Course Name (English)	ARTIFICIAL NEURAL NETWORK APPROVED
Course Code	ECE661

MQF Credit	3

Course Description	This course provides introductions to various aspects of artificial neural network, with emphasis on elements of design of trainable systems. Topics include linear and nonlinear neurons, multilayer networks, backpropagation algorithms, unsupervised learning algorithms, advanced neural network architectures and training algorithms. Theories and real world applications will be covered.

Transferable Skills	Artificial Intelligence

Teaching Methodologies	Lectures, Blended Learning, Lab Work, Tutorial, Presentation

CLO		
	CLO1	Describe the basic knowledge, learning methods and problem solving using ANN
	CLO2	Apply ANN techniques for related engineering application.
	CLO3	Implement and develop ANN approaches for real-time application

Pre-Requisite Courses	No course recommendations

Topics
1. Introduction to Neuron Model and Network Architectures 1.1) Artificial Intelligence 1.2) The Human Brain 1.3) MATLAB Fundamentals
2. Perceptron Learning Rule 2.1) The Single Layer Perceptron (SLP)
3. Single Layer & Multi-Layer Perceptrons 3.1) The Single Layer Perceptron (SLP) 3.2) The Multi-Layer Perceptron (MLP)
4. Backpropagation & Variants of Backpropagation 4.1) Backpropagation & Variants of Backpropagation
5. Associative Networks 5.1) Pattern Classification using MLP
6. Radial Basis Function Neural Networks 6.1) Radial Basis Function Neural Networks
7. Statistical Perspectives of Neural Networks 7.1) MLP for Pattern Classification + Statistical Validation 7.2) MLP for Function Approximation + Statistical Validation
8. Miniproject Presentation 8.1) n/a

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment on backpropagation algorithm.	6%	CLO2 , CLO3
	Assignment	Concepts of ANN. Areas of application for ANN	7%	CLO1
	Assignment	Assignment on SLP and MLP	7%	CLO2 , CLO3
	Test	Test on ANN concepts, SLP and MLP	15%	CLO1 , CLO2
	Test	Test on Backpropagation algorithm and ANN testing methods.	15%	CLO1 , CLO2

Reading List	Recommended Text	• **Muller 1995**, *Neural Networks: An Introduction*, **2 Ed., SPV**
	Reference Book Resources	• **Adami 1998**, *Introduction to Artificial Life*, **SPV**
		• **Allen 1995**, *Neural Language Understanding*, **2 Ed., B'Jamin**
		• **Laughey 1996**, *Elements of Machine Learning*, **MIE**
		• **Rich 1991**, *Artificial Intelligence*, **2 Ed., MCG**
		• **Schalkoff 1990**, *Artificial Intelligence: An Engineering Approach*, **McGraw-Hill College**
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	