

EE 321- Electrical Machines (1)

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2; Lab: 2

COURSE COORDINATOR

Dr Noha El Amary

TEXT BOOK:

B. S. Guru, "Electric Machinery and Transformers", Oxford Uni. Press, 2001

COURSE DESCRIPTION:

Definition of the magnetic terms. Magnetic materials and the B-H curve. Magnetic circuits principles. Electromechanical energy conversion principles. Force and torque equations in magnetic circuits. Construction of a DC machine. EMF and torque equations in dc machines. Armature windings and commutator design. Armature reaction and compensation techniques. Self excitation of dc generators. External characteristics of dc generators. Kinds of losses and efficiency of dc machine. Torque and speed characteristics of dc motor. Speed control of dc motor. Starting of dc motors. DC motor electrical braking technique.

PREREQUISITE:

EE232

RELATION OF COURSE TO PROGRAM:

Required

COURSE INSTRUCTION OUTCOMES:

The student gains detailed skills related to the subject of electromechanical energy conversion principles and the principles of operation of DC machines both in generator and motor action.

TOPICS COVERED:

- Magnetic terms, materials, B-H curves, magnetic circuit principles.
- Electromechanical energy conversion principles and force and torque equations in the magnetic circuits.
- Construction and EMF and Torque equations of the DC Machines.
- Kinds of losses and efficiency of dc machines.

- Armature winding and commutator design and Armature reaction and compensation techniques.
- Self excitation and external characteristics of dc generators
- Torque and speed characteristics of dc motor and Speed control.
- Starting and electrical braking technique of dc motors.

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.	