

ENGR 1XXX- VIRTUAL EXPLORATION OF CLEAN ENERGY ENGINEERING SOLUTIONS IN THE SCANDINAVIAN AND U.S. ELECTRICAL GRIDS

Summer 2021

Instructor:	Robert Kerestes	Time:	TBD
Email:	rjk39@pitt.edu	Place:	TBD

Course Description: This virtual program will explore clean energy practices and electric power transmission and distribution grid technologies. This is a unique opportunity for students to gain experience working with multi-national teams on a consulting project to gain professional and engineering skills.

The course will cover the application of various grid technologies from power generation through power consumption including transmission networks, grid automation, power electronics systems, communications and control, protection, grid operations, grid connectivity, renewable energy resource integration, cyber security, microgrids, DC technologies, and other emerging areas, as well as a brief introduction to power utility markets, business processes, and policy/regulation. The course will cover the application of various grid technologies in Scandinavia by providing virtual panel discussions, virtual company visits and opportunities to understand how culture impacts energy policy decisions.

The course includes a consulting project with a company in Denmark or Sweden. The course includes the potential interaction with students from Denmark Technical University in teams.

Course Pages: Canvas

Office: 1238C Bendedum Hall

Office Hours: TBD or by appointment

Email Policy: During the work week, all emails be answered within 24 hours. If there is no response within 24 hours, please send the email again. During the weekend, email responses may be delayed, but I will try to answer them as soon as possible. In the very worst case, these emails will be addressed first thing Monday morning.

Teaching Assistant: TBD

Recitation: TBD

Supplementary Materials:

- *Introduction to the OpenDSS*, R. Dugan, EPRI, April 2009
- *Reference Guide, The Open Distribution System Simulator (OpenDSS)*, R. Dugan D. Montenegro EPRI, June 2019
- *New User Primer, The Open Distribution System Simulator (OpenDSS)*, Jason Sexauer, 2012
- *Distribution System Modeling and Analysis, Fourth Edition*, William Kersting, CRC Press, Boca Raton, FL, 2017
- *DER Integration and Microgrids*, B. Enayati, A. Paaso, F. Katiraei, IEEE PES Industry Technical Taskforce, 2018

Learning Objectives: Upon completion of this course, student should be able to:

1. Run an electrical distribution system with distributed energy resources simulation using the Open Distribution System Simulator (OpenDSS). Read voltages, currents, power flows, and power losses from the simulation
2. Read an electrical distribution system one-line diagram and its associated data and model the circuit using OpenDSS
3. Communicate with a range of audiences including professor, teammates, and peers by writing and presenting a proposal for a clean energy solution clearly defining its benefits and limitations, as well as its economic and environmental considerations
4. Designing a electric power distribution systems with considerations for economic, environmental, and societal impacts in mind
5. Locate sustainable development goal number 7: "Ensure access to affordable, reliable, sustainable and modern energy for all" and consider each of the goals targets while aesigning a design

Prerequisites:

- ECE 0101 or Equivalent Linear Circuit Analysis Course

Tentative Course Outline: TBD**Grading Policy:**

- Class Participation (20%)
- Simulation Demonstration (20%)
- Team Self and Peer Assessments (20%)
- Proposal (20%)
- Presentation (20%)

Project:

- You will be assigned into teams and will work with your team on a design project OpenDSS
- You will write a paper based on this design, be asked to demonstrate using OpenDSS, and present your design to the class
- You will be assessed both team and individually

Academic Integrity:

Include repercussions for academic integrity violations.

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#) and the Swanson School of Engineering Policy. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity and the Swanson School procedures. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy.

All students are expected to adhere to the standards of professional conduct and academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the SSOE Academic Integrity Policy found at: <https://www.engineering.pitt.edu/Academic-Integrity-Guidelines/>.

To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Understanding and Avoiding Plagiarism tutorial.

Disability Services:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services \(DRS\)](#), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Statement on Classroom Recording:

To address the issue of students recording a lecture or class session, the University's Senate Educational Policy Committee issued the recommended statement on May 4, 2010. While it is optional, the Committee recommends that faculty consider adding the statement to all course syllabi.

"To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use."

Student Opinion of Teaching Surveys:

Students in this class will be asked to complete a Student Opinion of Teaching Survey. Surveys will be sent via Pitt email and appear on your Canvas landing page during the last three weeks of class meeting days. Your responses are anonymous. Please take time to thoughtfully respond, your feedback is important to me. [Read more](#) about Student Opinion of Teaching Surveys.

Religious Observance:

The observance of religious holidays (activities observed by a religious group of which a student is a member) and cultural practices are an important reflection of diversity. As your instructor, I am committed to providing equivalent educational opportunities to students of all belief systems. At the beginning of the semester, you should review the course requirements to identify foreseeable conflicts with assignments, exams, or other required attendance. If at all possible, please contact me within the first two weeks of the semester to allow time for us to discuss and make fair and reasonable adjustments to the schedule and/or tasks.

Diversity and Inclusion:

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices: <https://www.diversity.pitt.edu/civil-rights-title-ix/policies-procedures-and-practices>. I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or emailing titleixcoordinator@pitt.edu.

Reports can also be filed online: <https://www.diversity.pitt.edu/civil-rights-title-ix/make-report>

You may also choose to report this to a faculty/staff member; they are required to communicate this to the University's Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

COVID-19 Statement:

In the midst of this pandemic, it is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. While in class, at a minimum this means that you must wear a face covering and comply with physical distancing requirements; other requirements may be added by the University during the semester. These rules have been developed to protect the health and safety of all community members. Failure to comply with these requirements will result in you not being permitted to attend class in person and could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

Communication to Instructor Pertaining to Illness:

As in any situation regarding class absence (remote or in person), a student who becomes ill (albeit COVID-19 related or not) is responsible for communicating with me regarding course absences. Please contact me and provide documentation when absences affect quizzes/exams. This should be done via email as soon as possible.

Seating Charts (If Applicable):

For those individuals who will be attending the class in person, I will be using a seating chart. Please be considerate and continue to sit in your designated seat through the term. If you wish to move to a different location, please let me know and I will do my best to accommodate your request.

ABET Criteria 3. Student Outcomes:

The program must have documented student outcomes that support the program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering. Student outcomes are outcomes (1) through (7), plus any additional outcomes that may be articulated by the program.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.