LLMs, Q&A and Chatbots, Personalized Assistants, Interactive Storytelling, Search Enhancement, Data Extraction	4
7	**Tools & Platforms** Using ChatGPT / Claude / Gemini, Introduction to LangChain, Prompt IDEs and Notebooks, Vector Databases, APIs & SDKs Deployment Tools, Limitations and Ethics of LLMs	5
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical-1** Prompt ChatGPT to write and debug a simple Python script.	2
2	**Practical-2** Compare zero-shot vs few-shot responses for a text summarization task.	2
3	**Practical-3** Build a basic chatbot using ChatGPT and structured prompts.	2
4	**Practical-4** Create a multilingual prompt for translation and compare outputs.	2
5	**Practical-5** Analyze how the same prompt works across GPT-4, Gemini, and Claude.	2
6	**Practical-6** Use prompt chaining to build a question-answer system.	2
7	**Practical-7** Generate a role-playing conversation between historical figures.	2
8	**Practical-8** Explore content moderation by testing harmful prompt detection.	2
9	**Practical-9** Design a prompt to automate email summarization.	2
10	**Practical-10** Create a guided creative writing assistant using ChatGPT.	2
Total Hours		**20**

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Textbook :

1 Speech and Language Processing, Jurafsky, D., & Martin, J. H. , Stanford University., 2023

2 Natural Language Processing with PyTorch: Build Intelligent Language Applications Using Deep Learning. , Delip Rao, B., & McMahan, B., O'Reilly Media., 2018

References:

1 Practical Retrieval-Augmented Generation: Building RAG Applications with Haystack and Transformers. , Practical Retrieval-Augmented Generation: Building RAG Applications with Haystack and Transformers. , Haystack Team, deepset.ai, 2023

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	25.00	35.00	15.00	10.00	10.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1 https://www.coursera.org/learn/generative-ai-with-llms

2 https://github.com/openai/openai-cookbook

3 https://cognitiveclass.ai/courses/prompt-engineering-for-everyone

4 https://www.edx.org/learn/artificial-intelligence/ibm-introduction-to-prompt-engineering

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