High Voltage Engineering and Power System Protection — ECE 464

Winter 2014 term, taught by Prof. S. Jayaram
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All reference materials used in this course will be posted on the course web site on LEARN.
Course Description

Part A – Generation and Measurements
- Introduction to High Voltage Engineering
- Generation of AC, DC and Impulse Voltages
- Measurement of AC, DC and Impulse Voltages

Part B – Basics of Electrical Insulating Materials
- Charge carriers and conduction mechanisms
- Internal and Surface Discharges
- Breakdown and Failure Mechanisms

Part C – Insulation Coordination and System Protection
- Overvoltages and insulation coordination
- Over-voltage Protection
- Over-current Protection
- Relay Coordination
Laboratory Studies

Lab 1: Generation and Measurements of AC, DC Voltages

Lab 2: Generation and Measurements Impulse Voltages

Lab 3: Breakdown, Flashover and Surface Discharges

Lab 4: Introduction to Protection Equipment

Lab 5: Overcurrent Protection and Relay Coordination

Simulation Lab: Studies on power system protection using ETAP program.
High Voltage Testing Facilities

Twin-Blade Bridge and Standard Capacitor

150 kV Partial Discharge Generator

Inclined Plane Test Set

Salt/Glaze Fog Chamber

400 kV AC Test Transformer

300 kV Bipolar DC Test Set

600 kV/30 kJ Impulse Generator

38 kV Test/High Repetition Rate Impulse Modulator

30 kV Test/High Repetition Rate Impulse Modulator

15 kV Square and SPWM Waveform Generator

Superimposed Square + High Frequency Square Set

800 kV/40 kJ Impulse

Laser Set

Infrared Camera

Function Generator

Amplifier

System Electrometer

Null Detector

Corona Detection Camera

RLC Meter

Oscilloscope