Course Syllabus

Course Information

Electrical Energy Systems		**ECSE 2110**	**Summer 2023**
Credit Hours: 3	TF	8:30PM-10:05PM	CARNEG 113/Webex

Course Websites:

Piazza – one-stop source for class notes, HW, solutions, announcements, and discussions.
The platform is highly catered to getting you help quickly and efficiently from classmates, the TAs, and the professor. **Rather than emailing questions to the teaching staff, please post your questions on Piazza**.

https://piazza.com/rpi/summer2023/ecse2110/resources

Gradescope for grading and HW submission
https://www.gradescope.com/courses/543862

Blackboard – For submitting Homework Assignments and Project Report
https://lms.rpi.edu

Prerequisites:

- ECSE 2010 Electric Circuits or permission of instructor.
- PHYS 1200 Physics II, or
- Permission of the instructor

Course Description

This course introduces the major components of today's power system such as transformers, electric machines, and transmission lines. Renewable energy sources and systems are discussed, including wind and solar energy. Integration of energy sources with the grid is addressed.

Course Text(s)

Primary textbook-1: Hadi Saadat, Power System Analysis, 3rd Ed., PSA Publishing, 2011.

Primary textbook-2: Gilbert M. Masters, Renewable and Efficient Electric Power Systems, Wiley Interscience, a John Wiley & Sons, Inc., Publication, USA, 2004.

Reference book-1: Stephen J. Chapman, Electric Machinery Fundamentals, 5th Ed, McGraw-Hill, 2012.

Reference book-2: W.D. Stevenson Jr., Elements of Power System Analysis, 4th Ed., McGraw-Hill Inc., 1982

Instructor

Dr. Prabhakar Neti Email: netip@rpi.edu
Office Hours: Tuesdays 4 – 6 pm Eastern
Location: WebEx: https://rensselaer.webex.com/meet/netip

Teaching Assistant(s)

Name	Location	Hours	Email
Islam, Md Shamimul	https://rensselaer.webex.com/meet/islamm7	TBD	Islamm7@rpi.edu

Homework, Midterm Exam, and Final Exam Submission Schedules

There will be approximately 10 homework assignments in this course. Homework will be assigned on specified dates. Keep track of dates on piazza and course schedule. All Homework grades will be considered for course final grade evaluation. Both midterm exam and the final exam will be open book exams.

Exam	**Date**
Homework	Every Monday
Midterm 1	June 20th, 2023 (Tuesday)
Midterm 2	July 18th, 2023 (Tuesday)
Final Exam	TBD

Course Intended Learning Outcomes (ILOs)

After completing the course, the students should be able to:

After completing the course, the students should be able to:

1. Using first principles derive the equations to model electrical components used for energy system analysis.
2. Describe, derive, and compare models of the most common equipment used in power network models.
3. Construct mathematical models for computing the steady state performance of EES.
4. Compute, analyze, and reflect on the performance of a power system under steady state.
5. Apply a power system and general purpose software tools to analyze the performance of a power system, and evaluate it for different operating conditions.
6. Reflect and analyze broader factors related to electrical power grids, as for example, policy, regulation, etc.
7. Conceive and analyze a technical solution for a specific EES case study by applying their knowledge of the course using software tools.

Grading Criteria

Two midterm exams - 50% (25%, 25%)
Final exam – 25 %
Homework assignments -20 %
Attendance and in-class participation -5 %
Submitting all Homework Assignments is mandatory.

Other Course Policies

Homework Policy: All assignments have to be submitted via LMS on or before the deadline. Copied homework will receive a grade of zero. Repeated violations will lead to failing the course.

Assignment Grade Appeal: To appeal an assignment grade, you should submit a written **email request** to the professor **within two days** after receiving your graded assignment. In your request you must clearly specify why you believe you deserve a higher credit for the solutions you are appealing.

Exam Grade Appeal: To appeal an exam grade, you should submit a written **email request** to the professor **within a week** after receiving your graded exam. In your request you must clearly specify why you believe you deserve a higher credit for the solutions you are appealing.

Important Note: The only circumstance under which an appeal in the assignment or exam grades will be considered is a demonstrable factual error in grading, meaning either that scores were incorrectly totaled, or a correct answer was marked incorrect. Uniform standards for partial credit are applied for the class, so we will not revisit the amount of points awarded for an incorrect or incomplete solution.

Exam Policy: If you require extra time on exams or another form of accommodation, please contact the Dean of Students Office. Please do this early in the term so that we have plenty of time to plan.

Midterm and final exams: All students are expected to take all midterm and final exams given during the semester.

Academic Integrity

Student-Professor relationships are built on trust. Students must trust that professor has made appropriate decisions about the structure and content of the courses they teach, and professor must trust that the assignments that students turn in represent their own work. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities defines various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where unofficial help was received, or significant teamwork was involved, a notation on the assignment should indicate your collaboration.

If you have any question concerning this policy before submitting an assignment, please ask for clarification.

- Any violation of this policy will result in a 0 score for the related evaluation.
- Repeated violation will result in F grade.
- We have a zero-tolerance policy in exams, and any violation of the policies result in an F grade.
- For any case of academic dishonesty, a report will be filed to the Dean of Students.

Course Schedule

Course Number	ECSE 2110				
Course Name	Electrical Energy Sytems				
Teaching Semester	Summer 2023				
Instructor	Dr. Prabhakar Neti	netip@rpi.edu			
Instructor's WebEx Personal Room		https://rensselaer.webex.com/meet/netip			
Instructor's Office Hours	Tue: 4:00PM to 6:00PM	WebEx	https://rensselaer.webex.com/meet/netip		
TA's Name	**TA's Office Hours**	**TA's Email**	**Location (WebEx)**		
Islam, Md Shamimul	TBD	islamm7@rpi.edu	https://rensselaer.webex.com/meet/islamm7		
Text Book 1	H. Saadat, Power System Analysis, 3rd ed., PSA Publishing, 2010.				
ISBN: 978-0-9845438-0-9					
	Gilbert M. Masters, Renewable and Efficient Electric Power Systems, Wiley Interscience, a John Wiley & Sons, Inc., Publication, USA, 2004.				
Text Book 2	Stephen J. Chapman, Electric Machinery Fundamentals, 5th Ed, McGraw-Hill, 2012.				
ISBN 978-0-07-352954-7					
Text Book 3	William D. Stevenson Jr, Elements of Power System Analysis, 4th ed., McGraw-Hill Book Company, 1982.				
ISBN; 0-07-061278-1					
SBN 0-471-28060-7					

Date	Day	Time	Location	Activity	Details	Book Refrences
5/23/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 1	Course Overview and Introcution to Electrical Energy Systems	Sadaat, Chapter-1
5/26/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 2	Power Systems and Power Generation	Sadaat, Chapter-1
5/30/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 3	AC steady-state analysis, three-phase networks, and complex power	Sadaat, Chapter-2
6/2/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 4	AC steady-state analysis, three-phase networks, and complex power	Sadaat, Chapter-2
6/6/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 5	Per-unit system. Transformers	Sadaat, Chapter-3
6/9/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 6	Per-unit system. Transformers	Sadaat, Chapter-3
6/13/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 7	Generators	Sadaat Ch-3, Chapman Ch-4
6/16/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 8	Generators	Sadaat Ch-3, Chapman Ch-4
6/20/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Midterm Exam 1	Midterm Exam 1	
6/23/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 9	Transmission lines	Sadaat, Chapter-4
6/27/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 10	Transmission lines	Sadaat, Chapter-4
6/30/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 11	Transmission lines	Sadaat, Chapter-5
7/11/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 12	Transmission lines	Sadaat, Chapter-5
7/14/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 13	Power Flow Analysis	Sadaat, Chapter-6
7/18/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Midterm Exam 2	Midterm Exam 2	Sadaat, Chapter-6
7/21/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 14	Power Flow Analysis	Sadaat, Chapter-6
7/25/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 15	Power Flow Analysis	Sadaat, Chapter-6
7/28/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 16	Symmetrical Faults	Sadaat, Chapter-9
8/1/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 17	Symmetrical Components and Asymmetric Faults	Sadaat, Chapter-10
8/4/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 18	Renewable Energy	Leture Notes
8/8/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 19	Renewable Energy	Leture Notes
8/11/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 20	Renewable Energy	Leture Notes
8/15/2022	Tuesday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 21	Renewable Energy	Leture Notes
8/18/2022	Friday	8:30 AM to 10:05 AM	CARNEG 113	Lecture 21	Renewable Energy	Leture Notes
TBD	TBD	TBD	TBD	FINAL EXAM	Cummulative	Cummulative