RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Electronics & Communication Engineering, VIII-Semester

Departmental Elective EC 802 (A) AI & Signal Processing

Course Objective:
To impart knowledge about Artificial Intelligence and to give understanding of the main abstractions and reasoning for intelligent systems and signal processing.

Course Outcomes:
1. Ability to develop a basic understanding of AI building blocks presented in intelligent agents.
2. Ability to choose an appropriate problem-solving method and knowledge representation technique.
3. Ability to analyze the strength and weaknesses of AI approaches to knowledge-intensive problem-solving.

4. Understand real time applications of Fourier transform.

5. Describe discrete time systems in terms of difference equations.

UNIT-I

Introduction of AI

What is AI? Foundations of AI, History of AI, Agents and environments, The nature of the Environment, Problem solving Agents, Problem Formulation, Search Strategies

UNIT-II

Knowledge and Reasoning

Knowledge-based Agents, Representation, Reasoning and Logic, Prepositional logic, First-order logic, Using First-order logic, Inference in First-order logic, forward and Backward Chaining

UNIT-III
Learning
Learning from observations, Forms of Learning, Inductive Learning, Learning decision trees, why learning works, Learning in Neural and Belief networks.

Unit IV
Orthogonal transforms
DFT, DCT and Haar; Properties of DFT; Computation of DFT: FFT and structures, Decimation in time, Decimation in frequency; Linear convolution using DFT; Digital filter structures: Basic FIR/IIR filter structures, FIR/IIR Cascaded lattice structures, Parallel allpass realization of IIR transfer functions.

Unit V

Multirate signal processing

Basic structures for sampling rate conversion, Decimators and Interpolators; Multistage design of interpolators and decimators; Polyphase decomposition and FIR structures; Computationally efficient sampling rate converters, Lagrange interpolation, Spline interpolation; Quadrature mirror filter banks; Applications in subband coding;

References:

1. Stuart Russell, Peter Norvig: "Artificial Intelligence: A Modern Approach",2nd Edition, Pearson Education, 2007

2. Artificial Neural Networks B. Yagna Narayana, PHI

3. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).

4. Artificial Intelligence and Expert Systems – Patterson PHI.

5.. S K Mitra: "Digital Signal Processing: A Computer-Based Approach" (McGraw Hill)

6. E C Ifeacthor and B W Jervis "Digital Signal Processing A Practical Approach" (Pearson)

7.R. Chassaing and D. Reay, Digital signal processing and applications with TMS320C6713 and TMS320C6416, Wiley, 2008.

8.J. G. Proakis and D. G. Manolakis, Digital Signal Processing: