Rajiv Gandhi University of Knowledge Technologies

(Telangana Government Act 8 of 2016)

Basar, Nirmal, Telangana State – 504107, India.

Computer Science and Engineering

Subject Name: Natural Computing **Subject Code: CS**

Year- Sem: E3-Sem2

Department: CSE

Faculty Name: R.Sindhuja

Lecture Plan

Unit-No	Topic Name	No. of Hours
1	Introduction to Natural Computing: Motivation	1
	three branches of natural computing, when to use natural computing approaches	1
	General concepts and terminology	1
	Evolutionary Computing: Evolutionary Biology, Principles of genetics	1
	Genetic Algorithm. Pattern recognition example	1
	Neurocomputing: Biological nervous system, Artificial Neural Networks- artificial neuron	2
	types of activation function, types of learning (supervised, unsupervised, reinforcement learning)	3
	learning laws, backpropagation	1
2	Swarm intelligence (Social Computing): Ant colonies	2
	Simple Ant Colony Optimization algorithm (S-ACO)	2
	Social Adaptation of Knowledge	1
	Particle swarm optimization algorithm	1
3	Immuno Computing: The immune system, An artificial immune system algorithm	2
	From natural to artificial immune systems, Scope of Artificial Immune Systems	2
	Particle Systems: Principles, basic model of particle systems	1
	pseudo code and examples	1
4	Fractal Geometry of Nature: Self similarity, fractal dimension, example fractals	2
4	Cellular Automata: Formal definition, one and two dimension cellular automata, Application-generating fractal patterns, scope.	3
	L-Systems: Generating words or strings, geometric interpretation, models of plant architecture, scope.	3

	Iterated Function Systems(IFS), Fractional Brownian Motion.	**1**
5	DNA Computing: The DNA molecule, manipulating DNA, Formal models, Universal DNA computers,	**3**
	of Classical vs DNA computing, Scope Quantum Computing: Principles quantum mechanics	**2**
5	qubit, dirac notation, blochsphere notation, quantum gates	**2**
	quantum parallelism, quantum circuit example – the swap circuit.	**2**
	TOTAL	**41**