NE264- SCIENTIFIC THINKING

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 4 Hrs.

TEXT BOOK

Abdel-Moneim Hassan, Scientific Thinking

COURSE DESCRIPTION

Nature and postulates of scientific thinking, Evolution of scientific thinking, Mythical thinking, Metaphysical thinking, Superstition, Definition of Science, differences between sciences, pseudo–science and non science, characteristics of scientific thinking, Postulates of science, Objectives of science, The thinking processes, Incomplete & complete inductive reasoning mathematical induction, The meaning of mathematical sciences, Methods of Reasoning in Natural Sciences, Defining Experimentation, The difference between experimentation & observation, Defining Problem solving, The difference – reduction method, Means – Ends analysis method, Defining creative thinking and Components of creative thinking, Decision making.

PREREQUISITE:

None

RELATION OF COURSE TO PROGRAM

Required

COURSE INSTRUCTION OUTCOMES

The student will be able to:

learn to define science use reasoning skills such as, analysis, synthesis, including, deducing, increasing, apply the methods science to solve problems, use creative thinking skills in real situations

TOPICS COVERED

- Thinking Patterns Development.
- Meaning & Construction of Science; Scientific Values & Directions.
- Science, non-science & other-than science. Engineering & Technology.
- Properties of science & the thinking processes.
- Objectives of science & postulates of scientific thinking.
- Mental operations used in science, scientific guessing methods of reasoning in mathematics.
- Types of deductions & the 7th week exam.
- Methods of reasoning in Natural sciences.
- Research methods in natural sciences.

- Experiments & Observations; Scientific postulates & their conditions Creative thinking.
- Verification of scientific postulates.
- Flexibility & originality.
- Creative thinking, fluency types.
- Basics of brainstorming; methods of decision making.

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	
B	An ability to design and conduct experiments, analyze and interpret data.	
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	
D	An ability to function on multi-disciplinary teams.	
E	An ability to identify, formulate, and solve engineering problems	
F	An understanding of professional and ethical responsibility	f_1 f_2
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	h_1 h_2 h_3 h_4
I	A recognition of the need for, and an ability to engage in life-long learning.	i_1 i_2 i_3 i_4
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.	