



B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U18EIE0010 : Advanced Intelligent Controllers

COURSE OUTCOMES

CO1: Apply Various Soft Computing Frame Works

CO2: Design Of Various Neural Networks

CO3: Use of Fuzzy Logic

CO4: Apply Genetic Programming

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Define soft computing and hard computing. | CO1 | [K ₁] |
| 2. Mention the evolutionary algorithms in soft computing. | CO1 | [K ₁] |
| 3. Outline the Adaptive Linear Neuron. | CO2 | [K ₁] |
| 4. How does the Hebbian learning rule influence synaptic connections in neural networks? | CO2 | [K ₂] |
| 5. Define fuzzy logic | CO3 | [K ₁] |
| 6. List and compare classical logic & fuzzy logic. | CO3 | [K ₂] |
| 7. State multi-objective optimization problems (MOOPs) | CO4 | [K ₁] |
| 8. Infer the mutation in the context of genetic algorithms. | CO4 | [K ₁] |
| 9. Define neuro-fuzzy hybrid systems | CO1 | [K ₁] |
| 10. What are fuzzy genetic hybrid systems, | CO1 | [K ₁] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|---|---|-----|-------------------|
| 11. a) Compare and contrast soft and hard computing key characteristics. Provide examples of problems suitable for each approach. | 8 | CO1 | [K ₃] |
| b) Explain the concept of uncertainty in computing systems. | 8 | CO1 | [K ₁] |

12.	Describe the role of soft computing in optimization problems. Discuss how evolutionary algorithms or neural networks can be used to optimize solutions in various domains.	16	CO1	[K ₂]
13.	a) Discuss the principle of supervised learning in neural networks.	8	CO2	[K ₂]
	b) How does a supervised learning network differ from other types of networks?	8	CO2	[K ₂]
14.	Describe the architecture and training algorithm of a Back propagation Neural Network (BPN).	16	CO3	[K ₁]
15.	a) How do linguistic variables and fuzzy linguistic terms contribute to the representation of imprecise information in fuzzy logic systems?	8	CO4	[K ₂]
	b) Compare and contrast different MOEA algorithms, such as NSGA-II, SPEA2, and NSGA-III, in terms of their efficiency and effectiveness.	8	CO4	[K ₃]
16.	a) Discuss the role of genetic algorithms in optimizing the structure or parameters of neural networks within genetic neuro hybrid systems.	8	CO1	[K ₂]
	b) Explain the architecture of a typical neuro-fuzzy hybrid system	8	CO1	[K ₂]
