CSE508:KNOWLEDGE BASED EXPERT SYSTEMS

Course Outcomes: Through this course students should be able to

CO1 :: define various stages involved in the development of an expert system.

CO2 :: explain the knowledge architecture for making intelligent systems in multidisciplinary applications.

CO3 :: evaluate the knowledge for prototyping an artificial intelligence based decision support system.

CO4 :: analyze complex problems using fuzzy logic and ANFIS.

CO5 :: justify the need of expert system methods to advance the multidisciplinary applications.

CO6 :: develop a knoweldge based recommender system based on the learnt principle.

Unit I

Introduction to Expert System : Introduction, Characteristics and Elements of an Expert System, Expert Systems Applications and domains, development of an Expert System, Advantages of Expert Systems

Expert System Tools : Introduction to programming languages for expert system application, Knowledge Engineering languages, Systems building Aids and Support facilities

Unit II

The Representation of Knowledge : Introduction, The meaning of knowledge, Propositional Logic, FOPL, Universal and Existential Quantifiers, Rules of Inference and Resolution

Design of Expert System : Introduction, Selecting appropriate problem, Stages in the development of an expert System, errors in development stages, the Expert System Life Cycle, difficulties in development of an expert system, Pitfalls in expert systems

Unit III

Building Expert System using Fuzzy Logic and Hybrid Systems : introduction to fuzzy logic, fuzzification, rule designing and inferencing, overview of Fuzzy Logic Toolbox, introduction to ANFIS (Adaptive neuro fuzzy inference system), ANFIS Architecture, applications of ANFIS

Unit IV

Recommendation System : introduction to recommendation system, types of recommendation with their advantages and disadvantages, applications of Recommendation System, building a Basic Recommendation System

Unit V

Statistical Reasoning : probability and its types, bayes theorem, bayesian belief network, Dempster-Shafer Theory, certainty Factor, Markov Chain Rule

Unit VI

Introduction to Logic Programming and PROLOG : Conversion of FOPL Knowledge to logic program, Problem Solving using logic programming, Introduction to Prolog, Facts, Rules, Horn Clause, Prolog Control Strategy, Issues in Prolog Programming

Existing Expert System : case study on Course Advisor Expert System, medical expert systems and expert systems in manufacturing

Text Books:

1. EXPERT SYSTEMS: PRINCIPLES AND PROGRAMMING by JOSEPH C. GIARRATANO, GARY D. RILEY, CENGAGE LEARNING

References:

1. ARTIFICIAL INTELLIGENCE by KEVIN KNIGHT, ELAINE RICH, B. SHIVASHANKAR NAIR, MCGRAW HILL EDUCATION