National University of Engineering (UNI)
School of Civil Engineering
Syllabus 2027-I

1. COURSE

AI161. Applied AI (Mandatory)

2. GENERAL INFORMATION

2.1 Course	:	AI161. Applied AI
2.2 Semester	:	2nd Semester.
2.3 Credits	:	4
2.4 Hours	:	2 HT; 4 HP;
2.5 Duration of the period	:	16 weeks
2.6 Type of course	:	Mandatory
2.7 Learning modality	:	Face to face
2.8 Prerrequisites	:	BIC101. Introduction to Programming. (1st Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

This course provides a practical introduction to Artificial Intelligence (AI) for students from all scientific and engineering disciplines. Focused on developing AI literacy and practical skills, it covers fundamental concepts, modern AI tools (including Western and Chinese platforms), and responsible usage. Students will learn to effectively interact with diverse AI systems, write quality prompts, and apply AI solutions to problems across various domains while understanding ethical implications and cultural contexts of AI deployment.

5. GOALS

- Develop comprehensive AI literacy by understanding fundamental concepts, capabilities, and limitations of modern AI systems across different platforms and cultures.
- Master effective prompt engineering techniques and interaction patterns with various AI tools (Western: ChatGPT, Claude, Gemini; Chinese: DeepSeek, Kimi, ERNIE).
- Apply diverse AI tools to solve practical problems in scientific, engineering, and academic contexts while maintaining critical evaluation of outputs across platforms.
- Understand ethical considerations, biases, cultural contexts, and responsible usage of AI technologies in global professional and academic settings.
- Develop workflows that integrate multiple AI tools to enhance productivity and problem-solving capabilities while understanding regional strengths and specializations.

6. COMPETENCES

ABET-1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (Familiarity)

ABET-4) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. (Familiarity)

7. TOPICS

Unit 1: AI Fundamentals and Global Landscape (16 hours)	
Competences Expected: ABET-1,ABET-4	
Topics	**Learning Outcomes**
• What is AI? Definitions, history, and current global landscape. • Types of AI systems: chatbots, image generators, research assistants across regions. • Western AI ecosystems: OpenAI, Anthropic, Google, Microsoft. • Chinese AI ecosystems: DeepSeek, Kimi, ERNIE, Zhipu AI, Baidu. • AI capabilities and limitations: comparative analysis across platforms. • Digital literacy in the AI era: critical thinking about diverse AI outputs.	• Apply fundamental AI knowledge to identify system types and their capabilities [Usar]. • Analyze global intelligent systems and their distinctive characteristics [Evaluar]. • Critically evaluate AI outputs across different cultural contexts [Evaluar].
Readings : [**Ng2024**], [**Mollick2024**], [**UNESCO2023**], [**Tencent2024**]	

Unit 2: Effective AI Interaction and Cross-Platform Prompt Engineering (20 hours)	
Competences Expected: ABET-1,ABET-4	
Topics	**Learning Outcomes**
• Principles of effective prompt writing: clarity, context, constraints across platforms. • Prompt patterns: persona, template, chain-of-thought, few-shot for different AI systems. • Western tools: specific techniques for ChatGPT, Claude, Gemini, Copilot. • Chinese tools: specific features and best practices for DeepSeek, Kimi, ERNIE. • Cross-platform strategies: leveraging different AI strengths for complex tasks. • Iterative refinement: how to improve prompts based on outputs from diverse systems. • Practical sessions: comparative prompt writing workshops across platforms.	• Design effective prompt solutions for diverse AI systems [Evaluar]. • Develop cross-platform workflows that integrate different AI tools [Usar]. • Implement iterative refinement strategies to optimize AI outputs [Usar].
Readings : [**White2023**], [**PromptEngineering2024**], [**Microsoft2024**], [**DeepSeek2024**]	

Unit 3: AI Applications Across Disciplines and Platforms (16 hours)	
Competences Expected: ABET-1,ABET-4	
Topics	**Learning Outcomes**
• AI for research: literature review, data analysis using multiple AI assistants. • AI for writing: academic papers, reports with cross-platform verification. • AI for problem-solving: scientific calculations, engineering design with specialized tools. • AI for creativity: brainstorming, concept development across cultural contexts. • Platform-specific strengths: when to use Western vs. Chinese AI tools. • Discipline-specific workshops: tailored applications using diverse AI ecosystems. • Case studies: real-world applications in scientific research across regions.	• Apply AI fundamentals to solve discipline-specific problems [Usar]. • Design solutions that integrate multiple intelligent systems for complex tasks [Evaluar]. • Develop practical applications using Western and Chinese AI tools [Usar]. • Implement workflows that leverage specific strengths of each platform [Evaluar].
Readings : [**Mollick2023**], [**Google2024**], [**Alibaba2024**], [**OpenAI2024**]	

Unit 4: Global AI Ethics and Responsible Usage (12 hours)	
Competences Expected: ABET-1,ABET-4	
Topics	**Learning Outcomes**
• Understanding AI biases: Western and Eastern cultural perspectives. • Ethical frameworks: comparing EU AI Act, Chinese regulations, and global standards. • Academic integrity: proper citation and AI usage in coursework across platforms. • Privacy and data security: regional differences in AI data handling. • Cultural sensitivity: navigating AI outputs in global contexts. • Environmental impact: sustainability considerations of different AI systems. • Developing personal guidelines for ethical AI usage in international settings. • Case studies: ethical dilemmas in AI deployment across regions.	• Demonstrate professional responsibility in using AI technologies [Evaluar]. • Apply professional ethical principles in global AI contexts [Usar]. • Develop ethical guidelines to mitigate biases in AI systems [Evaluar]. • Evaluate ethical implications of AI deployment across different cultures [Usar].
Readings : [**UNESCO2023**], [**EU2024**], [**Bender2021**], [**ChinaAI2024**], [**Tencent2023**]	

8. WORKPLAN

8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

9. EVALUATION SYSTEM

********* EVALUATION MISSING ********

10. BASIC BIBLIOGRAPHY