

## **ARTIFICIAL INTELLIGENCE**

### 1. Logic & Theorem Proving

- Review propositional & predicate Calculus
- Resolution

### 2. Production Rules

- Procedural versus declarative knowledge
- Forward versus backward reasoning
- Matching
- Control Knowledge

### 3. Statistical Reasoning

- Classical logic versus nonmonotonic logic
- Default logic
- Circumscription
- Fuzzy Logic
- Typicality
- Levels of confidence
- Baye's Theorem
- Dempster-Shafer theory of evidence

### 4. Slot & Filler Structures

- Semantic nets
- Frames
- Scripts

### 5. Learning

- Rote Learning
- Learning by taking advice
- Explanation based learning
- Discovery
- Analogy

### 6. Computer Vision

- Defining the problem
- Overview of solution: Marr's Theory
- Early processing: Gray level primal sketch
- Primal sketch to 2.5D sketch
- Late processing: 2.5D sketch to 3D sketch

## 7. Natural Language Processing

- Defining the problem
- Overview of solution
- Syntactic Analysis: Context-free grammars
- Transformational grammars
- Parsing: Top down, bottom up & chart parsing
- Semantics: Thematic roles, Aktionsart, Coercion, Cospecification, Extended reasoning with KB
- Discourse & Pragmatic Processing: Modelling

## 8. Connectionism

- Biological basis of connectionism
- Historical background to connectionism
- McCulloch & Pits formal neuron, Hebb's learning rule, Rosenblatt's perception
- Associations
- Hopfield Networks
- Backpropagation
- Connectionist representations & representational adequacy