Artificial and Machine Intelligence

B.E. Sem. VIII [MECH/AUTO] (Elective − II)

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	−	−
Oral Exam	−	25
Term Work	−	25

SYLLABUS

1. **AI and Internal Representation**
   Artificial Intelligence and the World, Representation in AI, Properties of Internal Representation, The Predicate Calculus, Predicates and Arguments, Connectives Variables and Quantification, How to Use the Predicate Calculus, Other Kinds of Inference Indexing, Pointers and Alternative Notations, Indexing, The Isa Hierarchy, Slot-Assertion Notation, Frame Notation

2. **Lisps**
   Lisps, Typing at Lisp, Defining Programs, Basic Flow of Control in Lisp, Lisp Style, Atoms and Lists, Basic Debugging, Building Up List Structure, More on Predicates, Properties, Pointers, Cell Notation and the Internals (Almost) of Lisp, Destructive, Modification of Lists, The for Function, Recursion, Scope of Variables Input/Output, Macros.

3. **Neural Networks And Fuzzy Systems**
   Neural and fuzzy machine Intelligence, Fuzziness as Multivalence, The Dynamical Systems approach to Machine Intelligence, The brain as a dynamical system, Neural and fuzzy systems as function Estimators, Neural Networks as trainable Dynamical system, Fuzzy systems and applications, Intelligent behavior as Adaptive Model free Estimation, Generalization and creativity, Learning as change, Symbol Vs Numbers, Rules Vs Principles, Expert system Knowledge as rule trees, Symbolic Vs Numeric Processing, Fuzzy systems as Structured Numerical estimators, Generating Fuzzy rules with product space Clustering, Fuzzy Systems as Parallel associators, Fuzzy systems as Principle based Systems.

4. **Neural Network Theory**
   Neuronal Dynamics: Activations and signals, Neurons as functions, signal monotonicity, Biological Activations and signals, Neuron Fields, Neuron Dynamical Systems, Common signal functions, Pulse-Coded Signal functions

5. **Genetic Algorithms**
   A simple genetic algorithm, A simulation by hands, similarity templates(Schemata), Mathematical foundations, Schema Processing at work, The two- armed and k- armed Bandit Problem, The building block hypothesis, The minimal Deceptive Problem Computer implementation of Genetic algorithm, Data Structures, Reproduction, Cross over and Mutation. Time to reproduce and time to Cross Mapping objective function to fitness, form, Fitness scaling. Applications of genetic algorithm, De Jong and Function Optimization, Improvement in basic techniques, Introduction to Genetics based machine learning, applications of genetic based machine leaning.

6. Data Mining

Introduction to Data Mining, Computer systems that can learn, Machine learning and methodology of science, Concept learning, Data ware house, designing decision support systems, Client server and data warehousing, Knowledge Discovery Process, Visualization Techniques, K- nearest neighbor, Decision tree, OLAP tools, Neural networks, Genetic algorithm, Setting up a KDD environment, Real life applications, Customer profiling, Discovering foreign key relationships

Reference Books :

1. Introduction to Artificial intelligence (*Eugene Charniak, Drew McDermott*) Addison Wesley
2. Neural Networks and fuzzy systems A dynamical systems approach to machine Intelligence (*Bart Kosko*) PHI
3. Genetic Algorithms in search, Optimization & Machine Learning (*David E Goldberg*) Addison Wesley
4. Data Mining (*Pieter Adriaans and Dolt Zantinge*) Pearson Education Asia
5. Data Warehousing in the Real World (*Sam Anahory and Dennis Murray*)
6. Artificial Intelligence (*Elaine Rich, Kevin Knight, S. Nair*) *McGraw Hill Publishing Company Ltd*
7. Industrial Robotics (*Mikell Groover, Mitchell Weiss, Nagel, Odrey*) Tata McGraw Hill Publishing Company Ltd
8. Artificial Intelligence (*Michael Negnevitsky*) Tata McGraw Hill Publishing Company Ltd
9. Intelligence (*Patrick Winston*) Tata McGraw Hill Publishing Company Ltd
10. Artificial Intelligence (*Stuart Russell, Peter Norvig*) Tata McGraw Hill Publishing Company Ltd

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