

BA-MAJ-COMP-05: AI Applications and Prompt Engineering

Total Marks: 100
External Examination: 70
Internal Assessment: 30
Credits: 4

Maximum Time: 3 Hours
Minimum Pass Marks: 35%
Lectures to be delivered: 55-60 Hours
L: 4 T: 0 P: 0

Course outcome:

At the end of the course, the student will be able to:

- Explain the concepts and types of artificial intelligence.
- Illustrate basic machine learning methods for regression, classification and clustering.
CO3: Identify real-world applications across different disciplines.
- Make use of prompt engineering techniques to interact with generative AI tools. CO5:
Outline recent trends in artificial intelligence and machine learning.

A) Instructions for the paper setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for the candidates

1. Candidates are required to attempt five questions in all, selecting two questions each from Section A and Section B and compulsory questions of Section C.
2. Use of non-programmable scientific calculators is allowed.

Section A

Introduction to Artificial Intelligence: Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI.

Applications of AI: Application of AI in Healthcare, Application of AI in Finance, Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education, Application of AI in Transportation, AI in Experimentation and Multi-disciplinary research.

Machine Intelligence: Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Agent and Environment, Search, Uninformed Search Algorithms, Informed Search Algorithms: Pure Heuristic Search, Best-First Search Algorithm



(Greedy Search).

Knowledge Representation: Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge.

Section B

Introduction to Prompt Engineering: Introduction to Prompt Engineering, The Evolution of Prompt Engineering, Types of Prompts, How Does Prompt Engineering Work?, Comprehending Prompt Engineering's Function in Communication, The Advantages of Prompt Engineering, The Future of LLM Communication.

Prompt Engineering Techniques for ChatGPT: Introduction to Prompt Engineering Techniques, Instructions Prompt Technique, Zero, One, and Few Shot Prompting, Self-Consistency Prompt.

Prompts for Creative Thinking: Introduction, Unlocking Imagination and Innovation.

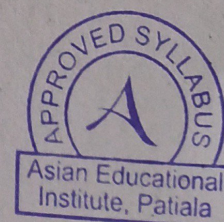
Prompts for Effective Writing: Introduction, Igniting the Writing Process with Prompts.

Textbooks:

1. Reema Thareja, *Artificial Intelligence: Beyond Classical AI*, Pearson Education, 2023.
2. Ajantha Devi Vairamani and Anand Nayyar, *Prompt Engineering: Empowering Communication*, 1st Edition, CRC Press, Taylor & Francis Group, 2024. (DOI: <https://doi.org/10.1201/9781032692319>).
3. Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti, "AI for Everyone – A Beginner's Handbook for Artificial Intelligence", Pearson, 2024.

Reference books / Manuals:

1. Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th Edition), Pearson Education, 2023.
2. Elaine Rich, Kevin Knight, and Shivashankar B. Nair, *Artificial Intelligence*, McGraw Hill Education.
3. Tom Taulli, *Prompt Engineering for Generative AI: ChatGPT, LLMs, and Beyond*, Apress, Springer Nature. Nilakshi Jain, *Artificial Intelligence: Making A System Intelligent*, First Edition, Wiley.



BA-MAJ-COMP-06: Computer Networks

Total Marks: 100
External Examination: 70
Internal Assessment: 30
Credits: 04

Maximum Time: 3 Hours
Minimum Pass Marks: 35%
Lectures to be delivered: 55-60 Hours
L:4 T:0 P:0

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C.

2. Use of non-programmable scientific calculator is allowed.

Course Objective :

- Become familiar with the basics of computer networks.
- Become familiar with network architectures.
- Become familiar with fundamental protocols.
- Become familiar with basic network computing techniques

Learning Outcome :

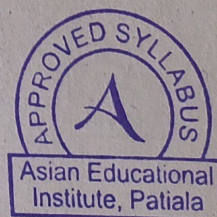
- Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.
- Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies

SECTION-A

Introduction to Computer networks: Applications, Network hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less). Network structure and architecture: point to point, multicast, broadcast. Classification of networks-LAN, MAN and WAN.

Reference models: OSI reference model, TCP/IP reference model. Comparison between OSI and TCP/IP models.

Data Link Layer: Design issues, Services to network layer, Framing. Error control. Flow control, Elementary data link protocols: unrestricted simplex protocol, simplex stop and wait protocol, simplex protocol for a noisy channel.



SECTION-B

Network layer: Design issues, Services to the transport layer. Routing algorithms – Static non-adaptive and dynamic/adaptive algorithms. Congestion control algorithms -the leaky bucket algorithm, the token bucket algorithm .

Transport layer: Design issues, connection management-addressing, establishing and releasing connection, transport protocols-TCP, UDP

Application layer:The DNS Name Space. Electronic Mail. The World Wide Web.

Network security: Introduction to cryptography, substitution ciphers, transposition ciphers, one-time pads, two fundamental cryptographic principles, public key algorithms (RSA, other Public-key algorithms), digital signatures, symmetric-key signatures, public key-signatures message digests.

Reference Books:

1. B Forouzan. Introduction to data communication and networking
2. AS Tanenbaum, Computer Networks

