

### 3/3 MCA First Semester

CA5T3F

EXPERT SYSTEMS

Credits : 4

Lecture Hours : 4 periods / week

Internal assessment : 30 Marks

Semester and Examination: 70 Marks

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#### Course Description :

This course is designed to teach you how to build expert systems from the inside out. It shows how to implement expert systems. And it deals with Knowledge productions and semantic nets. And finally it deals with reasoning on uncertainty & representing uncertainty.

#### Course Objectives:

- It provides the students to understand the role of Artificial Intelligence, Expert Systems and Decision Models in managerial decision-making.
- Develop abilities to apply, build and modify decision models to solve real problems.
- Explore the issues involved in the design and development of Artificial Intelligence Based Decision Support Systems and discuss the role these systems play in the business environment.
- Gain an In-Depth Knowledge of a particular type of Expert System Technique.
- Gain the knowledge to build a prototype of Expert Intelligent system Based on decision Supporting Systems.

#### UNIT-I:

**Introduction to Expert Systems:** Introduction, Fundamentals of Expert Systems, , Advantages of Expert Systems, Concepts of Expert Systems, Characteristics of Expert Systems, Development of Expert systems Technology, Expert Systems Applications and Domain

#### UNIT-II:

**Knowledge Representation:** Introduction, Meaning of Knowledge, Productions, Semantic nets, Object - Attribute –Value- Triples, Difficulty with semantic nets, Frames, Difficulty with Frames, Logic-Propositional logic and Predicate logic, Limitations

#### UNIT-III:

**Methods of Inference:** Introduction, State and problem spaces, Deductive logic and Syllogisms, Rules of Inference, Logic Systems, Resolution, Casual reasoning, Forward and Backward Chaining, other Methods of Inference.

#### UNIT-IV:

**Reasoning under Uncertainty:** Introduction, Uncertainty, Types of Errors, Classical Probability, Expert systems and Probability, Hypothetical Reasoning and Backward induction, Temporal Reasoning, The Odds of Belief, Sufficient and Necessity, Inference nets.

#### UNIT-V:

**Representing Uncertainty:** Introduction, Sources of Uncertainty , Certainty factors, Certainty Factors Vs Conditional Probabilities, Vagueness and Possibility, Fuzzy logic, Possibility Theory, The Uncertain State of Uncertainty.

**UNIT-VI:**

**Inexact Reasoning:** Introduction, Uncertainty Rules, Certainty Factors, Dempster-Shafer Theory, Approximate Reasoning, Applications.

**UNIT-VII:**

**Design of Expert Systems:** Introduction, Problem Selection, Stages in Development of an Expert system, Errors in development stages, Software Engineering and Expert Systems, Expert systems Lifecycles.

**UNIT-VIII:**

**Expert System Applications:** Introduction to CLIPS, Decision trees, Case based Reasoning, MYCIN, EMYCIN, OPS5, ROSIE

**Learning Resources****Text Books:**

1. Expert Systems- Principles and Programming, Joseph C. Giarrantono, Gary D.Riley, Thomson Course Technology, 4/e, 2007.
2. Introduction to Expert Systems, Peter Jackson, Pearson Education, 3/e, 2000.

**Reference Books:**

1. A Guide to Expert Systems, Donald A. Waterman, Pearson Education, 3/e, 2002.
2. Building Expert Systems, Frederick Hayes-Roth, Donald A. Waterman, and Douglas B. Lenat (eds.), 1/e, 1983.