

# **Syllabus: EEE 577 – Power Systems Operations and Planning**

## **Primary Textbook:**

A. J. Wood, B. F. Wollenberg, and G. B. Sheble, Power Generation, Operation, and Control, 3<sup>rd</sup> Ed. John Wiley & Sons, New York, NY, 2014.

NOTE: There is a 2<sup>nd</sup> Edition to this book that is adequate as well.

**Offered:** Fall semester every year.

**Prerequisites / co-requisites:** EEE 470 or EEE 471; Graduate standing; Background in power engineering.

**Course Description:** This course focuses on power systems generation, operations, and reliability. The course will first focus on the economic operations of power systems. This begins with a background on the characteristics of generators and then builds up to the most basic power generation scheduling problem, economic dispatch. The course will then cover the characteristics of the transmission system and then power flow, alternating current optimal power flow, and the linear approximation of the alternating current optimal power flow. The course also covers unit commitment, hydrothermal coordination, and production cost models. Optimization algorithms to solve these problems will also be covered in the class including, but not limited to, unconstrained optimization, constrained optimization, linear programming, dynamic programming, Lagrange relaxation, and mixed integer programming. Topics related to power systems reliability will also be discussed including, but not limited to, N-1 reliability, reserves, and contingency selection procedures. Various modules of energy management systems (EMS) will be discussed. Frequency control will be also covered in this course.