



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda

Established by Tribal Development Department, Govt. of Gujarat

School of Computer Science

M. Sc. (Information Technology) Programme

Subject Code & Name: MITMC202- Introduction to AI and Prompt Engineering

Teaching And Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
4	-	-	4	50%	-	50%	-

Programme Name	M. Sc. (Information Technology)
Semester	2
Course Code	MITMC202
Course Title	Introduction to AI and Prompt Engineering
Course Content Type (Th. / Pr.)	Th.
Course Credit	4
Sessions + Lab Per Week	4
Total Teaching/ Lab Hours	60

Learning Objectives

Upon successful completion of this course, students will be able to:



- Understand the fundamental concepts, history, evolution, and applications of Artificial Intelligence.
- Differentiate among Artificial Intelligence, Machine Learning, Deep Learning, and Generative AI technologies.
- Understand the architecture, capabilities, and limitations of Large Language Models (LLMs) and Generative AI systems.
- Apply prompt engineering techniques and frameworks to interact effectively with AI systems.
- Analyze AI-generated outputs and optimize prompts for improved accuracy and performance.
- Evaluate ethical, legal, security, and societal implications of AI technologies.
- Design AI-assisted workflows, intelligent applications, and domain-specific prompt solutions.
- Develop practical skills in using Generative AI tools for research, software development, data analysis, and content creation.

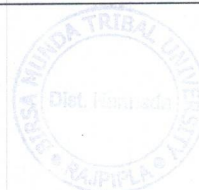
Learning Outcomes

After successful completion of the course, students will be able to:

- Explain the concepts, evolution, classifications, technologies, and applications of Artificial Intelligence and its role in modern computing systems.
- Utilize Generative AI tools and Large Language Models to perform knowledge discovery, content generation, research assistance, and problem-solving tasks.
- Construct effective prompts using standard prompt engineering techniques and frameworks for obtaining desired outputs from AI systems.
- Analyze AI-generated responses and evaluate prompt effectiveness by identifying limitations, biases, hallucinations, and optimization opportunities.
- Assess ethical, legal, privacy, security, and governance challenges associated with the deployment and use of Artificial Intelligence technologies.
- Design and develop AI-assisted workflows, domain-specific prompt libraries, and innovative solutions using advanced prompt engineering and Generative AI technologies.

CLO – PLO Mapping Matrix									
CLO/ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CLO1	3	2	2	2	1	2	–	1	2
CLO2	3	3	2	3	2	3	1	2	3
CLO3	2	3	3	3	2	3	–	2	3
CLO4	2	3	2	3	3	3	3	2	3
CLO5	2	2	2	3	3	3	3	3	3
CLO6	3	3	3	3	3	3	2	2	3

Detailed Contents		
Unit	Topic/Sub Topic	Teaching Hours
I Foundations of Artificial Intelligence	Foundations of Artificial Intelligence	15
	Introduction to AI • Definition and Evolution of AI • History and Milestones of AI • Types of AI (Narrow AI, General AI, Super AI) • AI vs Human Intelligence • Applications of AI in Various Domains (Education, Healthcare, Agriculture, Business, Cybersecurity, Smart Cities) AI Ecosystem • AI, Machine Learning, Deep Learning, and Generative AI • Overview of AI Technologies • Intelligent Agents and Environments • Problem Solving using AI	



II Generative AI and Large Language Models	Generative AI and Large Language Models Generative AI Fundamentals • Introduction to Generative AI • Evolution of Generative Models • Foundation Models • Transformer Architecture (Conceptual Overview) Large Language Models (LLMs) • Working of LLMs • Tokenization and Embeddings • Context Windows • Training and Fine-tuning Concepts • Retrieval Augmented Generation (RAG) • Hallucinations and Limitations of LLMs Popular Generative AI Platforms • ChatGPT , Gemini , Claude, Copilot, Perplexity AI , Open-source LLMs	15
III Prompt Engineering Techniques	Prompt Engineering Techniques Introduction to Prompt Engineering • Concept and Importance of Prompt Engineering • Anatomy of an Effective Prompt • Prompt Components • Context and Instructions Prompting Strategies • Zero-shot Prompting • One-shot Prompting • Few-shot Prompting	15

	• Chain-of-Thought Prompting • Role-based Prompting • Step-by-Step Prompting • Tree-of-Thought Prompting • Self-Consistency Prompting Prompt Design Frameworks • RTF (Role-Task-Format) • CARE Framework • RISEN Framework • CRISPE Framework • Chain Prompting Frameworks Prompt Optimization • Prompt Testing and Refinement • Error Analysis • Prompt Evaluation Metrics • Reducing Hallucinations	
IV AI Applications, Ethics and Advanced Prompt Engineering	AI Applications, Ethics and Advanced Prompt Engineering AI Applications • AI for Content Creation • AI for Software Development • AI for Data Analytics • AI for Research and Education • AI in Business Automation • AI-powered Chatbots and Virtual Assistants Advanced Prompt Engineering • Prompt Chaining	15

	• Multi-step Workflows • AI Agents and Agentic AI • Tool Calling Concepts • AI-assisted Coding and Debugging • AI Workflow Automation Ethical and Responsible AI • AI Ethics and Governance • Privacy and Security Issues • Copyright and Intellectual Property • Bias and Fairness in AI Systems • Responsible Use of Generative AI • Future Trends in AI	
--	---	--

Reference Books

1. Russell, S., & Norvig, P. (2024). *Artificial intelligence: A modern approach* (4th ed.). Pearson Education.
2. Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.
3. Raschka, S., & Mirjalili, V. (2025). *Machine learning with Python and Scikit-Learn, TensorFlow, and PyTorch* (4th ed.). Packt Publishing.
4. Poole, D. L., & Mackworth, A. K. (2023). *Artificial intelligence: Foundations of computational agents* (3rd ed.). Cambridge University Press.
5. Huyen, C. (2025). *AI engineering: Building applications with foundation models*. O'Reilly Media.
6. Phoenix, J., & Taylor, M. (2024). *Prompt engineering for generative AI: Future-proof inputs for reliable AI outputs*. O'Reilly Media.
7. Alammari, J., & Grootendorst, M. (2024). *Hands-on large language models: Language understanding and generation*. O'Reilly Media.
8. Subramanian, S., D., S., & Contributors. (2024). *Building LLM applications for production*. O'Reilly Media.
9. Fregly, C., Barth, A., & Eigenbrode, S. (2025). *Generative AI on AWS* (2nd ed.). O'Reilly Media.

10. Bahree, A. (2024). *Practical generative AI: Applications, techniques, and implementation strategies*. Apress.
11. Kaushik, S. (2023). *Artificial intelligence and machine learning*. McGraw Hill Education India.
12. Sharma, A. (2024). *Generative AI and prompt engineering: A practical guide*. BPB Publications.
13. Goyal, N. (2024). *Applied artificial intelligence using Python*. BPB Publications.
14. Raj, P., & Raman, A. (2023). *Artificial intelligence: Concepts and applications*. Khanna Publishing House.
15. Srivastava, D. (2024). *Generative AI for developers and researchers*. BPB Publications.

Web References :

1. <https://platform.openai.com/docs>
2. <https://platform.openai.com/docs/guides/prompt-engineering>
3. <https://ai.google.dev>
4. <https://www.promptingguide.ai>
5. <https://docs.anthropic.com>
6. <https://huggingface.co/docs>
7. <https://learn.microsoft.com/ai>
8. <https://www.deeplearning.ai/short-courses>
9. <https://developers.google.com/machine-learning/crash-course>
10. <https://www.unesco.org/en/artificial-intelligence/recommendation-ethics>

L:: Lecture, **T::** Tutorial, **P::** Practical

CCE:: Continuous & Comprehensive Evaluation

(CCE theory includes Mid Semester Examination, Assignment, MCQ Quizzes, Seminar, Reflective Notes, Class Participation, Case Analysis and Presentation, Slip Tests (Announced/ Surprised), Attendance etc. or any combination of these)

PWE: Practical Work Examination

(PWE includes Laboratory Practical Work, Project Work, Viva simulation exercise work etc.)

SEE:: Semester End Evaluation

