Mukesh Patel School of Technology Management and Engineering

B Tech (Artificial Intelligence)

- **Program Educational Objectives (PEOs)**
- **Program Outcomes (POs)**
- **Course Outcomes (COs)**

Program Educational Objectives (PEOs):

1. **Professional Skills**
2. **Career Growth**
3. **Higher Studies**

Program Outcomes (POs):

PO-1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO-2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO-3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO-4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO-5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO-6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO-7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO-8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO-9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO-10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO-11: Life-Long Learning: Recognize the need for, and have the preparation and ability for independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change

Courses and Course Outcomes (COs):

Intelligent System - I

- **CO-1:** Describe approaches to artificial intelligence
- **CO-2:** Define and identify different types of agents and environments.
- **CO-3:** Implement different search based problem solving techniques.
- **CO-4:** Represent and apply propositional logic & predicate logic to simple knowledge-based applications.

Optimization Techniques

- **CO-1:** Define suitable optimization technique for given problems.
- **CO-2:** Demonstrate use of decision making and game theory.
- **CO-3:** Solve assignment and transportation problems.
- **CO-4:** Apply concepts of linear programming and integer linear programming to solve real life problems.

Probability and Random Variables

- **CO-1:** Know the concept of probability and random variables.
- **CO-2:** Solve problems involving conditional probability and moments.
- **CO-3:** Demonstrate understanding of the applications of various probability distributions, measures of central tendency to solve real life problems.
- **CO-4:** Analyse the different probability density functions and their applications.

Constitution of India

- **CO-1:** Recall the historical evolution of India's democratic values, emphasizing the foundational principles of justice, equality, and liberty as enshrined in the Preamble of the Constitution.

- **CO-2:** Understand the fundamental rights enshrined in the Constitution, their permissible restrictions, and how these rights are balanced with duties, to grasp their application within societal and professional frameworks.
- **CO-3:** Apply the knowledge of the structure of India's polity and the role of the Judiciary in maintaining the basic structure of the Constitution in real-world professional contexts

Natural Language Processing

- **CO-1:** Describe the fundamental concepts and techniques of natural language processing
- **CO-2:** Use NLP technologies to explore and gain a broad understanding of text data
- **CO-3:** Implement various algorithms for information extraction and retrieval of textual data

Cryptography and Network Security

- **CO-1:** Explain and analyze symmetric key encryption and decryption.
- **CO-2:** Use asymmetric key cryptography for data encryption
- **CO-3:** Describe various techniques of network security
- **CO-4:** Discuss various system security mechanisms

Signal and Image Processing

- **CO-1:** Classify discrete time signals time systems and implement Discrete Fourier Transform on discrete time signals
- **CO-2:** Apply spatial domain and frequency domain techniques for grey image enhancement
- **CO-3:** Analyze images processed by various morphological and segmentation techniques
- **CO-4:** Illustrate motion estimation and compensation techniques in video processing

Evolutionary Computing

- **CO-1:** Explain the concepts Evolutionary computations and algorithms
- **CO-2:** Use the concepts of variation and selection techniques for particular classes of problems
- **CO-3:** Implement various evolutionary algorithms including ant colony optimization and swarm optimization algorithms
- **CO-4:** Apply the principles of evolutionary and genetic programming for real life problems

English Communication

- **CO-1:** Use their knowledge of vocabulary and grammar to articulate their ideas effectively
- **CO-2:** Demonstrate effective listening and speaking skills in oral communication situations such as speeches, conversations, power-presentations, etc.
- **CO-3:** Apply different reading techniques as needed to read passages effectively

Technical Communication

- **CO-1:** Apply the fundamentals of written communication to create written documents that are coherent, error-free and well organized.
- **CO-2:** Develop the ability to create effective and persuasive business correspondence, such as letters and emails, that follow etiquette and are able to achieve the desired outcomes.
- **CO-3:** Create basic reports such as memo, letter and survey-based report, using their understanding of report writing.

Data Structure and Algorithm

- **CO-1:** Understand the concept of data structures and computational complexity
- **CO-2:** Identify and implement appropriate linear data structure for the given problem.

- **CO-3:** Identify and implement appropriate non-linear data structure for the given problem.
- **CO-4:** Differentiate various searching and sorting algorithms.

Intelligent System-I

- **CO-1:** Describe approaches to artificial intelligence
- **CO-2:** Define and identify different types of agents and environments.
- **CO-3:** Implement different search based problem solving techniques.
- **CO-4:** Represent and apply propositional logic & predicate logic to simple knowledge-based applications.

Database Management Systems

- **CO-1:** Know the applications of statistics and sample the population using various sampling techniques
- **CO-2:** 2. Classify, tabulate and represent data and calculate the descriptive statistics
- **CO-3:** Explain the concepts of multivariate regression models, principal component analysis and discriminant analysis
- **CO-4:** Analyze and implement a simple and multiple linear regression model

Intelligent Systems -II

- **CO-1:** Quantify uncertainty using probability-based models.
- **CO-2:** 2. Analyze the applications of fuzzy logic to real-world problems
- **CO-3:** Apply evolutionary intelligence algorithms to solve real-world problems
- **CO-4:** Comprehend the fundamentals of the reinforcement learning approach.

Environmental Science

- **CO-1:** Explain the concept of natural resources, ecosystem, and biodiversity,
- **CO-2:** Relate the various aspects of environmental pollutions with its cause and effect

- **CO-3:** Explain the greenhouse effect and climate change.
- **CO-4:** Discuss the role of individual in environmental conservation