University of Wisconsin - Madison
College of Engineering [EGR]
Last Offered: 2015-2016 Fall [1162]
Direct Link to this Syllabus:
http://aefis.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=442&pdf=True

1. E C E 427, Electric Power Systems
2. Credits: 3  Contact Hours: 3.0
3. Textbook and Materials: Power System Analysis and Design; Glover, Sarma, Overbye; Fifth; 2012

   a. Other Supplemental Materials: None

   • Specific Course Information:

   a. Brief description of the content of the course (Course Catalog Description): The electric power industry, operation of power systems, load flow, fault calculations, economic dispatch, general technical problems of electric power networks.

   b. Pre-requisites or Co-requisites: ECE 330 or equiv

   c. This is a Selected Elective course.

   • Specific Goals for the Course:

   a. Course Outcomes:

      1. Students will understand the active and reactive power, and their relation to power system operation through the load flow problem.
      2. Students will be able to form and solve the electric power system load flow problem.
      3. Students will be able to calculate traditional economic dispatch.
      4. Students will be able to make fault analysis calculations.

   • ABET Student Learning Outcomes:

      (a) Ability to apply mathematics, science and engineering principles.
(c) Ability to design a system, component, or process to meet desired needs.
(d) Ability to function on multidisciplinary teams.
(e) Ability to identify, formulate and solve engineering problems.
(j) Knowledge of contemporary issues.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:**
  1. Fundamentals of Power Calculations: Instantaneous power, phasors, active power, reactive power, complex power, power factor, and power factor correction.
  2. Three phase circuit analysis: Balanced three phase circuits, delta-wye conversions, per-unit representation, single line diagrams.
  4. AC Power Flow: Full AC representation; Solution using Jacobi, Gauss-Siedel, and Newton-Raphson methods; Approximations include the Fast Decoupled Load Flow and DC Load Flow.