SUBJECT NO-EC61409, SUBJECT NAME- NEURAL NETWORKS AND APPLICATIONS

LTP- 3-0-0,CRD- 3

SYLLABUS :-

Pre-requisites: NoneIntroduction to neural networks: Human brain and models of a neuron, artificial neurons and activation functions; Learning processes: Error correcting learning, memory-based learning, Hebbian learning, competitive learning, Boltzman learning; Single-layer perceptrons: Unconstrained optimization, LMS algorithm, learning curves, perceptrons, convergence theorem, limitations of single-layer perceptrons; Multi-layerperceptrons: Back-propagation algorithm, XOR problem, feature detection, accelerated convergence of back-propagation algorithm, limitations; Radial Basis function networks: CoverÃ¢ÂÂs theorem on separability of patterns, interpolation problem, regularization theory and regularization networks, generalized RBF, approximation properties of RBF, comparison of RBF and back-propagation; Support Vector machines: Optimal hyperplanes for linearly and nonlinearly separable patterns, SVM for pattern classification, SVM for nonlinear regression; Principal Components Analysis: Intuitive principles of self-organization, Hebbian based PCA, Adaptive PCA using lateral inhibition, batch and adaptive methods of computation, kernel based PCA; Self- Organizing maps: Feature mapping models, SOM algorithm, learning vector quantization, adaptive vector quantization; Stochastic machines: Statistical mechanics, Markov chains, Simulated annealing, Gibbs sampling, Boltzman machine, Sigmoid belief networks, Helmhotz machine and their deterministic versions.