

## **EE328 – ELECTRICAL POWER AND MACHINES**

### **CREDIT HOURS**

3 Hours

### **CONTACT HOURS (Hours/week)**

Lecture: 2; Tutorial: 2; Lab: 2

### **TEXT BOOK**

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

### **COURSE DESCRIPTION**

Magnetic circuits and their basic relations. Core loss and transformer basic. Transformer model and voltage regulation. Transformer rating and testing. The law of motor and generator action – construction of dc machines. DC motors characteristics and applications. DC generators characteristics and applications . AC rotating fields and theory of 3-phase induction machines. Circuit model and variable speed drives . Synchronous generators. Single-phase and small motors. The electric power system and energy sources. Pollution problems and plant distribution systems. Switches and circuit breakers – system voltage. System protection and power factor correction.

### **PREREQUISITE:**

EE 232

### **RELATION OF COURSE TO PROGRAM**

Required

### **COURSE INSTRUCTION OUTCOMES**

The student will be able to:

- investigate the different stages of power system generation and distribution.
- study the basic concepts of transformers and 3-phase motors.
- study the basic of power generation and single-phase and dc machines

### **TOPICS COVERED**

- Revision on electric and magnetic circuits.
- The law of motor and generator action.
- DC Motors.
- DC Generators.
- Core Loss and transformer basics.
- Transformer model and regulation.
- Transformer ratings and testing.
- AC rotating field.
- 3-phase induction motor.

- Synchronous machines.
- Single phase and small motors.
- Electric power system.
- Plant distribution system.
- Protective devices and distribution of electricity in buildings.
- System protection & PF correction.

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:**

<b>Professional component Content</b>			
<b>Math and Basic Sciences</b>	<b>Engineering Topics</b>	<b>General Education</b>	<b>Other</b>
	✓		

**RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:**

<b>Student Outcomes</b>		<b>Course aspects</b>
A	An ability to apply knowledge of mathematics, science, and engineering	a <sub>1</sub> a <sub>2</sub>
B	An ability to design and conduct experiments, analyze and interpret data.	b <sub>1</sub> b <sub>2</sub> b <sub>3</sub> b <sub>4</sub>
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	
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.	