

EE 422 – Electrical Machines (3)

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2; Lab: 2

COURSE COORDINATOR

Dr Noha El Amary

TEXT BOOK:

P.C. Sen, “Principles of Electrical Machines and Power Electronics”, John Wiley

COURSE DESCRIPTION:

Principle of synchronous machines. Construction and emf equivalent circuit. Phasor diagram for motor generator. Power equation. Electrical load diagram and V-curves. Parallel operation, starting and synchronization. Voltage regulation. Effect of saliency. Three-phase transformer; polarity and standard terminal marking, inrush current, three-phase connections, open–delta connection. Three-windings transformer; Tap changer. Phase conversion (3-phase/2-phase and 3-phase/6-phase), parallel operation. Current transformer.

PREREQUISITE:

EE 322

RELATION OF COURSE TO PROGRAM:

Required

COURSE INSTRUCTION OUTCOMES:

The student gains detailed skills related to the subject of three phase transformers and synchronous machines.

TOPICS COVERED:

- Principle of synchronous machines, construction and emf-equivalent circuit
- Phasor diagram for motor generator, power equation, electrical load diagram and V- curves.
- Parallel operation starting and synchronization.
- Voltage regulation and effect of saliency
- Three-phase transformer, polarity and standard terminal marking inrush current transformer.
- Three-phase connections, open–delta connection, three windings transformer-tap changer and phase conversion (3-phase/2-phase and 3-phase/6-phase).

- Parallel operation.
- Current transforme

CONTRIBUTION OF COURSE TO MEET THE REQUIREMSNTS 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.	