ECE 5430 Syllabus
Electric Energy Systems Engineering

Credit Hours:
4 Credit Hours (LCT 4).

WSU Catalog Description:

Instructor: Dr. Caisheng Wang,
Course Meeting Time: Tuesday and Thursday, 10:30 AM - 12:10 PM
Course Meeting Location: 0103 MAIN
Office Hours: Tuesday and Thursday, 2:00 PM - 3:30 PM
Office Location: 3146 Engineering Building
Phone: (313) 577-7084
Email: cwang@wayne.edu

Prerequisite(s): ECE 4330: Linear Network and System Analysis.

Co-requisite(s): None.

Textbook(s) Required:

Computer Programs:
MATLAB/Simulink and PowerWorld Simulator

Goals:
Understand the theory and methods for analysis and control of power systems.
Know how to use power analysis and simulation software such as MATLAB and PowerWorld Simulator.

Course Objectives:
Upon completion of this course the student will be able to:
1. Model the main components in a power system
2. Determine the transmission capacity of a transmission line
3. Carry out power flow studies of power systems.
4. Carry out fault current calculation for balanced and unbalanced faults
5. Understand power system protection schemes
Topics:

1. Energy and circuit fundamentals (1 week)
2. An overview of power systems (1 week)
3. Generator and transformer models (1 week)
4. Transmission line model (1 week)
5. Transmission line theory and transmission capacity (2 weeks)
6. Power flow studies (2 weeks)
7. Synchronous machine transient analysis (1 week)
8. Balanced fault current calculation (1 week)
9. Symmetrical components analysis (1 week)
10. Unbalanced fault current calculation (1 1/2 weeks)
11. Power system protection (1 1/2 weeks)

Contributions to the ECE Program Outcomes:

(a) An ability to apply math, science and engineering knowledge. The homework, project, quizzes and exams require direct applications of mathematical, scientific, and engineering knowledge to successfully complete the course.

(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. The design in the project must be checked against real world operating limits.

(e) Identify, formulate and solve engineering problems. Students must be able to identify and model the system; analyze and solve control problems.

(g) An ability to communicate effectively. Students are required to write a comprehensive report on the project.

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. Students taking the course will learn how to use software tools such as MATLAB and other commercial software (PowerWorld Simulator) for solving practical power system problems.

Grading Policy:

Homework 25%
Project 25%
Testes/Quizzes 25%
Final 25%
Grading Scale:

- **A** 93-100
- **A-** 90-92
- **B+** 87-89
- **B** 83-86
- **B-** 80-82
- **C+** 77-79
- **C** 73-76
- **C-** 70-72
- **D+** 67-69
- **D** 63-66
- **D-** 60-62
- **F** Below 60

Schedules:

- Homework due: one week after completing the corresponding chapters/topics
- Project due: Dec 14
- Final Exam: Dec 14

Attendance:

Students are expected to attend all lectures. The most common reasons for failing this course are (1) not attending all lectures and (2) not having sufficient time spent on the course.

WITHDRAWAL POLICY:

Last day to drop with a tuition refund: End of the 2<sup>nd</sup> Week of the Semester.
Last day to drop without a notation of W on the transcript: End of the 4<sup>th</sup> Week.
Please check the university’s website for the latest information and policy.

Depending on the situation of withdrawal, one of the following grades will be assigned:
- WP: Withdrawal with Passing
- WF: Withdrawal with Failing
- WN: Withdrawal Never Attended

All drop/add activity during the first four weeks should be done by the student through Pipeline. Withdrawal after the fourth week requires the instructor's permission and must be submitted on a Drop/Add form to the Registrar's Office. Withdrawal after the ‘final drop’ date will only be permitted under exceptional circumstances.
circumstances and requires the permission of the Chair of the ECE department. A failing grade is not an acceptable reason for withdrawal after the ‘final drop' date.

**POLICY ON CHEATING:**

Cheating is defined by the University as “intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information, or assistance in any academic exercise.” This includes any group efforts on assignments or exams unless specifically approved by the professor for that assignment/exam. Evidence of fabrication or plagiarism, as defined by the University in its brochure *Academic Integrity*, will also result in downgrading for the course. Students who cheat on any assignment or during any examination will be assigned a failing grade for the course and may be subject to additional penalties. See [http://www.otl.wayne.edu/wsu_integrity.php](http://www.otl.wayne.edu/wsu_integrity.php) for more details.

**Code of Ethics for Engineers:**

WSU library has a tutorial that talks about transmitting ideas, plagiarism, copyright, and citing sources. At the end, there is a quiz. You are encouraged to visit this site then take the quiz at the end. [http://www.lib.wayne.edu/services/instruction_tutorials/searchpath/mod6/contents.html](http://www.lib.wayne.edu/services/instruction_tutorials/searchpath/mod6/contents.html)

The following list gives additional sites:

- [http://onlineethics.org/codes/](http://onlineethics.org/codes/)
- [http://www.iit.edu/departments/csep/codes/coe/abet-a.html](http://www.iit.edu/departments/csep/codes/coe/abet-a.html)

**AVAILABILITY TO STUDENTS WITH DISABILITIES**

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, the instructor will meet with you privately to discuss your special needs. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

**Last Updated:**

August, 2017

**Prepared by:** Dr. Caisheng Wang