Course Number and Name

BEE012 & Solid State Relays

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Mrs.V.Sumathi

Course Description

- To educate the basic concepts and new developments in solid state relays and power system protection
- To educate the theory and applications of the main components used in power system protection for electric machines, transformers, bus bars, overhead and underground feeders.

Prerequisites	Co-requisites
Basic Electrical & Electronics Engg	Nil

required, elective, or selected elective (as per Table 5-1)

Required

Course Outcomes (COs)

CO1 :Gain Knowledge On Different Protective Equipment's Or Power Relays, Know About Various Protective Systems- How It Works And Where It Works?

CO2 : Different Applications Of The Relays, Circuit Breakers, Grounding For Different Elements Of Power System Is Also Discussed In The Subject.

CO3: Ability To Understand Various Power, Frequency And Impedance Relays

CO4: Ability To Understand Protective Schemes ,Transient Behavior ,Testing And Tripping Schemes

CO5: Ability To Understand Relays Using Microprocessor

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	H	H	H	L	M	L	M	M		H
CO2	M	M	H	M	H	M	L	H	H	H	H	H
CO3	M	H	H	L	H	M	M	M	M	L	L	H
CO4	L	L	H	H	M	L	L	M	M	M	M	M
CO5	H	H	L	L	M	M	M	M	M	M	M	M

List of Topics Covered

UNIT I INTRODUCTION OF RELAYS 9

Comparators: phase and amplitude comparators-types-Direct and integrating rectifier bridge, circulating current, opposed voltage coincident type phase comparator-Direct or block spike phase comparator, phase splitting technique, integrating type phase comparator with transistor AND gate, hybrid comparator with transistor AND gate. Hybrid comparator- Hall effect type and magneto resistivity type, vector product type - zener diode phase comparators-Multi input-Three input coincidence comparators

UNIT II RELAY CIRCUIT 9

Static relay circuit (using analog and digital ic's) for over current, inverse time characteristics, differential relay.

UNIT III RELAY CIRCUIT 9

Static relay circuits fort generator loss of field, under frequency, distance relay, impedance, reactance, reverse power relays.

UNIT IV TRANSIENT BEHAVIOR OF RELAYS 9

Static relay circuits for carrier current protection-steady state and transient behavior of static relay-testing and maintenance - tripping circuits using thyristors.

UNIT V MICROPROCESSOR BASED RELAYS 9

Microprocessor based relays: hardware and software for the measurement of voltage, current, frequency, phase angle-microprocessor implementation of over current relays-inverse time characteristics-impedance relay-directional relay-mho relay.