

## Course Name: ARTIFICIAL INTELLIGENCE

Course Code: T.H 01

Course Duration: 24 Hours – 3 Days

### Course Syllabus:

#### 1. Introducing AI & its Optimization algorithms

- Introducing AI concept
- Introducing search methods
- Introducing important issues in AI
- The classic Optimization algorithms
- Limitations of The classic Optimization algorithms
- Introducing objective functions & their specialties

#### 2. Artificial Neural Network

- Introducing Neural Network concepts & neuron structure
- Multilayer Perceptron
- With & without supervision learning
- Add line network
- Hopfield network
- Feed forward network
- Fault Propagation algorithm
- Emission reduction algorithm using AI
- Introducing Neural Network application
- Introducing neural control
- Neural Network in control engineering
- Solving some examples

#### 3. How to use Artificial Neural Network in MATLAB

- Introducing MFILE programming

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- Introducing MATLAB commands
- Introducing neural network
- neural network test using MATLAB
- introducing GUI in neural network applications
- Solving some examples

#### 4. Fuzzy Logic

- Introducing Fuzzy Logic
- Introducing Membership function
- Fuzzy reasoning process
- Introducing SUJINO deduction
- Fuzzy control

#### 5. How to use Fuzzy Logic in MATLAB

- Introducing MATLAB commands
- How to work with GUI in Fuzzy Logic
- Solving some examples

#### 6. Genetic Algorithm

- Introducing GA
- Coding
- Mutation and fusion
- Chromosome intercourse different methods
- Fitness function
- Introducing evolution
- Introducing genetic algorithm cycle
- Using GA in neural network optimization
- Solving some examples

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## 7. How to use Genetic Algorithm in MATLAB

- Introducing GA commands
- Introducing GA in MATLAB
- How to optimize a GA function in MATLAB

## 8. Ant Colony

- Introducing ACO advantages
- ACO formulas & simulation
- Colporteur issue analyzing using ACO
- Solving some examples

## 9. Simulated Annealing

- Introducing Simulated Annealing & crystal
- Boltzmann law
- SA formulas
- SA algorithms

## 10. Particle Swarm Optimization

- Introducing Collective Intelligence
- Introducing BEES
- PSO algorithm
- Solving some examples

## 11. Bacterial Foraging Optimization

- Foraging strategies
- Introducing ECOLI bacteria
- Introducing search methods
- BFOA algorithm
- Solving some examples

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## 12. Introducing other Optimization algorithms

- Harmonic Search
- Tabu Search
- Etc.

## 13. How to use Optimization algorithms in MATLAB

- Introducing MATLAB commands
- Simulation
- Simulink & Mfile programming

## 14. Applications

- Objective function
- Introducing industrial models
- Programming description
- Model simulation

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