

# GREEN ELECTRIC ENERGY

## Fall 2021 Course Syllabus

<b>Course Title:</b>	Green Electric Energy
<b>Course Number:</b>	ECE 333
<b>CRN:</b>	54415
<b>Time:</b>	9:30 a.m. - 10:50 a.m., Tuesdays and Thursdays
<b>Location:</b>	Online Zoom lectures
<b>Credit:</b>	3 hours
<b>Instructor:</b>	George Gross, 244-6346; <a href="mailto:gross@illinois.edu">gross@illinois.edu</a>
<b>Teaching Assistant:</b>	Muhammad Talal Khalid; <a href="mailto:mkhalid4@illinois.edu">mkhalid4@illinois.edu</a>
<b>Secretary:</b>	Robin Smith, 333-6592, <a href="mailto:rsmth@illinois.edu">rsmth@illinois.edu</a>
<b>Online Office Hours:</b>	Gross: 11 a.m. – noon, Tue/Thu, by appointment Talal: 3 p.m. – 4 p.m., Fri
<b>Prerequisites:</b>	ECE 205 or ECE 210
<b>Catalogue Description:</b>	<p>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.</p>
<b>Text (required):</b>	Gilbert M. Masters, <i>Renewable and Efficient Electric Power Systems</i> , second edition, IEEE Press - Wiley, 2013. ISBN 978-1-118-14062-8
<b>Grading:</b>	<p>The course grade is based on quizzes (15 %), two midterm exams (each 20 %), and the final exam (45 %). Homework assignments are based on the text and notes and are not graded. Quiz problems are selected to resemble those of the homework assignments. 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.</p>

## **ECE 333 FALL 2021**

### **GREEN ELECTRIC ENERGY 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 power plants; wind resource and wind generation systems; other renewable resource technologies; economics of various technologies; environmental aspects**
- **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**
- **Energy economics and electricity market basics**
- **Integration of renewable generation into the grid**
- **The role of storage technologies in renewable implementation**
- **Examination of policy issues: regulation and government impacts**

**Final Exam date: Monday, December 13, 8:00 - 11:00 a.m.**