

<b>INSTITUTE</b>	<b>FACULTY OF TECHNOLOGY</b>
<b>PROGRAM</b>	<b>BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)</b>
<b>SEMESTER</b>	<b>2</b>
<b>COURSE TITLE</b>	<b>INTRODUCTION TO PROMPT ENGINEERING IN CIVIL ENGINEERING</b>
<b>COURSE CODE</b>	<b>01CI0202</b>
<b>COURSE CREDITS</b>	<b>1</b>

**Objective:**

- 1 To develop students' ability to craft effective prompts for AI tools to support problem-solving and innovation in civil engineering

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

- 1 Understand the fundamentals of AI-assisted tools and the role of prompt engineering in civil engineering applications
- 2 Apply prompt engineering techniques to generate relevant technical content such as problem statements, design alternatives, and analysis approaches.
- 3 Analyze the effectiveness of different prompts in retrieving accurate, context-specific solutions for civil engineering tasks.
- 4 Evaluate AI-generated responses for reliability, accuracy, and ethical use in engineering practice

**Pre-requisite of course:**None

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
0	0	2	0	0	0	25	25
<b>Contents : Unit</b>	<b>Topics</b>						<b>Contact Hours</b>
<b>Total Hours</b>							

**Suggested List of Experiments:**

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Introduction to Prompt Engineering</b> Overview of AI tools (ChatGPT, Gemini, etc.). Task: Students log in to an AI tool, ask 3 general questions, and record differences in responses.	2

**Suggested List of Experiments:**

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
2	<b>Anatomy of a Good Prompt</b> Structure: role, context, instructions, constraints. Task: Write prompts in two ways (vague vs. detailed) for the same question and compare responses	2
3	<b>Simple Prompt Writing</b> Crafting prompts for academic/technical clarifications. Task: Generate step-by-step explanations of “stress-strain relationship” and refine for clarity.	2
4	<b>Prompt Refinement</b> Iterative improvement techniques. Task: Start with a weak prompt on “properties of concrete,” improve it in 3 iterations, and note changes in AI outputs.	2
5	<b>Structured Prompts</b> Types: descriptive, instructive, comparative, scenario-based. Task: Create 4 different prompts for the same topic (e.g., “compare RCC and prestressed concrete”) and analyze outputs	2
6	<b>Civil Engineering Case Prompts I – Materials</b> Focus: cement, aggregates, mix design. Task: Generate prompts to design M30 concrete mix and cross-check AI’s values with IS code references	2
7	<b>Civil Engineering Case Prompts II – Structural Analysis</b> Focus: beams, trusses, load cases. Task: Create prompts asking AI to solve a simply supported beam under UDL and check correctness of steps.	2
8	<b>Civil Engineering Case Prompts III – Construction Management</b> Focus: project planning, safety, sustainability. Task: Ask AI to draft a construction schedule (Gantt chart style) for a 2- storey building project.	2
9	<b>Prompting for Design Innovation</b> Using AI for conceptual alternatives. Task: Develop prompts for “eco-friendly low-cost housing design” and collect 3 innovative suggestions	2
10	<b>Evaluating AI Outputs</b> Focus: accuracy, relevance, bias, ethics. Task: Provide prompts on soil bearing capacity; compare AI answers with standard textbook values, mark errors.	2
11	<b>Hands-on Review (AI vs Codes)</b> Validating results with standards (IS codes). Task: Students ask AI to generate steps for IS 456 design of slab; compare step-by-step with code procedure	2
12	<b>Mini-Project Work (Group Formation)</b> Group activity: select real-world civil engineering scenario. Task: Each group prepares at least 5–7 structured prompts related to their chosen topic.	2

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
13	<b>Mini-Project Work (Refinement &amp; Validation)</b> Refining prompts for better results. Task: Groups test outputs against references (books/codes) and prepare short presentation slides.	2
14	<b>Project Presentations &amp; Reflection</b> Group presentations, feedback, and learning discussion. Task: Each group presents their prompts, AI outputs, validations, and lessons learned.	2
<b>Total Hours</b>		<b>28</b>

### Textbook :

- 1 Prompt Engineering for Generative AI, James Phoenix and Mike Taylor, O'Reilly, 2024

### References:

- 1 Prompt Engineering for LLMs, Prompt Engineering for LLMs, John Berryman, Albert Ziegler, O'Reilly, 2024

### 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 and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	25.00	25.00	25.00	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, ecourses, Virtual Laboratory

### Supplementary Resources:

- 1 <https://www.coursera.org/learn/generative-ai-with-llms>
- 2 <https://github.com/openai/openai-cookbook>

**Supplementary Resources:**

- 3 <https://cognitiveclass.ai/courses/prompt-engineering-for-everyone>
- 4 <https://www.edx.org/learn/artificial-intelligence/ibm-introduction-to-promptengineering>