



Course: M.Tech. (Electronics & Communication Engineering)	Name of Faculty: Mithun Haridas T.P.
Topic: 20-437- 0115 NEURAL NETWORKS	Semester: FIRST
Lecture Hall: MTech 1 st (Electronics & Communication)	Timings: as per CBCS, Slot E

<i>Week and date</i>	<i>Lecture topics</i>	<i>Assignments</i>	<i>Remarks</i>
Week 1	Module 1 : Introduction: Motivation from Human Brain, mathematical model of a neuron, basic computational unit, Activation Functions		
Week 2	Module 1: Neural networks viewed as Directed Graphs, Feedback, Network Architectures, Knowledge Representation.		
Week 3	Module 1: Learning Process–Supervised, Unsupervised and Reinforcement learning, Learning Tasks–Pattern Association, recognition, function approximation, control, beamforming.		
Week 4	Module 2: Perceptron: Perceptron convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment	Assignment-1	
Week 5	Module 2: batch perceptron algorithm. Model building through regression- linear regression model		
Week 6	Module 2: Cost Function, gradient descent algorithm, chain rule,	Assignment-1 submission	
Week 7	Module 2: optimization, Local minima, Global Minima, computer experiment: pattern classification. Least-Mean-Square Algorithm		
Week 8	Module 3: Multilayer Perceptron: <i>Batch learning and Online learning, Back propagation algorithm, XOR problem,</i>		
Week 9	Module 3: heuristics for making the back-propagation algorithm perform better, activation functions, differentiability,		
Week 10	Module 3: symmetric, feature scaling, initialization, stopping criteria, computer experiment: pattern classification.		
First Internals			

Week 11	Module 4: Learning: <i>back propagation and differentiation, Hessian matrix, optimal annealing and adaptive control of the learning rate</i>	Assignment-2	
Week 12	Module 4: <i>Approximations of function, Generalization, Cross validation</i>		
Week 13	Module 4: Network pruning Techniques, Virtues and limitations of back propagation learning.	Assignment-2 submission	
Week 14	Module 5: Kernel Methods and Radial-Basis Function networks: Cover's theorem on the separability of patterns, the interpolation problem		
Week 15	Module 5: radial-basis-function networks, k-means clustering, recursive least-squares estimation of the weight vector		
	Second Internals		
Week 16	Module 5: <i>hybrid learning procedure for RBF networks, computer experiment: pattern classification, interpretations of the Gaussian hidden units.</i>	Publication of Sessional	