GREEN ELECTRIC ENERGY

Fall 2016 Course Syllabus

Course Title:	**Green Electric Energy**
Course Number:	**ECE 333**
CRN:	**54415**
Time:	**9:30 a.m. - 10:50 a.m., Tuesdays and Thursdays**
Location:	**2017 ECE Bldg.**
Credit:	**3 hours**
Instructors:	**George Gross, (217) 244-6346, gross@illinois.edu**
Teaching Assistant:	**Adriano Abrantes, adriano2@illinois.edu**
Secretary:	**Robin Smith, (217) 333-6592, rsmth@illinois.edu**
Office Hours:	**Gross:11 a.m.–12 p.m., Tues/Thursdays in 4052 ECEB** **Abrantes: 4 – 6 p.m., Wednesdays in Rm. 4036, ECEB**

Prerequisites: ECE 205 or ECE 210

Catalogue Description: **The course explores the technical, economic, environmental and policy aspects of renewable and alternative energy systems to provide a comprehensive picture of their role in meeting society's electricity needs. The upsurge in the world-wide demand for oil-based resources, the restructuring of the electricity industry, the advances in engineering technology and the increasing interest in environmental protection are presenting unparalleled challenges to the electric power industry. The role of new energy resource technologies, the application of power electronics, the use of demand-side management, and the effects of market forces in addressing these challenges are discussed. The course covers the basics of energy production from renewable sources, the relevant thermodynamics background, the structure and nature of the interconnected electric power system and the critical need for environmentally sensitive solutions. In addition, the economic and regulatory policy aspects of electricity and electricity markets are treated.**

Text (required): **Gilbert M. Masters, *Renewable and Efficient Electric Power Systems*, second edition, IEEE Press - Wiley, 2013. ISBN 978-1-118-14062-8**

Grading: **The course grade is based on quizzes (15 %), two midterm exams (each 25 %), and the final exam (35 %). Homework assignments are based on the text and notes but do not require submission and are not graded. The two midterms cover the parts of the course up to the date of each exam. The final exam is comprehensive and covers all the topics in the course.**

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OUTLINE OF TOPICS

- **General overview of electricity demand, supply, industry structure, interconnected system operations and state of technology**
- **Nature and role of alternative generation sources**
- **Review of concepts in electric circuit analysis**
- **Engineering aspects of alternative source generation technologies: thermodynamics considerations; solar resource and solar array systems; concentrated solar plants; wind resource and wind generation systems; other renewable resource technologies; economics of various technologies; environmental aspects**
- **The role of electrical storage technologies**
- **The demand picture: the nature of electrical loads; time variation, periodicity and price dependence aspects**
- **Demand management and energy conservation; efficiency improvements; load management; price-responsive demand; and, the role of new technologies**
- **Energy economics and electricity market basics**
- **Integration of renewable generation into the grid**
- **Regulatory policy issues**

Final Exam: Tuesday, December 13, 2016, 7:00 - 10:00 p.m.