



DEPARTMENT OF
ELECTRICAL ENGINEERING



NCESR | Nebraska Center for
Energy Sciences Research

UNIVERSITY OF
Nebraska
Lincoln

N
Nebraska Public Power District

Wind Application Center

Jerry Hudgins



Wind and Related Education

- Freshmen Courses
- Senior Electives
- Graduate Courses
- Senior Design Projects
- Research Projects



Energy Sciences Minor

Wind Energy Concepts Introduced

9 credits required

9 breadth credits required

Energy in Society (3)
100-level

Introduction
to
Energy Systems (3)
100-level

Energy, Economy
and Environment (3)
100-level

Biotechnology/
Food Systems*
200-400 Level

Renewable
Energy
Bio-Sources
(Animal Science,
Agronomy)*
200-400 Level

Renewable
Energy
Engineering*
200-400 Level

Energy
Economics/
Policy*
200-400 Level



Introduction to Energy Systems

- Devoted to the exposition of sources of available energy, their geographic distribution, estimated recoverable amounts, sustainability, discussion of trade-offs (economical, environmental, technological), the transformation process in converting source energy into high-quality energy in other forms, future expected energy demand, and the link between power production and water resources.
- Includes renewable/sustainable sources such as wind and solar, etc.



Transfer Student Curriculum - STEP

- "Strengthening Transitions into Engineering Programs" enables students to complete **selected freshman and sophomore engineering courses at the state's community colleges** and transfer seamlessly into the UNL College of Engineering.
- The project goal is to offer transferring community college students the opportunity to complete a baccalaureate engineering degree within a traditional time frame.
- **One of these selected transfer courses is an Introduction to Energy Technology (includes wind technology)**



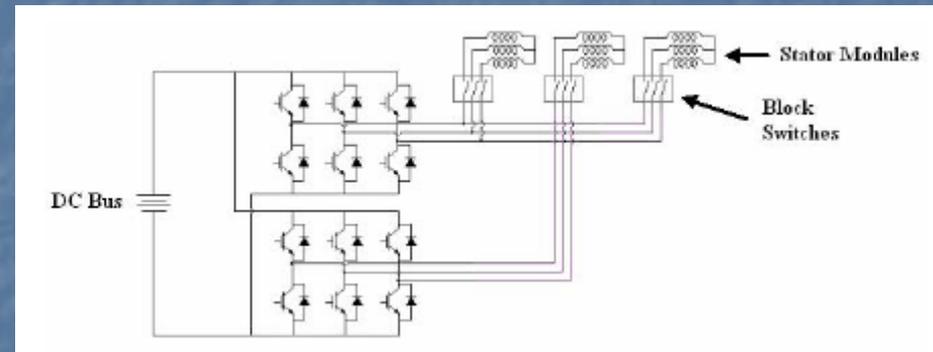
Senior Electives

- **ELEC 498a Power Electronics** - power conditioning and production of dc or ac output such as used in isolated or grid-connected wind turbines
- **ELEC 498b Electric Machines** - understanding of the fundamental design and operation of induction, synchronous, and permanent magnet machines operating as generators (or motors) in applications such as wind turbines.
- **ELEC 498c Renewable Energy Systems** - One-third of this course material is devoted to wind energy systems including basics of aerodynamics, turbine operation, generator design, and the associated power electronics.



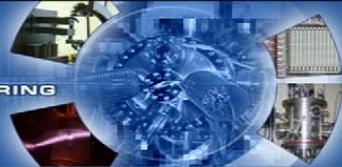
Senior Design Projects

- Data logging system



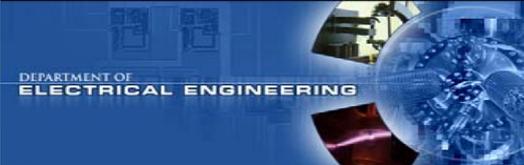
- Small (200 W) turbine operation and modeling, power converter design and fabrication for use with the small turbine and a battery storage system (48 V)
 - 200 W dc/dc converter





Graduate Research

- 2 Skystream turbines purchased
 - 1 to be installed
 - 1 to be used for other power electronics and PM Generator design projects (Grad and UG)
- Monopole tower fabricated by Valmont and moved to sight
- Foundation to be poured
- Utility contacted and will inspect installation and grid connection



- Skystream Turbine Installation at Roger's Memorial Farm

