26/5/25 FN

Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

B.E.GEOINFORMATICS
6th Semester
GI5602 - SOFT COMPUTING TECHNIQUES
(Regulation 2019)

Time: 3hrs Max. Marks: 100

CO1	Understand the principles and applications of soft computing techniques, including ANN, fuzzy systems, and genetic algorithms.
CO2	Learn the structure and function of artificial neural networks, including single-layer networks and training algorithms.
CO3	Apply fuzzy systems and neuro-fuzzy models to design intelligent systems for decision-making processes.
CO4	Analyze the performance of genetic algorithms and their convergence properties in optimization problems.
CO5	Develop creative and integrated solutions using soft computing techniques for geomatics applications like flood forecasting and urban planning.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2 = 20 Marks)
(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	Differentiate soft and hard computing.	2	1	L2
2	What are the key differences between CNN and RNN?	2	2	L2
3	List out three important remote sensing applications where fuzzy logic is highly effective.	2	4	L1
4	Define a fuzzy set and a crisp set with examples from remote sensing data applications.	2	4	L1
5	Explain the benefits of ANFIS.	2	3	L2
6	Examine the potential of Radial Basis Functions in defining the hyperplane for complex problems that cannot be solved using linear approaches.	2	3	L2
7	Define the fundamental structure of a Genetic Algorithm with a clear diagram.	2	1	L1
8	List out the most commonly used selection operators in Genetic Algorithms.	2	4	L1
9	Examine the potential of Fuzzy Logic in automated feature extraction for complex land cover types?	2	5	L3
10	Determine the suitable selection operator in Genetic Algorithm for the cloudy satellite imagery.	2	5	L3

PART- B(5x 13 = 65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No	Questions	Marks	CO	BL
11 (a)	Explain the role of the Recurrent Neural Network in solving complex time-series analysis and prediction.	13	2	L2
	OR			
11 (b)	Describe the structure and working principles of Adaline and	13	2	L2

	Madaline networks, highlighting their key differences and applications.			
12 (a)	Examine the significance of Mamdani fuzzy inference in LULC applications using COA method.	**13**	3	L3
	OR			
12 (b)	Examine the structure and functioning of fuzzy rule-based systems with a neat illustration.	**13**	3	L3
13 (a)	Analyze the significance of the ANFIS in handling the uncertainty in the remote sensing data and application for which it can be effectively used.	**13**	3	L4
	OR			
13 (b)	Analyze the potential of the CANFIS in detail and list the remote sensing applications where CANFIS can be effectively utilized.	**13**	3	L4
14 (a)	Analyze the role of operators and parameters in implementing Genetic Algorithm.	**13**	4	L4
	OR			
14 (b)	Analyze the role of Genetic Algorithm in addressing the problem in classifying the time-series imageries.	**13**	4	L4
15 (a)	Justify why ANN are considered effective in object recognition for high-resolution remote sensing images.	**13**	5	L5
	OR			
15 (b)	Evaluate the significance of a Neuro-Fuzzy system in enhancing the accuracy of flood forecasting when integrated with GIS.	**13**	5	L5

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16	a) Evaluate how can Genetic Algorithms ensure optimal control point selection for image registration while balancing accuracy and computational efficiency?	**10**	5	L5
	b) Evaluate why Gaussian kernels are generally preferred for classifying rare forest species.	**5**	5	L5