Course Code EPE-812	Credit Hours (Th-Pr) 3-0	**Advanced Power System Protection (Elective)**	Contact Hrs/Week (Th-Pr) 3-0	Total Contact Hrs (Th-Pr) 45-0

Course Outline:

Topics include analysis and characterization of different types of Power System faults both symmetrical and asymmetrical ,Fault Current Measurement and Control, Protective Devices design considerations, Protective Devices characteristics, Relay Logics, Impedance and admittance at the relays, introduction to advance protection concepts ,Fault protection of radial distribution feeders, differential protection, transmission lines protection, analysis of distance protection , Apparatus protection , Transformer generator and motor protection, Protection against abnormal system frequency, Protective schemes for stability enhancement, Lightning Protection, SF6 Circuit Breakers, Fuses and Switch Gears

Eligibility Criteria:

B.E (Electrical Engineering)

Recommended Books:

S. No.	Title	Author(s)	Assigned Code	Remarks
1	Power System Protection	P. M. Anderson	PM	Text
2	Fundamentals of Power System Protection	Y.G. Paithankar	YP	Text
3	Protective Relaying: Principles and Applications	J. Lewis Blackburn	JL	Reference
4	Modern Solutions for protection, control and monitoring of power systems	Hector J.Altuve	HJ	Reference
5	Modern Power System Protection	J. B. Ekanayake	JB	Reference
6	Electrical Power systems	C L Wadhwa	CW	Reference

Course Objectives:

The primary objectives of this course are to familiarize students with different protective devices used for the protection of power system equipment and enable them to develop and implement different relay logics for secure and reliable operation of power system

Learning outcome:

At the end of the course, students will ::

- Have adequate knowledge in the field of power system protection, circuit breakers, and instrument transformers
- Be able to understand the programming and operation of digital relays
- Be able to design the relevant protection systems for the main elements of a power system.
- Demonstrate an ability to participate in professional multidisciplinary teams

Topics Covered:

S No	Topics	Text Book	Allocated Periods
1.	Characterization of different types of Power System faults both symmetrical and asymmetrical, Fault Current Measurement and Control	PM & YP	5
2.	Determination of system voltages produced by traveling wave surges. Insulation coordination, Causes of over voltages. Propagation of surges, Protection against lighting. Surge arrestors and directors. Interference with Communication circuits	PM & YP	4
3.	.Protective Devices design considerations, Protective Devices characteristics, Relay Logics, Impedance and admittance at the relays, introduction to advance protection concepts ,Fault protection of radial distribution feeders, differential protection, transmission lines protection	PM & YP	5

4	Over current, impedance, instantaneous, Pilot and time relays. Electromechanical, static and microprocessor based relays. Instrument transformers. Protection schemes; over current, earth fault, differential and distance relaying	PM & YP	6
5	Review of short circuit calculations. Working, types, and application of Reactors and Fuses.	PM & YP	8
6	Initiation of arc, recovery voltage and restricting voltage in circuit breakers. Construction, working and types of circuit breakers. Trip circuit. Auto reclosing. Isolators.	PM & YP	8
8	Transformer generator and motor protection, Protection against abnormal system frequency	PM & YP	9