

CC 524 – NEURAL NETWORKS

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2.

TEXT BOOK

- Simon Haykin, “Neural Networks: A Comprehensive Foundation”, Prentice Hall, latest edition.
- MATLAB neural networks toolbox, user guide, latest version.

COURSE DESCRIPTION

Introduction to basic concepts of neural networks. The basic neuron. The multilayer perceptron. Artificial neural networks: applications, learning, and architecture. Competitive neural networks. Kohonen self-organizing networks. Adaptive reasoning theory (ART). Hopfield neural networks. Neural networks implementation. Neural networks applications.

Introduction to MATLAB environment. Single perceptron, Multilayer perceptron, Competitive networks, Kohonen networks, ART networks, And Hopfield networks using MATLAB.

PREREQUISITE:

CC 112 – BA 323

RELATION OF COURSE TO PROGRAM

COURSE INSTRUCTION OUTCOMES

The student will be able to:

- Explain the basic concepts of neural networks.
- Discuss a wide variety of neural networks with architecture, training, algorithms, and applications.

Demonstrate the architecture, training, and applications of a wide variety of neural networks using MATLAB simulation package.

TOPICS COVERED

- Introduction to basic concepts of neural networks.
- The basic neuron.
- The multilayer perceptron.
- Artificial neural networks: applications, learning rules, and architecture.
- Competitive neural networks.
- Kohonen self-organizing networks.
- Adaptive reasoning theory (ART) – part 1.

- Adaptive reasoning theory (ART) – part 2.
- Hopfield neural networks.
- Neural networks implementation.
- Neural networks applications – part 1.
- Neural networks applications – part 2.
- Neural networks applications – part 3.
- Neural networks applications – part 4.
- Neural networks applications – part 5.

CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:

Professional component Content			
Math and Basic Sciences	Engineering Topics	General Education	Other
	✓		

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course aspects
A	An ability to apply knowledge of mathematics, science, and engineering	a ₁ a ₂
B	An ability to design and conduct experiments, analyze and interpret data.	b ₁ b ₂ b ₃ b ₄
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	c ₁ c ₂ c ₃
D	An ability to function on multi-disciplinary teams.	
E	An ability to identify, formulate, and solve engineering problems	e ₁ e ₂ e ₃
F	An understanding of professional and ethical responsibility	
G	An ability to communicate effectively	
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social content	
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	
k	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	k