Course Syllabus
Gyanmanjari Institute of Technology
Semester-6 (B. Tech.)

Subject: AI Interface Design and Prompt Engineering-BETCE16333

Type of course: Skill Based Courses

Prerequisite: Students are expected to have basic computer and internet skills, along with a fundamental understanding of Python programming to run small experiments on online platforms like Google Colab. Good communication skills in English and a curious, problem-solving mindset are essential to design and refine prompts effectively. Prior exposure to AI tools such as ChatGPT or Hugging Face is helpful but not mandatory.

Rationale:

Prompt Engineering is emerging as a critical skill for effectively interacting with AI systems. This practical-based course enables students to learn how to design, refine, and evaluate prompts using free online tools, without the need for complex setups. By mastering prompt strategies, students will enhance their ability to solve problems, generate content, and apply AI in real-world contexts such as coding, data analysis, and communication.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
0	0	4	2	0	0	10	40	50	100

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No	Course Content	% Weightage
1	**Introduction to Prompt Engineering:** Overview of prompt engineering, evolution of human–AI interaction, types of prompts (zero-shot, few-shot, chain-of-thought), and introduction to free online platforms (ChatGPT Free, Hugging Face Spaces, OpenAI Playground).	15%
2	**Prompt Design Fundamentals:** Principles of clarity, context, and constraints in writing prompts; instruction-based prompting; iterative refinement; hands-on practice using ChatGPT Free and OpenAI Playground.	20%
3	**Advanced Prompting Techniques:** Role prompting, persona-based prompting, few-shot prompting, chain-of-thought reasoning, multi-turn prompts; practical use cases with Hugging Face Spaces and Colab notebooks.	20%
4	**Practical Applications:** Applying prompts in software engineering (debugging, code generation, documentation), data science (summarization, SQL queries, analysis), and communication (emails, reports, resumes).	20%
5	**Ethics & Responsible Prompting:** Bias and limitations in AI outputs, responsible usage of free AI tools, maintaining academic/professional integrity, and guidelines for ethical AI interaction.	25%

x

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Comparative Prompt Strategy Analysis:** Students will test zero-shot, few-shot, and chain-of-thought prompts across at least two free AI platforms (ChatGPT Free & Hugging Face Spaces). They will analyze response quality, depth, and reliability, prepare a comparative study report, and submit it on the GMIU Web Portal.	10
2	**Multi-Stage Prompt Design Project:** Students will choose a real-world scenario (e.g., "Generating a business proposal" or "Creating lesson plans for IT students"). They will build multi-stage prompts where outputs from one step feed into the next, document the workflow, and submit a step-by-step design report on the GMIU Web Portal.	10
3	**Persona & Role Simulation Challenge:** Students will design a complex persona simulation (e.g., an AI "career counselor" or an AI "startup mentor"). They must create at least 3 layered prompts for consistency, evaluate effectiveness, and prepare a demo documentation report with examples. The final submission will be uploaded on the GMIU Web Portal.	10
4	**Domain-Specific Application Lab:** Students will apply prompt engineering in a specialized technical domain (e.g., software debugging, SQL query generation, or research summarization). They must create a prompt-based solution workflow using Google Colab/Kaggle free APIs and submit a case study prototype report on the GMIU Web Portal.	10
5	**Ethical Prompt Stress Test:** Students will intentionally design prompts to explore bias, hallucination, or misleading answers in AI systems. They will refine prompts to reduce these issues and prepare a reflection + evaluation report (failure vs improved outputs), which will be submitted on the GMIU Web Portal.	10
	Total	50

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	**Remembrance (R)**	**Understanding (U)**	**Application (A)**	**Analyze (N)**	**Evaluate (E)**	**Create (C)**
Weightage %	N/A	N/A	N/A	N/A	N/A	N/A

Course Outcome:

After learning the course the students should be able to:	
CO1	Apply basic prompt engineering techniques such as zero-shot, few-shot, and chain-of-thought using free online tools.
CO2	Analyze and design clear, contextual, and well-constrained prompts, and evaluate responses across platforms.
CO3	Create advanced prompts like persona-based and multi-turn prompts for real-world task simulation.
CO4	Develop domain-specific prompt engineering applications in coding, data analysis, and communication using tools like Colab and Kaggle.
CO5	Evaluate ethical issues, biases, and limitations in AI outputs, and design fair and responsible prompt strategies.

List of Practical

Sr. No	Description	Unit No	Hrs.
1	Perform zero-shot prompting on ChatGPT Free for general knowledge questions and document accuracy, relevance, and limitations.	01	02
2	Implement few-shot prompting with 3–5 examples for the same task (e.g., math problem-solving) and compare outputs.	01	02
3	Apply chain-of-thought prompting for reasoning-based problems (puzzles, logic) and evaluate improvement over direct answers.	01	02
4	Explore different free AI platforms (ChatGPT Free, Hugging Face Spaces, OpenAI Playground) and prepare a feature comparison.	01	02
5	Prepare a short analytical report on the effectiveness of different prompt styles (zero-shot, few-shot, chain-of-thought).	01	02

6	Design structured prompts with clear instructions, context, and constraints to generate a professional email draft.	02	02
7	Refine poorly written or ambiguous prompts into effective ones and analyze the improvements in clarity and response quality.	02	02
8	Use iterative prompting to generate step-by-step solutions for a multi-step math or coding task and record variations.	02	02
9	Compare responses for the same prompt on ChatGPT Free and Hugging Face Spaces, noting differences in detail and tone.	02	02
10	Develop prompts to summarize a long text into multiple formats (abstract, bullet points, key insights) and prepare a case study.	02	04
11	Create persona-based prompts (e.g., "Act as a teacher explaining recursion" / "Act as a doctor explaining symptoms") and evaluate accuracy.	03	02
12	Implement role-based prompting for professional scenarios such as project planning or career counseling and analyze consistency.	03	02
13	Build multi-turn conversations with AI (at least 5–7 turns) and evaluate how well context is preserved.	03	02
14	Combine few-shot and persona prompting to simulate a customer support chatbot for FAQs.	03	02
15	Apply chain-of-thought prompting for debugging a small piece of Python code and compare with non-CoT outputs.	03	04
16	Use ChatGPT Free to debug Python programs with logical errors and document corrections.	04	02
17	Generate SQL queries for a given dataset description using prompts in Kaggle Notebook and validate outputs.	04	02
18	Apply natural language prompts in Google Colab to summarize a CSV/JSON dataset (descriptive analysis).	04	02
19	Design prompts for drafting a structured resume (skills, projects, achievements) and compare different prompt strategies.	04	02
20	Create prompts to generate business proposals or project reports in a professional tone and format.	04	02
21	Compare AI-generated vs manually written technical explanations for the same topic and evaluate clarity and correctness.	04	02
22	Mini-project: Build a multi-prompt workflow for automated "data cleaning → summarization → reporting" using free tools.	04	04
23	Design intentionally biased prompts (e.g., stereotypes in job roles) and analyze how AI responds to bias.	05	02

24	Refine biased or ambiguous prompts into fair, neutral ones and compare improvements in AI-generated responses.	05	04
25	Conduct a stress test by giving misleading/ambiguous prompts, document hallucinated outputs, and create an ethical prompting guide (good vs bad prompts).	05	04
		Total	60

Instructional Method:

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.

From the content 10% topics are suggested for flipped mode instruction.

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

The internal evaluation will be done on the basis of Active Learning Assignment.

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

Reference Books:

[1] Lilian Weng – Prompt Engineering for Large Language Models – Self-Published, 2023.
[2] Jason D. Brownlee – Prompt Engineering for Everyone: How to Harness AI Effectively. Machine Learning Mastery, 2023.
[3] Nathan Hunter – The Art of Prompt Engineering with ChatGPT: Crafting Effective Prompts-Independently Published, 2023.
[4] James Phoenix – Mastering Prompt Engineering: Expert Techniques for Working with AI Models – Independently Published, 2023.
[5] Pamela Baker – ChatGPT Prompt Engineering for Developers – O'Reilly Media, 2023.