

13EE4115-SWITCHGEAR AND PROTECTION

(EEE)

Lectures/Week: 4Hrs.
End Exam Duration: 3Hrs

Credits: 4
Sessional Marks: 40
End Exam Marks: 60

UNIT-I

OVER VOLTAGE PROTECTION: causes of overvoltages – Phenomena of lightning – silicon carbide & gap arresters-protection against direct lightning strokes & traveling waves. Protection of power station & substation from direct lightning strokes- Insulation coordination

UNIT-II

FUSES: Definitions - characteristics - selection of fuses, types of fuses and applications.

CIRCUIT BREAKERS: Arc phenomena - initiation & maintenance of arc – methods of arc interruption- Terms associated with CBs – Expression for RRRV – Resistance switching – Single frequency transients – Double frequency Transients – Current Chopping – Interruption of capacitive currents.

UNIT-III

CLASSIFICATION OF CIRCUIT BREAKERS: Principle of operation & constructional features of oil - air blast - SF_6 & vacuum CB's- Ratings of CB's – Testing of CB's - Auto reclosing.

PROTECTIVE RELAYS: Basic idea – essential qualities of protection – principle of operation of protective schemes.

UNIT-IV

TYPES OF RELAYS: Types of Electromagnetic relays – over current, directional and non-directional, earth fault, distance, negative sequence, differential and under frequency relays-applications.

STATIC RELAYS: Basic static relays used in protective scheme – classification-over current - differential protection. Comparators – Amplitude & phase comparators – Duality.

UNIT-V

EQUIPMENT PROTECTION: Main considerations in apparatus protection - transformer protection, generator protection, protection of bus bars, Feeder protection -Transmission line protection - zones of protection. CTs and PTs and their applications in protection schemes.

TEXT BOOKS:

- 1."Power system protection and Switchgear" by Badriram & D.N.Viswakarma, TMH publishing company Ltd.
2. "Electrical Power systems" by C.L. Wadhwa, Wiley Eastern Ltd.
3. "A Course in Power systems" by J.B Gupta, S.K.Kataria & Sons

REFERENCES:

1. "Switchgear & Protection " by Sunil S Rao, Khanna Publishers.
2. "Power System Protection & Switchgear" by B.Ravindranath &M.Chander, Wiley Eastern Limited.
3. "Electrical Power " by S.L. Uppal., Khanna Publishers.