1. **Course number and name**  
**ENGR 448 Electrical Power Systems**

2. **Credits and contact hours**  
3 Credits

3. **Instructor’s or course coordinator’s name**  
Instructor: Ronald F. Trauner.  
Course coordinator: Hao Jiang

4. **Text book, title, author, and year**  

   a. **other supplemental materials**  

5. **Specific course information**  
   a. **brief description of the content of the course (catalog description)**  
   Operating characteristics of transmission lines, transformers, and machines. Symmetrical component theory and sequence network method. Use of commercial programs to conduct load flow study, short circuit analysis, and economic dispatch problems. State estimation, unit commitment, and system transient and stability issues.

   b. **prerequisites or co-requisites**  
   ENGR 306 with a grade of C or better.

   c. **indicate whether a required, elective, or selected elective course in the program**  
   Elective for Electrical Engineering.

6. **Specific goals for the course**  
   a. **specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**

      - The student will demonstrate an ability to analyze single and three phase AC electrical circuits.
      - The student will demonstrate an ability to analyze electrical characteristics of transformers.
      - The student will demonstrate an ability of analyzing AC transmission lines for their electrical parameters.
The student will demonstrate an ability of using compensation techniques to satisfy system requirements of AC transmission lines.

The student will demonstrate a basic understanding of symmetrical component theory.

The student will acquire the ability to use symmetrical component theory to analyze unbalanced operating condition of AC electrical systems.

The student will acquire the ability to obtain sequence networks (positive, negative, and zero sequence) for a given AC electrical system.

The student will demonstrate the ability to calculate short circuit currents and system voltages for faulty electrical AC systems.

The student will demonstrate a skill of using commercial software to run load flow study of AC electrical systems.

The student will demonstrate a skill in using commercial programs to solve economic dispatch problems for AC electrical systems.

The student will demonstrate a skill in using commercial programs to solve short circuit problems for AC electrical systems.

The student will acquire basic understanding of current issues of utility industries.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

Course addresses ABET Student Outcome(s): [a, c, e, k].

7. Brief list of topics to be covered

- Intro to AC Electrical Power Systems: Overview/History/Trends.
- Review of Rotating Machines and Transformers.
- Electrical Analysis of AC Transmission Line.
- Compensation of AC Transmission Lines
- Symmetrical Components Technique for Analyzing Unbalanced AC Systems.
- Short Circuit Current Analysis.
- Economic Dispatch.
- System Stability Issues.
- Introduction to new technologies (HVDC and FACT.)