# SWARNANDHRA
## COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada

### Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

## Department of Electrical & Electronics Engineering

## TEACHING PLAN

| Course Code | Course Title | Semester | Branches | Contact Periods/ Week | Academic Year | Date of Commencement of Semester |
|---|---|---|---|---|---|---|
| 20EE6E02 | AI Applications to Electrical Engineering | VI | EEE | 6 | 2024-25 | 18-11-2024 |

**Course Outcomes:** *After successful completion of this course, students should be able to:*

| | |
|---|---|
| 1 | Analyse different models of artificial neuron & Use learning methods of ANN. |
| 2 | Evaluate different paradigms of ANN |
| 3 | Classify between classical and fuzzy sets |
| 4 | Illustrate different modules of Fuzzy logic controller. |
| 5 | Apply Neural Networks and fuzzy logic for real-time applications |

| Unit | Outcome/Bloom's Level | Topics No. | Topics/ Activity | Text Book/ Reference | Contact Hour | Delivery Method |
|---|---|---|---|---|---|---|
| I | Analyse different models of artificial neuron & Use learning methods of ANN. | 1.1 | INTRODUCTION TO AI TECHNIQUES | T1,R1 | 1 | Chalk and Board |
| | | 1.2 | Artificial Neural Networks (ANN) – Humans and computers | T1,R1 | 1 | Chalk and Board, PPT |
| | | 1.3 | Biological neural networks | T1,R1 | 1 | Chalk and Board, PPT |
| | | 1.4 | ANN Terminology | T1,R1 | 1 | Chalk and Board, PPT |
| | | 1.5 | Models of Artificial neuron, activation functions | T1,R1 | 2 | Chalk and Board, PPT |
| | | 1.6 | Typical architectures, biases and thresholds | T1,R1 | 2 | Chalk and Board, PPT |
| | | 1.7 | Learning strategy (supervised - unsupervised and reinforced) | T1,R1 | 2 | Chalk and Board, PPT |
| | | 1.8 | Neural networks learning rules | T1,R1 | 1 | Chalk and Board, PPT |
| | | 1.9 | Single layer feed forward neural networks: concept of pattern and its types | T1,R1 | 1 | Chalk and Board, PPT |
| | | 1.10 | perceptron training and classification using Discrete and Continuous perceptron algorithms | T1,R1 | 2 | Chalk and Board, PPT |

# SWARNANDHRA
## COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
### Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

|     |                                          |      |                                                                    |        |    |                         |
| --- | ---------------------------------------- | ---- | ------------------------------------------------------------------ | ------ | -- | ----------------------- |
|     |                                          | 1.11 | Linear separability- XOR function.                                 | T1,R11 | 1  | Chalk and Board         |
|     |                                          |      |                                                          Total     |        | 15 |                         |
| II  | Evaluate different paradigms of ANN      | 2.1  | **Multi-Layer Feed Forward Networks**                              | T1, R1 | 1  | Chalk and Board         |
|     |                                          | 2.2  | Generalized delta rule                                             | T1, R1 | 1  | Chalk and Board         |
|     |                                          | 2.3  | Back Propagation algorithm                                         | T1, R1 | 1  | Chalk and Board         |
|     |                                          | 2.4  | Radial Basis Function (RBF) network                                | T1, R1 | 1  | Chalk and Board         |
|     |                                          | 2.5  | Kohonen's self-organizing feature maps (KSOFM)                     | T1, R1 | 1  | Chalk and Board, PPT    |
|     |                                          | 2.6  | Learning Vector Quantization (LVQ)                                 | T1, R1 | 1  | Chalk and Board, PPT    |
|     |                                          | 2.7  | Bidirectional Associative Memory (BAM)                             | T1, R1 | 1  | Chalk and Board, PPT    |
|     |                                          | 2.8  | Hopfield Neural Network.                                           | T1, R1 | 1  | Chalk and Board, PPT    |
|     |                                          |      |                                                          Total     |        | 08 |                         |
| III | Classify between classical and fuzzy sets| 3.1  | **CLASSICAL AND FUZZY SETS:** Introduction to classical sets      | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.2  | Properties of classical sets                                       | T1,R1  | 2  | Chalk and Board         |
|     |                                          | 3.3  | Operations and relations classical sets                            | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.4  | Fuzzy sets and its Properties                                      | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.5  | Fuzzy sets Operations                                              | T1,R1  | 2  | Chalk and Board         |
|     |                                          | 3.6  | Fuzzy relations                                                    | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.7  | Cardinalities of Fuzzy Sets                                        | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.8  | Membership functions                                              | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 3.9  | Simple Problems                                                    | T1,R1  | 2  | Problem Solving         |
|     |                                          |      |                                                  Total Classes     |        | 12 |                         |
|     | Illustrate different modules of Fuzzy logic controller. | 4.1 | **Fuzzy Logic System Components:**Fuzzification      | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 4.2  | Membership value assignment                                        | T1,R1  | 1  | Chalk and Board         |
|     |                                          | 4.3  | Development of rule base and decision-making system                | T1,R1  | 2  | Chalk and Board         |

# SWARNANDHRA
## COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

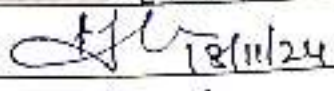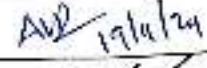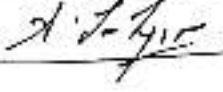| | | | | | | |
|---|---|---|---|---|---|---|
| IV | | 4.4 | Defuzzification to crisp sets | T1,R1 | 2 | Chalk and Board |
| | | 4.5 | Defuzzification methods | T1,R1 | 1 | Chalk and Board |
| | | | | Total | 07 | |
| V | Explain about Generation of over voltages in power systems (K2) | 5.1 | **Application of AI Techniques:** Speed control of DC and AC motors. | T1,R1 | 1 | Chalk and Board |
| | | 5.2 | Load flow studies | T1,R1 | 1 | Software based Learning |
| | | 5.3 | Load forecasting | T1,R1 | 1 | Software based Learning |
| | | 5.4 | Economic load dispatch | T1,R1 | 1 | Software based Learning |
| | | 5.5 | Load frequency control | T1,R1 | 1 | Software based Learning |
| | | 5.6 | Reactive power control | T1,R1 | 1 | Software based Learning |
| | | 5.7 | Revision | T1,R1 | 1 | Chalk and Board |
| | | | | Total Classes | 08 | |
| | | | | Overall Classes | 50 | |

**Text Books:**

| S. No. | Authors, Book Title, Edition, Publisher, Year of Publication |
|---|---|
| 1 | S.Rajasekaran and G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy logic, Genetic algorithms; synthesis and applications, PHI Publication. |
| 2 | T.J. Ross, Fuzzy logic with fuzzy applications, TMH |

**Reference Books:**

| S. No | Authors, Book Title, Edition, Publisher, Year of Publication |
|---|---|
| 1 | Jacek M. Zurada,Introduction to Artificial Neural Systems –Jaico Publishing House,1997. |
| 2 | Laurene Fausett, Fundamentals of Neural Networks Architectures, Algorithms and Applications,Pearson. |
| 3 | James A. Freeman, David M.S kapura Neural Networks, Algorithms, Applications and programming Techniques |
| 4 | S N Sivanandam, S Sumathi, S N Deepa, Introduction to Neural Networks using MATLAB 6.0 by TMGH |

| | | Name | Signature |
|---|---|---|---|
| i. | Course Coordinator | Dr V Madhu | 18/11/24 |
| ii. | Module Coordinator | Mr A V D Suresh | 19/11/24 |
| iii. | Programme Coordinator | Mr A Satyanarayana | |

Principal
(Dr A Gopichand)