A unique 3-level education series intended for workforce development providing students essential skills to support the energy transformation to modern, resilient, clean microgrid systems.

TELEPATH SYSTEMS

CSU | Cleveland State University

Energy Learning Lab

INCOSE

CLEVELAND ENGINEERING SOCIETY
Learn • Connect • Lead

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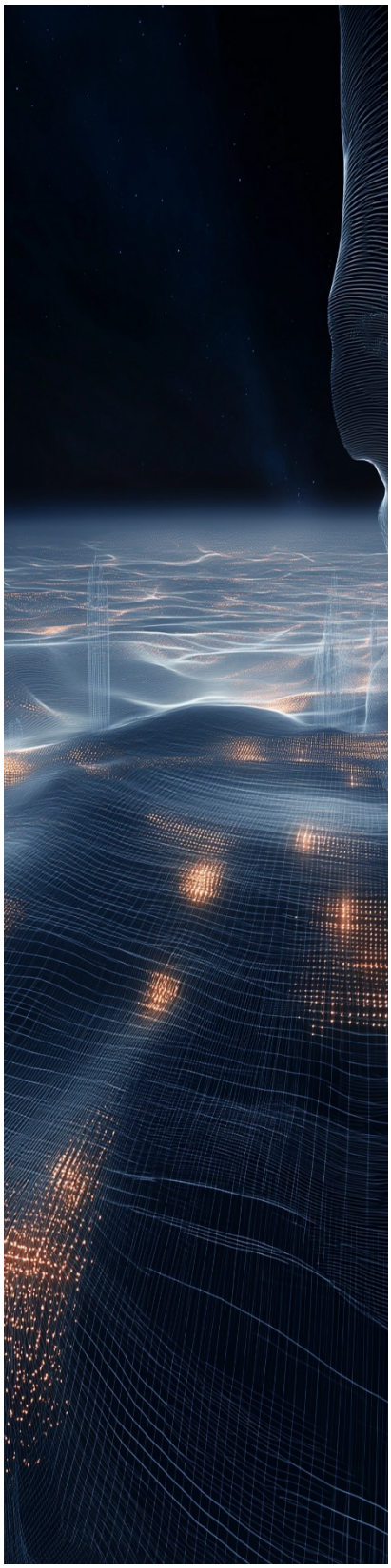


Contents

Background 3
What is a Microgrid? 3
Microgrids Career Prospects 4
Microgrid Systems Course Series: Objectives 5
Microgrid Systems Course Series: Overview.....6
Level 1 Foundations: Key Dates 7
Level 1 Foundations: Learning Objectives by Week.....7
Level 1 Foundations: Instructor & Guest Lecturer Profiles..... 10

Be part of the new energy transition

Register now: **Microgrid Systems** Certificate - Level 1

Background

Global electricity demand is rapidly rising, driven by the growth of AI-powered data centers, electric vehicles, and next-generation hybrid /electric aircraft. At the same time, the nation's power grid is under increasing stress from an aging, vulnerable infrastructure, and extreme weather events causing power loss. This combination is accelerating the need for additional capacity, resilient, flexible energy systems and a capable workforce trained to support their effective development.

Microgrid systems are a critical part of this transition. These self-contained power networks are revolutionizing how we generate and distribute electricity. Microgrids support grid modernization through digitalization, decentralization, and decarbonization. They add generation capacity, enhance resilience through islanding capabilities, and make it easier to integrate renewable energy sources. As the adoption of microgrids and distributed energy resources (DERs) grows, ***so does the demand for skilled workers who understand how to design, build, manage, and optimize these technologies.***

To address this workforce gap, Cleveland State University's Washkewicz College of Engineering and Division of Continuing and Extended Education (DCEE) have partnered with Telepath Systems Inc., the International Council of Systems Engineers (INCOSE), the Cleveland Engineering Society (CES), and industry leaders to develop a 3-level practical, accessible training program, labeled "Microgrid Systems".

What is a Microgrid?

Microgrids are small-scale power grids with well-defined system architecture, powered by a combination of available energy sources (solar, wind, diesel, natural gas, hydrogen, geo-thermal, and other resources) to generate electricity for a localized area, such as a university campus, hospital complex, local community, military base or other critical infrastructure.

Microgrids can connect to the main electrical grid for economic advantage under peak loads but can also operate in support of resilience by functioning independently in "island mode", ensuring continuous power to designated vital loads during blackout conditions.

Microgrids definition: (Department of Energy - Grid Deployment Office)

"A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can operate in either grid-connected or in island mode, including entirely off-grid applications."

Microgrids Career Prospects

The surging demand for energy creates opportunities for numerous skilled workers, e.g. -

JOB TITLE	JOB DESCRIPTION
Project Manager	Oversee microgrid projects from conception to completion, manage timelines and budgets, coordinate between teams, and ensure compliance with regulations.
Electrical Engineer	Design and optimize electrical systems for the microgrid, including generation, distribution, and storage components.
Civil Engineer	Design infrastructure for microgrid installations, including site layout, foundations, and access roads.
Energy Analyst	Conduct energy modeling and analysis to optimize energy consumption and generation, assess feasibility studies, and develop energy management strategies.
Renewable Energy Specialist	Focus on integrating renewable energy sources (solar, wind, etc.) into the microgrid, assessing site suitability, and recommending technology.
Control Systems Engineer	Develop and implement control strategies for microgrid operations, including demand response and energy management systems.
Environmental Scientist/Engineer	Assess environmental impacts of microgrid projects, ensure compliance with environmental regulations, and conduct site assessments.
Regulatory Affairs Specialist	Navigate regulatory frameworks, obtain necessary permits, and ensure project compliance with local, state, and federal regulations.

Communications Specialist	Manage stakeholder engagement, public relations, and communication strategies regarding microgrid initiatives.
Financial Analyst	Analyze project financing options, conduct cost-benefit analyses, and develop financial models for microgrid projects.
Grid Integration Engineer	Ensure seamless integration of the microgrid with the larger grid, focusing on interconnection and grid stability.
Safety Officer	Implement and monitor safety protocols during the planning and construction phases of the microgrid project.
Data Scientist	Analyze large data sets from microgrid operations, develop predictive models, and support decision-making processes.
Maintenance Technician	Perform routine maintenance and troubleshooting on microgrid components, ensuring operational reliability.
Community Liaison	Engage with local communities to educate and inform them about the microgrid project and address concerns.

Microgrid Systems Course Series: Objectives

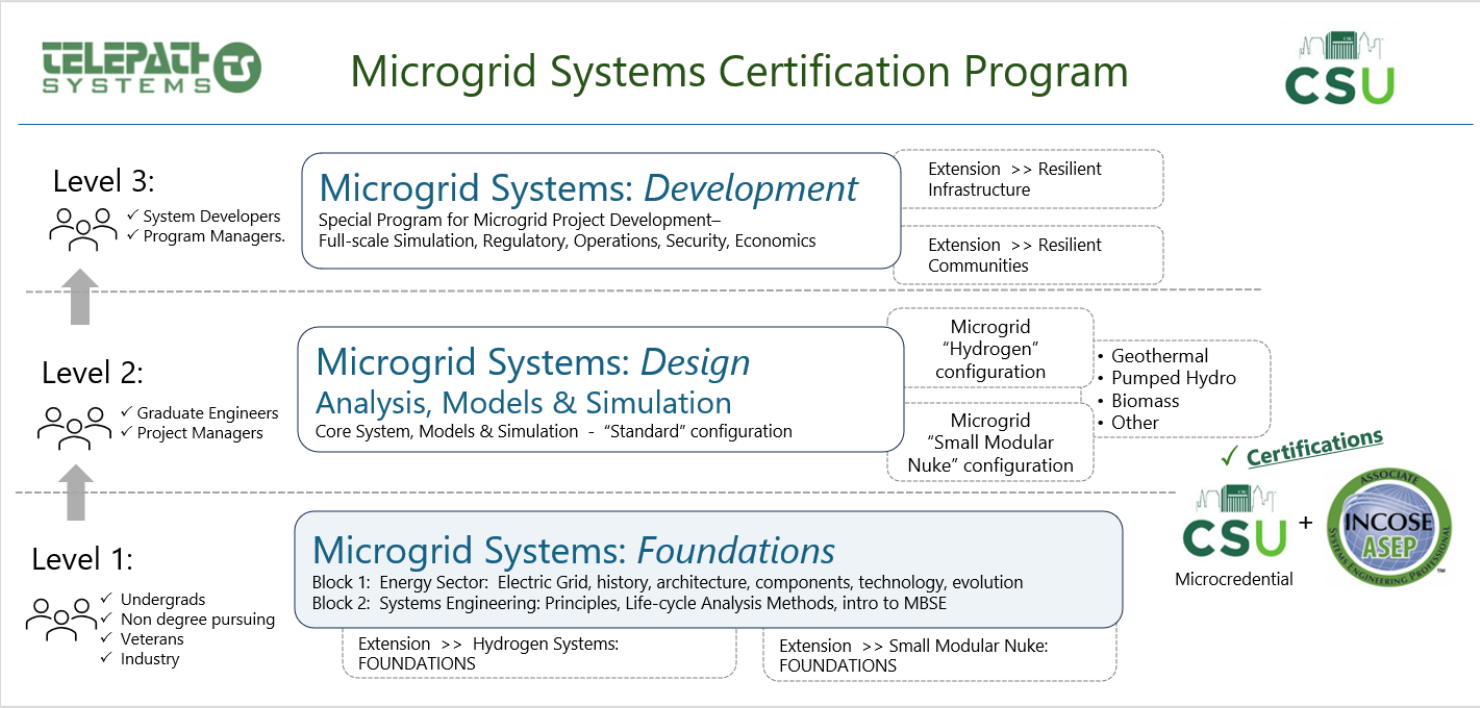
- To offer pathways of learning, knowledge and skills acquisition for workers seeking engagement and job opportunities in Microgrid Systems related projects
- To provide a substantive introduction to (microgrid relevant) principles of systems engineering, life-cycle stages of development, and overall management
- To equip students with tools and skills for applications of computer models and simulation capabilities in support of a wide range of initiatives
- To facilitate risk-informed decision support with Model-based SE methods for projects in Microgrid development or related Energy projects.

Microgrid Systems Course Series: Overview

Our program directly supports workforce development goals by providing students with essential skills to support the energy transformation to modern, resilient, clean microgrid systems. We aim to provide students with a comprehensive understanding of microgrid systems, integrating technical knowledge of electric power with systems engineering (SE) principles and methods. The series is comprised of three levels, the first of which launches on October 3, 2025, at Cleveland State University.

Program graduates will:

1. Earn a CSU Systems Engineering micro credential, special focus = microgrids
2. Prepare to test for the INCOSE Associate Systems Engineering Professional (ASEP) certification



Level 1 Foundations: Key Dates

- Early-bird tuition discount ends: October 12, 2026
- Registration deadline: November 5, 2026
- Class begins November 6, 2026, 6 weeks online, Friday afternoons (3 hour sessions – Eastern Standard Time)
- November 6, 13, 10
- December 4, 11, 18
- Final class on December 18, 2026 includes computer modeling demo (microgrid simulation)

Level 1 Foundations: Learning Objectives by Week

Microgrids Systems Level 1: Foundations provides a practical overview of microgrid technologies, its applications, and its growing role in modernizing and supporting the energy sector.

Week 1
6-
November

Introduction to Energy and Electricity

- Inform about the key concepts, atomic structure of matter, and fundamental physics of electricity and magnetism, relevant behavior, properties and observable parameters
- Educate about basic components, and essential calculations in electric circuits related to voltage, current, impedance, power, and energy, both for DC and AC circuits
- Provide an overview of the existing national grid architecture, its key components, functions, and the overall supply chain in delivering essential electricity to users.

Week 2
13-
November

Evolution of the Modern Electric Grid

- Provide high level perspective on the discovery of electricity and relevant innovations, the debates and relative advantages of AC vs DC systems
- Chronicle the key milestones and developments which led to the evolution of the current grid architecture, its key advantages and known vulnerabilities
- Explain the rationale for the emergence of Microgrids as a means of achieving improved resilience through "de-centralization" in various applications
- Suggest some potential "resilience strategies " and pathways for the further evolution and transformation of the grid for achieving a robust, decentralized energy infrastructure.

Week 3
20-
November

Key Components of Microgrids

- Basic overview of modern "distributed energy resources" (DERs) and their role in creating localized "tailored" solutions to providing energy
- Describe basic structure of Microgrid Systems with the combination of DER components to address a set of unique system requirements
- Explain the need and means for energy storage (batteries, hydro, flywheel, etc.) in addressing issues when power generation is intermittent (e.g. wind, solar)
- Discuss the characteristics of various power consuming loads and challenges of maintaining essential power quality, and prioritization of load shedding
- Discuss control function design and considerations related to thermal management and recovery of heat energy.

Week 4
4-
December

Understanding Systems Principles

- Introduce basic concepts related to Systems Principles, relevant theories, and characteristics
- Illustrate the general approach to problem solving by "Systems Thinking" and the implications for developing solutions
- Describe the life-cycle stages of methodical systems development and means of verifying required outcomes

Week 5
11-
December

Introduction to Model-Based Systems Engineering

- Fundamental concepts of applying modern computing capabilities for modeling system architecture and behavior
- Benefits of modeling and simulation of expected system behavior in providing valuable decision support for design and development, risk avoidance
- Illustration or demonstration of Case Studies of MBSE in Microgrid Systems

Week 6
18 -
December

Integration of Microgrid Systems

- Issues & challenges of Microgrid integration of DER components, grid connection, island-mode operation, etc.
- "Smart grid" developments and implications for Microgrids
- Emerging energy policy directions and considerations
- Demonstration of Microgrid Model & Simulation

Level 1 Foundations: Instructor & Guest Lecturer Profiles

The course is developed and taught by leading faculty and industry experts, blending theoretical foundations with practical skills.

Jeremy Ross, Adjunct Professor. University of Detroit, INCOSE.

Jeremy Ross is a Senior Systems Engineer at Ford Motor Company's Research and Advanced Engineering division, where he leads automated-driving system architecture and functional safety development. He is an adjunct instructor at the University of Detroit Mercy, focusing on model-based systems architecting and coupled architecture-simulation methods using SysML. Jeremy holds degrees in Mechanical Engineering (BSE, MSE) from the University of Michigan and in Product Development (MS) with a Systems Engineering certificate from the University of Detroit Mercy. He is a Certified Systems Engineering Professional (CSEP) through INCOSE, the International Council on Systems Engineering.

John Juhasz, CEO - Telepath Systems, Inc.

John Juhasz is Founder and Executive Director of Telepath Systems, Inc., a nonprofit advancing systems thinking to address complex energy and infrastructure challenges. He leads the Energy & Mobility Conference in Cleveland, a growing cross-industry platform supported by NASA, INCOSE, InfraGard, and others.

In partnership with Cleveland State University, John is helping shape the next generation of the energy workforce through advanced microgrid training programs that integrate systems engineering, modeling, and real-world application.

He brings nearly two decades of experience at NASA Glenn Research Center supporting the International Space Station, with leadership roles across engineering, program management, and executive operations. He holds nine patents in automotive electronics and contributed to innovations in adaptive braking, vehicle diagnostics, and connected vehicle systems at GM Europe.

GUEST LECTURERS

Casey Shull, PhD, MS, MBA, PMP. Purdue University Adjunct Professor.

Dr. Shull has 30+ years of experience and passion for resilient power systems, creating innovative solutions for commercial and industrial customers. He has a PMP certification and a PhD in Analytics and System Engineering from Purdue University, where he also teaches as an Adjunct Professor.

Casey has invented and patented Dimensional Metering, a method to identify different sources of electrical production and consumption and developed the world's only electrical blackout recovery system for critical infrastructure processes, using a model-based SysML approach. He has led and supported multiple projects in alignment with various federal and state specifications, as well as Smart Grid applications. Casey has also published and presented his work in several journals and conferences and received awards for his contributions to the field.

Joe Hofstetter P.E., CEM, Principal. Director of Building Performance and Sustainability, Karpinski Engineering.

Mr. Hofstetter helps organizations get more out of their building assets, focusing on energy, sustainability, and system operational improvements.

Big-picture thinking is an important part of his job. Every organization has different priorities, whether it's facility improvements or sustainability initiatives and he works with clients to define their building performance goals, develop and implement solutions, then measure the results.

Chris Evanich, BSEE, MBA.
New Energy Landscape Commercial Leader, Schneider Electric

Mr. Evanich is an electrical engineer with two decades of experience in the electrical power industry and has developed and financed dozens of distributed generation projects across multiple technologies around the world. He has delivered more than 100 industry presentations and has been published in more than a dozen different publications worldwide.

He holds a Bachelor of Science in Electrical Engineering from Cleveland State University and an MBA from Case Western Reserve University.

Matthew Hause - Principal Consultant at SSI

Mr. Hause was previously an Engineering Fellow at PTC, is a member of the OMG SysML specification team, and the co-chair of the UAF (Unified Architecture Framework) group. He has been developing complex, real-time systems for over 40 years. He started out working in the Power Systems Industry, and has been involved in Process Control, Communications, SCADA, Distributed Control, military systems and many other areas of real-time systems.

His roles have varied from project manager to developer. His skills include mentoring, sales presentations, standards development and training courses. He has written a series of white papers on project management, Systems Engineering, architectural modeling and systems development with UML, SysML and Architectural Frameworks. He has been a regular presenter at INCOSE, the IEEE, BCS, the IET and other conferences. Matthew studied Electrical Engineering at the University of New Mexico and Computer Science at the University of Houston, Texas.