# Department of Artificial Intelligence

### 1. AI algorithms and Applications of AI

Definition and history of AI, Turing Test and the Philosophy of AI, AI vs. Human Intelligence, Ethical and societal, considerations in AI, Problem Solving and Search Algorithms, Problem formulation and representation, State space, search trees, and graph traversal, Uninformed search algorithms: BFS, DFS, Informed search algorithms: A*, AO*, Heuristic functions, Supervised, Unsupervised & Reinforcement learning Techniques, AI applications in the area of  NLP, Agriculture and Health care etc.

### 2. Machine Learning/ Deep Learning

Supervised Learning, Classification, Logistic regression, multi-class classification, Regularization, Basic concepts of Probability and Probability Density Function, Naïve Bayes Classifier, Decision Tree, K nearest neighbor algorithm, Ensemble Learning, Bagging and Boosting, ADA boost, Feature selection, Branch & bound, sequential forward, sequential backward and bidirectional, Feature Extraction, Principle Components Analysis, Support Vector Machine and its variants, Unsupervised Learning Algorithms, Clustering, K means and hierarchical clustering, Performance metrics for classification and regression, Hypothesis testing, Deep neural networks, Sequence models: RNNs and LSTMs, recent popular neural network based models, Generative models, Convolution Neural Networks

### 3. Soft Computing

Basic concepts of neural networks, Feed Forward Neural network, Recurrent Neural Network, Learning algorithms, Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules, Process control using fuzzy logic, Decision-making fuzzy systems, Applications of fuzzy logic, Hybrid systems like neuro-fuzzy systems, Fuzzy variants of machine learning algorithms, Evolutionary Algorithms, Genetic algorithms, Particle Swarm optimization, Ant colony optimization, Simulated Annealing, Tabu search etc.