1. ECE 4300: Electrical Power Systems
2. Credit Hours: 3; Contact Hours: 3
3. Johnson Asumadu, PhD, Professor
5. Scientific calculator.
6. Course Information
   1. Transmission lines, network analysis, load flow, system faults, fault calculation, transients, and system stability.
   2. Prerequisites: ECE 3300
   3. Required
7. Course Goals:
   1. ABET student outcome assigned to this course according to ECE Assessment Plan: e and j.
   2. to analyze steady-state AC, balanced, three-phase circuits (a, e, i);
   3. to develop distributed resistance, inductance and capacitance models for conductors, cables and bundled cables for single-phase and three-phase transmission lines (a, c, e, i);
   4. to compute transmission line voltage regulation and transmission efficiency vs. loading (a, e);
   5. to design reactive compensation circuitry for voltage control (a, c, e);
   6. to develop one-line diagrams, circuit models for major power system components, i.e., three-phase generators, transformers, lines and equivalent loads (a, c, e, k);
   7. to use per-unit notation for system analysis and design (a, c, e);
   8. to reformulate and use for analysis the network equations in terms of the system bus admittance and impedance matrix (a, c, e, k);
   9. to develop the non-linear “load flow” equations and solve using numerical analysis (a, c, e, k)
10. to use “load flow” analysis for system voltage control and power flow (a, c, e, h, i, j, k);
11. to develop and use for circuit breaker and fuse selection, the sub-transient, transient and steady-state model for symmetrical three-phase short circuits (a, c, e, k);
12. to develop and analyze system models in terms of symmetrical components for unbalanced faults and selection of protective devices (a, c, e, i, k);
8. Course Topics
   1. Review, single and three-phase AC circuits, steady-state (2 classes)
   2. Transmission lines, distributed resistance, inductance and capacitance (6 classes)
   3. Line models, performance and compensation (4 classes)
   4. Generator and transformer models and per-unit notation (6 classes)
   5. System modeling and network calculations (5 classes)
   6. System power flow analysis (5 classes)
   7. Transients and symmetrical three-phase faults (5 classes)
   8. Symmetrical components and unsymmetrical faults. (4 classes)