

Course Number and Name												
BEE053 & Power System Protection and Switchgear												
Credits and Contact Hours												
3 & 45												
Course Coordinator's Name												
Mr.D.Purushothaman												
Text Books and References												
Text Book:												
1. Sunil S. Rao. 'Switchgear and Protection', Khanna publisher, New Delhi. 1986												
2. C.L Wadhwa, 'Electrical Power System', Wiley eastern Ltd, New Delhi 1983.												
3. Ravindranath & M. Chandar, "Protection & switch gear" New Age International.												
Reference Book:												
1. S L Uppal. 'ELECTRICAL POWER', Khanna publishers. New Delhi. 1981												
2. Son Bhatnagar & Gupta, 'A course in electrical power', Dhanpat Rai & Sons, New Delhi, 1976												
3. B Ravindranath N chander, 'Power system protection and switch gear'. Wiley eastern Ltd, NEW Delhi, 1997												
4. http://www.nptel.ac.in/downloads/108101039/												
Course Description												
To develop an ability and skill to design the feasible protection systems needed for each main part of a power system in students.												
Prerequisites						Co-requisites						
Transmission & Distribution, Power System Analysis						Nil						
required, elective, or selected elective (as per Table 5-1)												
Required												
Course Outcomes (COs)												
CO1: Understand the basic concepts of power system protection and relays.												
CO2: Design the relevant protection systems for the main elements of a power system.												
CO3: Understand the theory of arcing phenomenon.												
CO4: Analyze the purpose and working principle of different circuit breakers and tests.												
CO5: Understand the overvoltage protection methods.												
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	M	H	H	M	L	M	L	H	M	L	M
CO2	H	M	H	H	M	L	M	L	H	M	L	M
CO3	H	M	H	H	M	M	M	L	H	M	L	M
CO4	H	M	H	H	M	M	M	M	H	M	L	M

CO5	H	M	H	H	M	M	M	M	H	M	L	M
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List of Topics Covered

UNIT I PROTECTIVE RELAYS 9

Relay construction and characteristics-over current relays - Directional over current relays Directional relays-Differential relays-COMPARATORS-Under frequency and negative sequence relays-Electromagnetic and solid relay comparison.

UNIT II APPARATUS PROTECTION 9

Protection of generator &-transformer protection-Bus zone protection-Feeder protection carrier current scheme for transmission line-Relay co-ordination for a sample system- Substation layout and arrangement of equipment's.

UNIT III THEORY OF ARC QUENCHING 9

Arcing phenomena- Theory and methods of arc quenching- Circuit interruption in AC circuits- Recovery voltage- Restriking voltage- Resistance switching- Current chopping- Capacitive breaking characteristics of fuses and HRC fuses- DC circuit breaking.

UNIT IV CIRCUIT BREAKERS 9

Fault clearing process- Classification of circuit breakers- Construction and operation of circuit breakers- Oil minimum circuit breakers-air blast circuit breaker- Vacuum circuit breaker-SF₆, circuit breaker- Circuit breaker rating- Circuit breaker testing.

UNIT V OVER VOLTAGE PROTECTION 9

Cause for over voltages- Lighting surges insulation failure and arcing grounds- Method of protection- ground wires, Peteron coils, surge absorbers and diverters- location of protective apparatus- Insulation co-ordination- neutral earthing.