

NE264- Scientific Thinking

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2;

COURSE COORDINATOR

Prof. Samir Youssef

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 is able to define science using reasoning skills such as; analysis and synthesis. He/She is able to apply the methods science to solve problems and use creative thinking skills in real situations.

TOPICS COVERED:

Thinking Patterns Development - Nature and postulates of scientific thinking - Meaning and objective of Science - Scientific values and directions - Science, non-science and other-than science - Engineering and Technology - Properties of science - Mental operations used in science and Scientific Guessing - Types of deductions and Representation - Research methods in natural sciences: definitions, Experiments, Observations, Scientific postulates and their conditions - Verification of scientific

postulates - General methods of problems solving - Creative and critical Thinking - Fluency types – Flexibility - Originality and Basics of Brain Storming.

CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:

Professional Component Content			
Math and Basic Sciences	Engineering Topics	General Education	Engineering Design
		✓	

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course Outcomes
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 economic, 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.	
g.	An ability to communicate effectively.	✓
h.	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal 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.	