

Course Context: AI is no longer optional — it is the defining technology of this decade. Every engineer, regardless of branch, will work alongside AI tools in their career. This course demystifies AI for first-year students from all streams: what it is, how it works at a concept level, where it is already changing their field, and — most practically — how to communicate with AI systems effectively through Prompt Engineering. No prior programming or mathematics required. Concept, awareness, and hands-on practice are the goals.

Course Code	AAI101/AAI201
Title of the Course	Introduction to AI and Prompt Engineering
Course Category	Engineering Science Course (ESC)
Credits	02
NCrF Hours	30
Tools Used	ChatGPT / Claude / Gemini / Copilot (free tier) — browser based

Main Focus of the Course Outcomes

Employability	Skill Development	Entrepreneurship
✓	✓	✓

Course Objectives:

1. Understand what Artificial Intelligence is, its history, and how it is changing every engineering field
2. Understand key AI concepts — Machine Learning, Deep Learning, and Neural Networks — at a conceptual level
3. Explore how AI is applied across domains — healthcare, agriculture, manufacturing, finance, and education
4. Understand Generative AI — how large language models (LLMs) like ChatGPT and Gemini work
5. Learn and practise Prompt Engineering — the skill of communicating effectively with AI tools to get useful results

Course Content

Unit	Topics	Weightage
1.	Introduction to Artificial Intelligence 1. Definition and scope of AI; brief history — from Alan Turing to ChatGPT	20%

	1. Types of AI — Narrow AI, General AI, Super AI (concept) 2. AI vs Machine Learning vs Deep Learning — what is the difference 3. How machines learn — data, patterns, and predictions (concept, no maths) 4. AI today — where it already exists in daily life (Google Maps, Spotify, Netflix, Google Photos, voice assistants) 5. Machine Learning Concepts, Learning Strategies- Supervised, Unsupervised, Reinforcement Learning 6. Data, Data Visualization, Data Pre-processing Class Activity: Students list 5 AI tools they use every day and discuss how each one 'learns'. <i>Branch connect: CE — AI in structural health monitoring; ME — AI in predictive maintenance; EE — smart grid; CSE — AI in compilers; BT — drug discovery; AG — crop yield prediction.</i>	
2.	Core AI Concepts 1. Machine learning: Classification Techniques- K-Nearest Neighbors (KNN), Naïve Bayes, Clustering Technique-K-Means 2. Classification metrics-accuracy, precision, recall, F1 score, MAE. 3. Neural networks — concept of neurons, layers, weights (simple diagram) 4. Deep learning — what makes it 'deep'; why it needs GPUs, CNN 5. Computer vision — how AI sees images (face recognition, medical imaging) 6. Natural Language Processing (NLP) — how AI understands text and speech Class Activity: Show Google Teachable Machine (teachablemachine.withgoogle.com) — train a simple image classifier in 5 minutes, no code. <i>Branch connect: ECE — image sensors + AI; BT — protein structure prediction (AlphaFold); AG — plant disease detection from photos; TX — fabric defect detection.</i>	20%
3.	Generative AI and Large Language Models 1. What is Generative AI — AI that creates text, images, code, audio, video	20%

	2. Large Language Models (LLMs) — what they are, how they are trained (concept) 3. Popular LLMs — ChatGPT (OpenAI), Gemini (Google), Claude (Anthropic), Llama (Meta) 4. Tokens, context window, temperature — simple explanation 5. Multimodal AI — text + image + voice in one model (GPT-4o, Gemini concept) 6. AI image generation — Stable Diffusion, Midjourney, DALL-E (concept + demo) 7. Limitations of LLMs — hallucination, knowledge cutoff, bias 8. Responsible use — academic integrity, plagiarism, AI-generated content disclosure Class Activity: Students interact with ChatGPT/Gemini/Claude; observe how different inputs give different outputs; identify one hallucination example. <i>Every professional today uses at least one Generative AI tool. Understanding how LLMs work makes students better users and future developers.</i>	
4.	AI Applications Across Engineering Domains 1. AI in Civil Engineering — structural health monitoring, smart cities, traffic optimisation 2. AI in Mechanical Engineering — predictive maintenance, design optimisation, robotics 3. AI in Electrical and Electronics — smart grids, fault detection, VLSI design automation 4. AI in CSE — code generation (GitHub Copilot), cybersecurity, natural language interfaces 5. AI in Biotechnology and Healthcare — drug discovery, medical imaging, genomics, wearables 6. AI in Agricultural Engineering — precision farming, crop monitoring, drone-based spraying, soil analysis 7. AI in Chemical and Textile Engineering — process optimisation, quality control, material design 8. Ethical concerns — bias in AI, data privacy, job displacement, responsible AI Class Activity: One case study per student group — each group presents a 2-minute real AI application from their own engineering branch.	20%

	<i>This unit ensures every student, regardless of branch, sees AI as directly relevant to their future career.</i>	
5.	Prompt Engineering 1. What is a prompt — the instruction you give to an AI model 2. Why prompt quality matters — same AI, very different results with different prompts 3. Principles of good prompting — clarity, context, specificity, role assignment, format instruction 4. Prompting techniques: • Zero-shot prompting — direct question • Few-shot prompting — give examples in the prompt • Chain-of-thought prompting — ask AI to think step by step • Role prompting — 'Act as a civil engineer and...' 5. Prompt for different tasks — summarisation, explanation, code generation, report writing, brainstorming, translation 6. Domain-specific prompting — students write prompts relevant to their own branch (CE, ME, BT, AG, etc.) 7. AI tools for engineers — GitHub Copilot (code), Grammarly (writing), Consensus (research), Wolfram Alpha, Canva AI, Notion AI Hands-on Practice (every lecture): Students write prompts, compare outputs, refine and improve. Graded prompt assignment: write 5 prompts for an engineering problem from their own branch. <i>Prompt Engineering is already a job role (avg. salary \$100K+ globally). Every engineer who can communicate well with AI has a significant career advantage.</i>	20%

Suggested Assignments / Practice Tasks but not limited to

Assignment	Task
Assignment 1 (Unit I)	Research task — no AI tool interaction required. Find 3 real AI applications in your engineering branch. For each: name the product/system, what data it uses, and what it predicts or generates. Submit as a one-page note (250–300 words).

Assignment 2 (Unit II)	Concept-check task. Pick one real ML-based system relevant to your branch (e.g., a recommendation engine, a defect detector, a chatbot). Identify: (a) Is it supervised, unsupervised, or reinforcement learning? (b) What could cause it to overfit or underfit? (c) Sketch a simple diagram showing its inputs, a basic neuron/layer concept, and output. Submit as a half-page note (200–250 words) with diagram.
Assignment 3 (Unit III)	Hands-on task — direct AI interaction required. Interact with any free LLM (ChatGPT/Gemini/Claude). Ask it a question related to your branch. Identify one correct and one incorrect (hallucinated) response. Explain why the hallucination occurred (150–200 words), with screenshots of both responses.
Assignment 4 (Unit IV)	Group case study: Each group (3–4 students) picks one AI application in their domain, prepares a 2-minute presentation covering: problem → data → AI solution → impact. Submit slides/notes plus a 1-page group summary handout.
Assignment 5 (Unit V)	Write 5 prompts for an engineering problem from your branch using: (a) Zero-shot (b) Few-shot (c) Chain-of-thought (d) Role prompting (e) Format-specific prompt. Submit the prompt + AI response + your evaluation of the output quality, as a single document (2–3 pages).
Assignment 6 (Unit V)	Use an AI tool to help complete one academic task (summarise a topic, generate a study plan, explain a concept, translate a text). Document the prompt used, output received, and how you verified/corrected it. In a 200–300 word reflection, address: (a) what you changed or verified and why, and (b) one way AI use in this task could raise a bias, privacy, or academic-integrity concern.

Teaching-Learning Methodology

Every lecture begins with a real-world AI example — a news article, a product demo, or a live tool interaction. No heavy mathematics or programming — concepts are taught through analogies, diagrams, videos, and demonstrations. Unit V (Prompt Engineering) is entirely hands-on — students bring their laptops/phones and write prompts live in class. Group activities, branch-specific case studies, and AI tool explorations keep every session engaging. Teachers are encouraged to use AI tools

themselves in class to demonstrate live prompting and critical evaluation of AI outputs.

Course Outcomes (COs)

COs	Course Outcome Statement	KL
CO1	Explain what AI is, its types, and identify AI applications in everyday life and their own engineering domain	K2
CO2	Describe key AI concepts — ML, Deep Learning, NLP, Computer Vision — and relate them to real applications	K2
CO3	Apply the working principles, capabilities, limitations, and responsible use of Generative AI and Large Language Models.	K3
CO4	Apply the concept of Artificial Intelligence across engineering domains and their societal, ethical, and professional implications.	K3
CO5	Design and refine effective prompts using zero-shot, few-shot, chain-of-thought, and role prompting techniques for domain-specific tasks	K3

CO-PO Articulation Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	–	2	–	–	–	–	–	1
CO2	3	2	2	1	3	–	–	–	–	–	1
CO3	3	3	2	2	3	1	1	3	–	–	2
CO4	3	3	2	2	2	2	2	3	1	1	2
CO5	3	3	3	2	3	1	–	2	–	2	3

Evaluation Pattern

Sr.	Component	Marks	Weightage
1.	Class Tests (CT) — concept questions + short answer	15	15%
2.	Teacher's Assessment (TA) — Assignments + Group Case Study + Prompt Portfolio	15	15%
3.	End Semester Theory Examination — concept + application + prompt writing questions	70	70%

Suggested Textbooks / Reference Books

1. *The Quick Guide to Prompt Engineering*, I. Khan, John Wiley & Sons Inc.
2. *AI: Its Nature and Future* – Margaret Boden (Oxford University Press) — accessible, non-technical introduction to AI concepts
3. *Human Compatible: Artificial Intelligence and the Problem of Control* – Stuart Russell (Penguin) — accessible reading
4. *The Age of AI* – Henry Kissinger, Eric Schmidt, Daniel Huttenlocher — for AI and society context
5. *Prompt Engineering for Generative AI* – James Phoenix and Mike Taylor (O'Reilly) — practical guide to LLMs and prompting, supports Units IV & V

Online Resources

1. Google Teachable Machine – teachablemachine.withgoogle.com (train AI with no code, free)
2. Elements of AI – elementsofai.com (free, beginner course by University of Helsinki + MinnaLearn)
3. Microsoft AI for Everyone – learn.microsoft.com (free beginner modules)
4. ChatGPT – chat.openai.com / Gemini – gemini.google.com / Claude – claude.ai (free tier for prompt practice)
5. Prompt Engineering Guide – promptingguide.ai (free, comprehensive reference)
6. Ethics of AI – ethics-of-ai.mooc.fi (free, beginner course by University of Helsinki on bias, privacy, and responsible AI)
7. 3Blue1Brown – Neural Networks series (YouTube, free) — visual, no-maths-heavy explanation of how neural networks work

[Back to Course Structure & Evaluation Scheme](#)