Electrical distribution systems

Text books:
1) Electrical distribution systems by turan gonen,
2) electrical power distribution by A.S Pabla.

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FIGURE 1-1
Typical Electric Power Generation, Transmission, and Distribution System
This subject deals with

- 1) GENERAL CONCEPTS.
- 2) DISTRIBUTION FEEDERS.
- 3) SUBSTATIONS.
- 4) SYSTEM ANALYSIS.
- 5) PROTECTION.
- 6) COORDINATION.
- 7) COMPENSATION FOR POWER FACTOR IMPROVEMENT.
- 8) VOLTAGE CONTROL.
1) GENERAL CONCEPTS.

- Load modelling and characteristics.
- Coincidence factor.
- Contribution factor.
- Loss factor - Relationship between the load factor and loss factor.
- Coincidence factor.
- Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.
DISTRIBUTION FEEDERS

- Design Considerations
- Voltage levels.
- Feeder loading.
- Basic design practice of the secondary distribution system.
Benefits derived through optimal location of substations

Rating of distribution substation
SYSTEM ANALYSIS

- Voltage drop and power-loss calculations
- Derivation for voltage drop and power loss in lines
- Three phase balanced primary lines.
PROTECTION

- Objectives
  - Distribution system protection.
  - Types of common faults and procedure for fault calculations.
  - Protective Devices
  - Principle of operation of Fuses.
  - Circuit Reclosures.
  - Line sectionalizes.
  - Circuit breakers.
COORDINATION

- Coordination of Protective Devices.
- General coordination procedure.
COMPENSATION FOR POWER FACTOR IMPROVEMENT

- Power factor correction.

- Capacitor allocation – Economic justification – Procedure to determine the best capacitor location.

- Capacitive compensation for power-factor control.

- Different types of power capacitors.
  - Shunt and series capacitors.
  - Effect of shunt capacitors (Fixed and switched)
Contd..

- Power factor correction, capacitor allocation – Economic justification – Procedure to determine the best capacitor location.
Voltage Control

- Equipment for voltage control.
- Effect of series capacitors.
- Effect of AVB/AVR.
- Line drop compensation
Objectives

- To improve performance.
- Design and Planning.
- Better Operation and maintenance.
- To reduce transmission losses.
- To improve system efficiency.
- Improve quality of power to customer.
- Load modelling, better load dispatch
- Load growth calculation in service areas
- Load forecasting.
- Automation development.
- Protection of whole system etc...
Questions ????
Thank you