

Electric Storage – Education and Research

Presented by –

Ned Mohan

University of Minnesota

mohan@umn.edu

Energy Storage Summit

University of Minnesota

July 15, 2015

UNIVERSITY OF MINNESOTA
Driven to Discover™

myU > One Stop >

Search U of M Web sites Search

COLLEGE OF Science & Engineering

CSE Home | CSE Directory | Give to CSE | Student Dashboard

CUSP™

Welcome

Welcome to CUSP™, the Consortium of Universities for Sustainable Power. This consortium will include universities that have come together to utilize, collectively evolve and promote the curriculum developed at the University of Minnesota – Twin Cities with the help of funding from various organizations including NSF, ONR (Office of Naval Research), NASA and EPRI.

Available Courses

- Power Electronics
- Electric Power Systems
- Electric Machines and Drives
- Wind Energy Essentials
- Electric Machine Design
- Electricity Markets
- Power Generation, Operation & Control

What is CUSP™?

CUSP™ Curriculum

CUSP™ Members

Join

Forum

- Content is totally free to download
- **211** U.S. Universities have become members

www.cusp.umn.edu

Power Systems:

- Power Systems
- Advanced Power Systems I and II
- Power Generation, Operation and Control
- Power System Protection and Relaying
- Electricity Markets
- High Voltage Insulation, Surge Arresters, Insulation Coordination

Power Electronics:

- Power Electronics
- Advanced Power Electronics I and II
- High Power Electronics in Power Systems: HVDC and FACTS
- Control for Power Electronic Systems

Electric Machines and Drives:

- Electric Drives
- Advanced Electric Drives: Modeling and Control
- Electric Machine Design
- Finite Element Analysis for Designing Electrical Apparatus: Transformers and Electric Machines

Renewable Energy Systems:

- Wind Energy Essentials
- **Solar Electric Systems, Fuel Cells, Storage Systems**
- Energy, Environmental Policies, and Regulatory Issues



5 NAE Members; >10 IEEE Fellows

ONR Grant: Increasing Power Engineering Pipeline Nationwide

Objective: *Increase* the number of university graduates in power engineering by building a robust pipeline of transfer students from community colleges.

Public Two-Year	\$2,713
Public Four-Year In-State	\$7,605

“Sustainable Electricity: Generation, Transmission and Conservation”

Research

- Flywheel-based Energy Storage
- Combining Battery-Storage and PVs

