E4 238 Jan 3:0

Advanced Power System Protection

Instructor

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Teaching Assistant

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Department: Electrical Engineering

Course Time: Tue, Thu 2 - 3:30 pm

Lecture venue: EE B308

Detailed Course Page: http://www.ee.iisc.ac.in/academics-courseprograms-details.php

Announcements

Brief description of the course

Both research and course students working in the area of power systems can take this course. This course

discusses the advanced techniques which are used for protecting power system network and equipment. The

topics are mostly selected from IEEE and CIGRE standards.

Prerequisites

Familiarity with basics of power system protection

Syllabus

Overview of over-current, directional, distance and differential, out-of-step; protection and fault studies;

Service conditions and ratings of relays; Impact of CVT transients on protection; Current Transformer:

accuracy classes, dynamic characteristics, impact and detection of saturation, choice for an application; Circuit

Breaker: need for breaker failure protection, breaker failure protection schemes, design considerations for

breaker failure protection; Transmission line protection: issues and influencing factors, definitions of short,

medium and long lines using SIR, protection schemes, fault location identification techniques; Transformer

protection: issues, differential protection of auto-transformers, two-winding, three-winding transformers,

impact of inrush and over-excitation, application of negative sequence differential, protection issues in 'modern' transformers; Generator protection: issues, generating station arrangements, groundings, protection schemes; Bus protection: issues, bus configurations, protection zones, protection schemes; Overview of HVDC protection systems; Protection scheme for distributed generators (DGs); Special Protection Schemes (SPS); Power system protection testing; Common Format for Transient Data Exchange (COMTRADE), Communication architecture for substation automation; Basics of synchrophasor based Wide Area Monitoring Systems (WAMS);

Course outcomes

This course mostly use IEEE and CIGRE standards to teach advanced topics of power system protection. As a result, students will be familiar with the industrial practices.

Grading policy

40% for Final Exam, 15% for Mid-term, 30% for Projects, 15% for Assignments

Assignments

Resources