



INFORMATION TECHNOLOGY
ENGINEERING

IT ENGINEERING SEM VII



POSITIVE QUADRANT
TECHNOLOGIES
SERVING INFORMATION WORLDWIDE

AI AND DS

Programming & development

Course Curriculum



AI AND DS SEM VII

Module 1 : Introduction to AI

- Uncertainty in AI
- Inference using full joint distributions
- Bayes Theorem
- the semantics of Bayesian Networks
- Inference in Bayesian networks
- Decision Theory
- Markov Decision Processes
- Self-learning Topics
- Hidden Markov Model (HMM)
- Gaussian Mixture Model (GMM)

Module 2: Cognitive Computing

- Foundation of Cognitive Computing
- Design Principles for Cognitive Systems
- Natural Language Processing in Support of a Cognitive System
- Representing Knowledge in Taxonomies and Ontologies
- Applying Advanced Analytics to Cognitive Computing
- The Process of Building a Cognitive Application
- Self-learning Topics
- Cognitive Systems such as IBM's Watson

Module 3: Fuzzy Logic & Its Applications

- Introduction to Fuzzy Sets
- Properties of Fuzzy Sets
- Operations on Fuzzy Sets
- Fuzzy Membership Functions
- Fuzzy Relations with Operations and its Properties
- Fuzzy Composition
- Max-Min Composition
- Max-Product Composition



- Defuzzification Methods
- Architecture of Mamdani Type Fuzzy Control System
- Design of Fuzzy Controllers like Domestic Shower Controller
- Washing Machine Controller
- Water Purifier Controller
- Self-learning Topics
- Other Fuzzy Composition Operations
- Fuzzy Inference System (FIS) & ANFIS

Module 4: Introduction to Deep Learning

- Introduction to Deep Learning
- ANN
- Machine Learning Vs Deep Learning
- Working of Deep Learning
- Convolutional Neural Network
- Introduction, Components of CNN Architecture
- Properties of CNN
- Architectures of CNN
- Applications of CNN
- Recurrent Neural Network
- Introduction
- Simple RNN
- LSTM Implementation
- Deep RNN
- Autoencoder
- Introduction
- Features
- Types
- Applications of Deep Learning
- Self-learning Topics
- Restricted Boltzmann Machine (RBM)



Module 5: Advanced ML Classification Techniques

- Ensemble Classifiers
- Introduction to Ensemble Methods
- Bagging



- Boosting
- Random forests
- Improving classification accuracy of Class-Imbalanced Data
- Metrics for Evaluating Classifier Performance
- Holdout Method and Random Subsampling
- Cross-Validation
- Bootstrap
- Model Selection Using Statistical Tests of Significance
- Comparing Classifiers Based on Cost–Benefit and ROC Curves
- Self-learning Topics
- Introduction to ML (Revision)
- Introduction to Reinforcement Learning

Module 6: Trends and Application in Data Science

Data Science: applications and case studies, Data science for text, image, video, audio. Data science for Multimodal applications. Self-learning Topics: ImageNet Large Scale Visual Recognition Challenge (ILSVRC)

