VIRTUAL DISTRIBUTED ENERGY SUMMIT 2021 - MODERNIZING NEW MEXICO ENERGY

Distributed Energy Technologies Program

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July 30, 2021
Smart- and Microgrid Training Center (SMTC)

SMTC is a comprehensive center for training the next generation of smart- and microgrid professionals.

- Curriculum and courses –
  - 4 Courses
  - 3 Certificates
  - 3 Degrees
- Educational equipment and software
- Educational microgrid
New Courses

• **DESG 1120 – Introduction to Power Systems** — energy conversion/generation, transmission, and use

• **DESG 1110 – Introduction to Smart Grids** — Distributed energy and smart grid design consideration

• **DESG 2998 – Distributed Energy Capstone** — team project based — ideas??

• **DESG 2999 – Distributed Energy Internship** — individual experience in a microgrid topic chosen by the student and instructor — employers, research/design project — if you’re an employer interested in internships, contact us!

These have all been approved by the SFCC Curriculum Committee and are in our catalog
Curriculum Side

Certificates

• **Distributed Energy Technician** – focus on basic skills to function as a technician: math, energy conversion, computer skills (programming/cyber security/networking)

• **Grid Modernization** – for working professionals to learn about the fundamental issues of grid modernization

• **IT Support** – IT/certification focus, but with an emphasis on smart- and microgrid issues
Certificate In Distributed Energy Technician
(Nests into Engineering Technologies AAS)

PROGRAM REQUIREMENTS: (38-41 CREDITS)
BLDG 111 – Workplace Health and Safety Credits: 3
DIST 1110 – Introduction to Smart Grids Credits: 4
DIST 1120 – Introduction to Power Systems Credits: 4
ELCT 227 – National Electrical Codes Credits: 2
ELEC 111 - Electronic Fundamentals Credits: 4
ELEC 122 – Digital Circuits Credits: 4
ENVR 113 – Instrumentation and Controls Credits: 3
ISCS 114 – PC Hardware and Software Credits: 4
ISCS 122 – Computer Networks Credits: 3

MATH 1220 – College Algebra Credits: 4 [OR]
MATH 1350 – Introduction to Statistics Credits: 3
SOLR 121 - Design and Installation of PV Systems I Credits: 3

RELATED REQUIREMENTS (1-3 CREDITS)
DIST 268 – Distributed Energy Capstone Credits: 3 [OR]
DIST 298 – Distributed Energy Internship Credits: 1-3 [OR]
ISCS 298 – Information Systems and Computer Science Internship Credits: 1-3
Certificate In Grid Modernization
(Nests into Engineering Technologies AAS)

PROGRAM REQUIREMENTS: (13 CREDITS)
DESG 2298 – Distributed Energy Internship Credits: 2 [OR]
DESG 2299 – Distributed Energy Capstone Credits: 2
DESG 1110 – Introduction to Smart Grids Credits: 4
DESG 1120 – Introduction to Power Systems Credits: 4
SOLR 121 - Design and Installation of Photovoltaic Systems I Credits: 3

RELATED REQUIREMENTS: (3 CREDITS MIN)
ISCS 171 – Computer and Security Fundamentals Credits: 3 [OR]
ISCS 175 – Disaster Recovery Credits: 3 [OR]
ISCS 273 – Computer and Network Defenses and Countermeasures Credits: 3
Certificate In IT Support for Smart- and Microgrids
(Nests into Computer and Information Technologies AAS)

PROGRAM REQUIREMENTS: (29 CREDITS)
ELEC 111 - Electronic Fundamentals Credits: 4
ENVR 113 – Instrumentation and Controls Credits: 3 [OR]
DESG 1110 – Introduction to Smart Grids Credits: 4
DESG 1120 – Introduction to Power Systems Credits: 4
SUST 1130 – Sustainable Energy Technologies Credits: 3
ISCS 114 – PC Hardware and Software Credits: 4
ISCS 122 – Computer Networks Credits: 3
ISCS 171 – Computer and Security Fundamentals Credits: 3
ISCS 273 – Computer and Network Defenses and Countermeasures Credits: 3
ISCS 298 – Information Systems and Computer Science Internship Credits: 1-3
Simulation Capabilities:

- Dedicated Computers
- PowerWorld Simulator – Grid Simulation Software
- HOMER Pro – Microgrid Design Software
- Siemens Campus Microgrid Simulators
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Educational Microgrid
- 12 kW Tracking PV Array
- 100 kW/85 kWh Lithium-ion Energy Storage System
- 30 kW Natural Gas Backup Generator
- 11,000 sf greenhouse and classroom/lab building – about 20 kW peak, 10 kW min, 15 kW average
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Microgrid Loads

- 11,000 sf greenhouse
- CEA classroom/lab
- 3-phase, 480 V
- ~20 kW currently
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12 kW Tracking PV Array

• 3 x 4 kW tracking arrays
• 3 x 4 kW inverters – one per phase
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Energy Storage System (ESS)

- 100 kW/85 kWh
- Aeros Controller
- Demand Reduction
- Resilience for Greenhouse
- Research
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In Progress

• 30 kW natural gas generator
• Load bank – resistive and inductive loads
• Water Catchment system – pumps and controls will become part of the microgrid

Future

• Cold storage,
• the “Dome”
• PV expansion
• Concentrating PV integration
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Campus Microgrid

The educational microgrid is being integrated into the broader campus microgrid project that is part of an energy performance contract with Siemens and moves the campus towards state and federal energy targets.
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Summer Equipment Installations & Our First Intern!

Set up a data acquisition network to enable education, training, and research.