H.N.G. University, Patan
M.C.A. SEMESTER - V
MCA-54: DSS with Artificial Intelligence [Elective – I]

Unit : 1 **[30%]**

AI and Knowledge Based Decision Support

Artificial Intelligence: Concepts, Definitions, Fields, AI v/s Natural Intelligence

Problem Solving: Defining the Problem as State Space Search, Water-jug Problem, Production System , Problem Characteristics, Production System Characteristics.

Heuristic Search Techniques: Generate and Test, Hill Climbing, Best First Search, A* Algorithm, Problem Reduction, Constraint Satisfaction, Means - End Analysis.

Expert System: Types of Knowledge Based DSS, Basic Concepts of ES, Structure of ES, Type of ES, Development Life Cycle of ES, Problem Area's and Example Of ES, Advantages and Limitations of ES, ES and Internet/Intranet/Web.

Unit : 2 **[25%]**

Knowledge Representation and Knowledge Acquisition

Knowledge Representation: Introduction, Representation in logic and Other Schemas, Rules in Knowledge Representation, Multiple, Experimental and Uncertain Knowledge Representation, Knowledge Representation Techniques: Semantic Net, Frame, Script.

Knowledge Acquisition: KE Introduction, Scope Of Knowledge: Sources, Level and Categories, Difficulties in KA, Methods Of Knowledge Acquisition: Interview, Tracking Methods, Observation And Manual Methods, Expert Driven Method, RGA, Role Of Knowledge Engineer, Machine learning, KA from Multiple Experts ,V & V in Knowledge Base, Analyzing, coding, Documenting, Diagramming knowledge, Numerical and Documented KA, KA and Internet/Intranet.

Game Playing: The Minimax Search Procedure, Alpha - Beta Cutoffs.

Unit : 3 **[30%]**

Neural Network and Natural Language Processing

Neural Network: Machine Learning, Neural computing, Analogy, Fundamental NN, NN application Development, Data Collection and Preparation, Architecture, Back propagation Network, learning Algorithm, testing, Implementation ,Software and Hardware of NN, Benefits and Limitations, NN in ES,NN for Decision Support, Example Of NN.

Application of NN and AI: Overview, credit Approval, Bankruptcy Prediction with NN, Stock Market Prediction with NN, Integrated NN and ES, Genetic Algorithm, Optimization Algorithm, QR, Intelligent System Integration, Data mining and Knowledge Discovery.

Perception: Speech recognition, Vision, Action,

Natural Language Processing: Introduction, Phases of NLP, Syntactic Processing, Semantic Analysis, ATN (Augmented Transition Network)

Unit : 4 **[15%]**

Fuzzy Logic

Fuzzy Set: Introduction, Basic Types and Concepts, Basic Operation, Arithmetic and Relation, Fuzzy Decision Making

Text Books:

1 Decision Support System and Intelligent System
Author: Efraim Turban and Jay E. Aronson, Pub: PHI.
2 Fuzzy Sets and Fuzzy Logic: Theory and Applications
Author: GEORGE J. KLIR AND BO YUAN, Pub: Prentice Hall

Reference Books:

1 Principles of Artificial Intelligence and Expert System Development.
Author: David W. Rolston, Pub: McGraw Hill Book Company
2 Artificial Intelligence - Author: Elaine rich, Kevin Knight, Pub: Tata McGraw Hill