

Course Information:

Course title:	ECEN 460: Power System Operation and Control
Lecture time and location:	Spring 2023, TR 5:30-6:45 pm, Zach 440
Lab time and location:	Varies by section, see below, Zach 230
Course website:	https://birchfield.engr.tamu.edu/460s23
Prerequisites:	ECEN 215 or ECEN 314 or consent of instructor (recommended ECEN 340)
Required textbook:	Glover, Overbye, Sarma, and Birchfield, <i>Power Systems Analysis and Design</i> , Seventh Edition, Cengage Learning, 2023
Catalog description:	Load flow studies; power system transient stability studies; economic system loading and automatic load flow control.
Syllabus version:	1/13/2023

Instructor and TAs:

Instructor:	Prof. Adam Birchfield, abirchfield@tamu.edu
Office hours:	Tuesdays 3-5pm in WEB 215-E and by request
Website:	https://birchfield.engr.tamu.edu/

Teaching Assistants:

Yousef Abu-Khalifa	yousefak7@tamu.edu , office hours Mondays 1-3pm in WEB 114 Lab Section 502: Friday 11:30am-1:20pm Lab Section 505: Tuesday 11:10am-1:00pm Lab Section 506: Tuesday 8:00-9:50am
Max Briones	max25@tamu.edu , office hours Wednesdays 1-3pm in WEB 114 Lab Section 501: Wednesday 8:00-9:50am Lab Section 503: Friday 1:30-3:20pm Lab Section 504: Friday 4:10-6:00pm

Evaluation and Exam Information:

First in-class exam	15%	Tentatively scheduled for Tuesday, February 28, in class
Second in-class exam	15%	Tentatively scheduled for Tuesday, April 18, in class
Comprehensive final	25%	Tuesday, May 9, 3:30-5:30 pm
Quizzes and project	20%	
Laboratory	25%	

All exams are closed-book, closed-notes. You may use one hand-written notesheet (8.5" by 11", front and back) and standard calculators.

Each grade in the course is given a percentage. Final grades are determined based on these percentages. If your final average falls within the following ranges you are guaranteed to receive at least the letter grade indicated: A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: 59 or lower.

Lab Technology Requirement:

You are required to have a laptop capable of running software that requires a Windows operating system. This will be necessary for the labs and some assignments. More information is available at the link below.

<https://engineering.tamu.edu/academics/byod/devices/index.html>

Course Schedule

Week of	Chapters	Topics	Lab
Jan 17	1,2	Introduction to power systems	No lab
Jan 24	1,2	Review of complex power, three-phase, per unit	Lab 1: Power system ops, max loading
Jan 31	3,4,5	Modeling transmission lines, transformers	Lab 2: Power flow analysis 42 bus and 2000 bus cases
Feb 7	6	Modeling generators and loads	Lab 3: System operations
Feb 14	6	Bus admittance matrix, power flow formulation	Lab 4: Machine parameters
Feb 21	6	Power flow sensitivity, large system studies	Lab 5: Machine operation
Feb 28	6	First exam , power flow solution methods	No lab due to Exam 1
Mar 7	7	Economic dispatch	Lab 6: Economic dispatch and contingency analysis
Mar 14		Spring break	No lab due to spring break
Mar 21	7	Optimal power flow, security-constrained optimal power flow	Lab 7: OPF, SCOPF, and LMPs
Mar 28	11	Power system stability	Lab 8: Market auctions
Apr 4	11	Power system stability	Lab 9: Transient stability and dynamics
Apr 11	11	Power system controls	Lab 10: Interactive multi-user operations
Apr 18	11	Second exam , Power system controls	No lab due to Exam 2
Apr 25	15	Emerging topics	Makeup lab time
May 2		No class	No lab due to finals
May 9		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 Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. 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.

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 the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can 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.