| MCPEC1014 : Soft Computing | | |
|---|---|---|
| **Teaching Scheme** | **Examination Scheme** | |
| **Lectures : 04 Hrs/Week** | **ISE I*** | **20 Marks** |
| **Tutorial :** | **ISE II*** | **20 Marks** |
| **Credits : 04** | **End Semester Examination** | **60 Marks** |

**Course Outcome -** After studying this course, students will be able to

**CO1:** Understand the basic concepts of ANN
**CO2:** Understand different ANN training algorithms
**CO3:** Understand Fuzzy logic concepts and apply it for simple applications
**CO4:** Design ANN using supervised and unsupervised learning algorithms
**CO5:** Apply ANN and fuzzy logic for application development

## Course Contents

| Unit No | Detailed Contents |
|---|---|
| 1 | **Introduction to ANN:** Basic terminology, Biological neurons and its working, Simulation of biological neurons to problem solving, Different ANNs architectures, Training techniques for ANNs, Applications of ANNs to solve some real life problems. |
| 2 | **Pattern recognition and data classification:** Pattern recognition and data classification, neuron signal functions, Non-linearly separable problems, XOR problem, perceptron learning algorithm |
| 3 | **Multilayer network** Multilayer network, Back propagation algorithm, function approximation and NN, applications of FFNN, learning from examples and generalization, radial basis function network |
| 4 | **Self organization:** Self organization, competitive learning, vector quantization, Mexican hat networks, self organizing feature map, applications of self organizing feature map |
| 5 | **Fuzzy sets and fuzzy systems:** Fuzzy sets and fuzzy systems, need for numeric and linguistic processing, fuzzy uncertainty and the linguistic variable, fuzzy sets, membership functions, simple operations on fuzzy sets, fuzzy rules, applications |

**Text Books**

1. Neural Network – A classroom approach, Satish Kumar, Tata McGraw hill
2. Fuzzy logic, F. Martin McMeill, Academic Press Inc

**Refernce Books**

1. Artificial Neural Network, Yagnanarayana
2. Soft Computing techniques, N.P. Padhy , S.P. Simon, Oxford University Press
3. Soft Computing: Neural Networks, Fuzzy Logic and Genetic Algorithms, Sushil Kumar Singh, Galgotia Publications (P) Ltd

## E Books/ Online learning material

1. https://swayam.gov.in/nd1_noc20_cs17/preview
2. www.mathworks.com

## Mapping of COs and POs

| PO → CO ↓ | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 1 | 2 | | | | | | | | | | | 1 | 1 | |
| CO 2 | 1 | 2 | 3 | | 2 | | | | | | | | 1 | 1 | |
| CO 3 | 1 | 2 | 1 | | | | | | | | | | 1 | 1 | |
| CO 4 | 1 | 2 | 1 | | | | | | | | | | 1 | 1 | |
| CO 5 | 1 | 2 | 1 | | | | | | | | | | 1 | 1 | |

## Assessment Table

| Assessment Tool | Course Outcomes | | | | |
|---|---|---|---|---|---|
| | CO1 | CO2 | CO3 | CO4 | CO5 |
| ISE I* (Class Test) 20 Marks | 5 | 10 | 5 | - | - |
| ISE II* 20 Marks | - | 5 | 5 | 5 | 5 |
| ESE Assessment 60 Marks | 12 | 18 | 12 | 18 | - |

## Assessment Pattern

| Level No. | Knowledge Level | ISE I* | ISE II* | End Semester Examination |
|---|---|---|---|---|
| K1 | Remember | 5 | - | 12 |
| K2 | Understand | 10 | 5 | 24 |
| K3 | Apply | 5 | 5 | 24 |
| K4 | Analyze | - | 5 | - |
| K5 | Evaluate | - | 5 | - |
| K6 | Create | - | - | - |
| Total | | 20 | 25 | 60 |

*Approved in BoS meeting held on 24/08/2023 and Approved by Chairman, Academic Council*