Proposed Title: Wind Energy Essentials

Catalog Description: (2 Credits; Grading: A-F or S/N): The objective of this course is to familiarize students with various essential aspects in harnessing wind energy and its conversion and delivery as electricity. It will consist of a series of seminars offered by various speakers.

Contact Hours: 2 hrs/week, Thursdays 4:15-6:15 PM; EE/CS 3-111 – it will be offered through UNITE as well.

Course Coordinators:
Ned Mohan – ECE
Fotis Sotiropoulos – CE

Text: None - course notes from various speakers

Prerequisite: Graduate students or qualified senior-year students; by instructor permission

Course Objectives: The course objective is to familiarize students with various essential aspects in harnessing wind energy and its conversion and delivery as electricity.

Course Outcome: A broad understanding of essential elements in wind-electric systems: turbines, wind-plant development and their integration into the utility grid, environmental impacts, wind forecasting, etc.

Grading Procedure:
For A-F: Online HW Problems plus a proctored Final Exam
For S/N: Online HW Problems only

Tentative Course Outline & Lecturers

1. Introduction (Fotis Sotiropoulos - CE, Ned Mohan - ECE)
2. New Challenges in a High Penetration of Wind Power (Ed Muljadi, Senior Engineer, National Wind Technology Center, NREL)
3. Gears/Transmission (Kim Stelson - ME)
4. Blade Aerodynamics and Acoustics (Fotis Sotiropoulos, Roger Arndt - CE)
5. Foundation Design (Chris Kopchynski, Jennifer Entwistle, Barr Engineering)
6. Controls (Mihailo Jovanovic - ECE, Gary Balas - AEM)
7. Electric Generation and Power Electronics (Ned Mohan - ECE)
8. Materials and Structural Reliability (Sue Mantell - ME, Henryk Stolarski - CE)
9. Wind Assessment and Wind Forecasting (Mark Ahlstrom, CEO, WindLogics Inc.)
10. Grid Integration (Matt Schuerger, Energy Systems Consulting Services)
12. Environmental Considerations – Radar Interference (Mos Kaveh – ECE, others TBD)

Participating Univ. of Minnesota Departments: Electrical & Computer Engineering (ECE); Civil Engineering (CE); Mechanical Engineering (ME); Aerospace Engineering & Mechanics (AEM)