

EEE 470 Electric Power Devices (3) [F]

Course (Catalog) Description:

Analyzes devices used for short circuit protection, including circuit breakers, relays, and current and voltage transducers. Protection against switching and lightning over voltages. Insulation coordination.

Lecture. Technical Elective

Prerequisite:

EEE 360.

Textbook:

J.D. Glover, M. Sarma, T. J. Overbye, *Power System Analysis & Design*, 5th Edition, Thomson Learning, 2008, ISBN 13: 978-1-111-42577-7 (includes all course software).

Supplemental Material:

Blackboard: EEE470/591, Power System Devices.

Coordinator:

V. Vittal, Professor

Prerequisites by Topic:

1. Three-phase system and phasor analysis
2. Power system components
3. Mesh and node equations
4. Computer programming (Fortran)

Course Objective:

1. Students are familiar with power system devices and have basic skills for power-system protection

Course Outcome:

1. Students are familiar with power system devices and have basic skills for the analysis and application of power-system protection including proficiency in the application of software for power-system modeling and fault analysis

Course Topics:

1. AC circuit and power system fundamentals (2 classes)
2. Principles of symmetrical components (4 classes)
3. Analysis of unsymmetrical faults (4 classes)
4. Transient analysis of symmetrical faults (2 classes)
5. System protection components (4 classes)
6. System relaying principles (4 classes)
7. Principles of power system transients (4 classes)
8. Insulation coordination for power systems transient protection (3 classes)

Computer Usage:

A project requiring the use of fault analysis software.

Laboratory Experiments: None.

Course Contribution to Engineering Science and Design:

The course involves an extensive project where the students receive a power system computer model consisting of transmission and sub-transmission systems. The students develop three types of fault-protection systems and determine the appropriate settings using short circuit software.

Course Relationship to Program Outcomes:

The project trains the students to develop models appropriate to a given problem using assumptions, estimates, and approximations guided by sound engineering judgement (**a,c**). The homework assignments help the students identify, formulate, and solve engineering problems (**e,k**). The lectures prepare the students to understand the mathematics and physics necessary to solve a broad range of power-system problems (**a**).

Person preparing this description and date of preparation: Vijay Vittal, February 20015