

Course Information

Course Number:	ECEN 615
Course Title:	Methods of Electric Power System Analysis
Section:	600/700
Time:	Section 600: 4:10-5:25pm / Section 700: Online
Location:	Section 600: ETB 1003 / Section 700: Online
Credit Hours:	3
Course Website:	https://birchfield.engr.tamu.edu/615f23/
Syllabus version:	8/14/2023

Instructor Details

Instructor:	Adam Birchfield
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Office Hours:	2:30-4:00pm, Wednesdays
Website:	birchfield.engr.tamu.edu

Course Description

Digital computer methods for solution of the load flow problem; load flow approximations; equivalents; optimal load flow.

Course Prerequisites

ECEN 460 or consent of instructor

Special Course Designation

None

Course Learning Outcomes

- Outcome 1. Students will have an understanding of the power flow problem for large-scale power systems, including modeling complexities.
- Outcome 2. Students will have an understanding of the power flow solution methods for large-scale power systems, including sparse matrix techniques, simplifications, and sensitivities.
- Outcome 3. Students will have an understanding of other large power system analysis techniques, such as power flow optimization, equivalents, and state estimation.

Textbook and/or Resource Materials

- J. Wood, B.F. Wollenberg, and G. B. Sheble. *Power Generation, Operation, and Control*, Third Edition, Wiley, 2013, ISBN-13: 978-0471790556 (recommended textbook)
- Other articles/resources provided by the instructor.

Grading Policy

- 30% - Written Exam #1 Tentative date **Wednesday, October 4th**
- 30% - Written Exam #2 Tentative date **Wednesday, November 29th**
- 20% - Homework assignments (4-6)

- 10% - Class participation. This class will have a significant in-class discussion aspect. In-person students should actively participate in class discussion. Distance students should email the professor a 100-300 word paragraph of their contributions to the discussion once per week after listening to the recorded lectures and discussion. Grade is based on the extent to which student participation reflects active engagement with course concepts, understanding of assigned reading, and thoughtfulness in the topics being discussed.
- 10% - Oral exam. Student will work the instructor to schedule a 30-minute meeting, either in-person or on Zoom. The exam will occur in the month of October, and it must be scheduled by October 10th. The exam will be an opportunity for the student to demonstrate understanding of the concepts in an interactive setting.

All exams are closed-book, closed-notes. You may use standard calculators and a single sheet of hand-written notes, 8.5"x11", front and back.

Late Work Policy

Homework assignments will be accepted up to 2 weeks late with a 10 point penalty. After that they will not be accepted.

Course Schedule

Week 1: August 21, 23 Introduction, Background, History
Week 2: August 28, 30 Basic Power Flow Review
Week 3: September 6 – No class on Labor day (4th) Advanced Power Flow Modeling
Week 4: September 11, 13 Advanced Power Flow Modeling, cont.
Week 5: September 18, 20 Advanced Power Flow Solution Methods
Week 6: September 25, 27 Advanced Power Flow Solution Methods
Week 7: October 2, 4 Review Written Exam #1 on Wednesday, October 4th
Week 8: October 11 – No class on fall break (9th) Sparse Matrix Methods
Week 9: October 16, 18 Sensitivities
Week 10: October 23, 25 Least Squares and State Estimation
Week 11: October 30, November 1 Optimization
Week 12: November 6, 8 Optimization, Cont.
Week 13: November 13, 15

Equivalents, Voltage Stability
Week 14: November 20 – No class on thanksgiving reading day (22nd) No class meeting – recorded special topic lecture
Week 15: November 27, 29 Monday review day for exam Written Exam #2 on Wednesday, November 29th
Week 16: December 4 Last day of class – special topic lecture
No final exam

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student’s grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor” ([Student Rule 7, Section 7.4.1](#)).

“The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence” ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

Academic Integrity Statement and Policy

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that

student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services \(CAPS\)](#).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](https://www.suicidepreventionlifeline.org).