ECE 611: Electrical Transients in Power Systems

Description: Transient performance of power systems with lumped properties, interruption of arcs, restriking voltage, re-ignition inertia effects, switching of rotational systems, magnetic saturation in stationary networks, harmonic oscillations, saturated systems, transient performance of synchronous machines, corona, lightning, and ground potential rise. Additionally, we will reference global regulatory and industrial product compliance standards for actual product requirements related to transient suppression and control.

Prerequisite: All Engineering Graduate Students are encouraged to take this course

Instructor: Don Gies, Adjunct Professor
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Classroom: FMH 409, Time: Tuesday 6:00PM-9:00PM

Office hours: By appointment


Topics:
- Introduction and Transient Fundamentals
- Switching Transients
- Damping
- Abnormal Switching Transients
- Transients in Three-Phase Circuits
- Transients in DC Circuits, Conversion Equipment and Static VAR Control
- Electromagnetic Phenomena of Importance Under Transients Conditions
- Traveling Waves and Other Transients on Transmission Lines
- Principles of Transient Modeling of Power Systems and Components
- Modeling Power Apparatus
- Component Parameter Values for Use in Transient Calculations
- Lightning
- Insulation Coordination
- Protection of Systems and Equipment Against Transient Overvoltages
- Corona

In addition, transient requirements or recommendations from the following organizations may be referenced in class:
- National Fire Protection Association (NFPA), including the National Electrical Code
- International Electrotechnical Commission (IEC)
- Underwriters Laboratories (UL)
- Federal Communication Commission (FCC)
- Telcordia
- IEEE

References: The following may be referenced for further information:

**Course Policy:**
- Homework/quizzes-30, Midterm-30, Final-40 (paper on selected topic).
- Homework must be submitted before lecture starts.

**Class Rules:**
- No food or drink is allowed in the Lecture or Lab Rooms.
- Arrive to class on time.
- Silence or turn off cell phones prior to arrival at class. Use of cell phones during class is forbidden.
- Participate! This class should be interactive.

**Honor code:**
- All students are expected to follow the NJIT Honor Code in this course. This includes pledging all homework assignments, mid-term and final exams.