Division of Engineering
Colorado School of Mines

EGGN498 - Practical Design of Small Renewable Energy Systems

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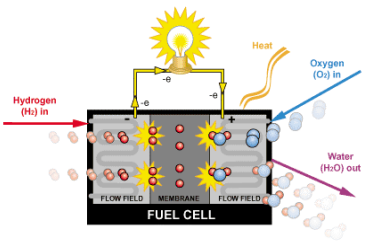
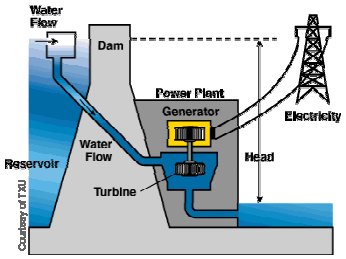
TR (10:00 am – 11:15 am)

This course has been designed to cover practical topics related to the design of alternative energy based systems. It is assumed that students will have some basic and broad knowledge of the principles of electrical machines, thermodynamics, electronics, and fundamentals of electric power systems. One of the main objectives of this course is to focus on the interdisciplinary aspects of integration of the alternative sources of energy, including hydropower, wind power, photovoltaic, gas, biomass and energy storage for those systems. Power electronic systems will be discussed and how inverters can be used for stand-alone and grid-connected electrical energy applications.

Outline

1. **RENEWABLE SOURCES OF ENERGY: AN INTRODUCTION**
2. **PRINCIPLES OF ELECTRIC ENERGY CONVERSION**
3. **HYDROELECTRIC POWER PLANTS**
4. **WIND POWER PLANTS**
5. **PHOTOVOLTAIC POWER PLANTS**
6. **POWER PLANTS WITH FUEL CELLS**
7. **THE INDUCTION GENERATOR**
8. **STORAGE SYSTEMS**
9. **POWER ELECTRONICS FOR INTERCONNECTION**
10. **ECONOMICAL EVALUATION AND IMPLEMENTATION**





Text: Textbook to be defined. Reading list (provided during the course).
Prerequisites: *EGGN382 or Consent of Instructor.*

Grading:

Weighting of course efforts will be given as follows:

Outline of Technical Papers: 20%
Assignments: 25%
Seminar 25 %
Final Project: 30%

Final grades will be based on a linear scale: (90+=A, 80-89=B, 70-79=C).

Outline of Technical Papers

Students will turn in outline of assigned paper every two weeks. Those paper reports will be based on IEEE literature, manufacturer datasheets and technical reports. Each paper outline will have to summarize the main ideas of the document, in a Word file, one and half space paragraph format, 5 pages maximum.

Assignment

Assignments may have several forms: it can be a formal homework, a problem to be worked or finished at home, a modeling or simulation exercise. Those several homework formats are intended to be an interactive learning tool.

Seminar:

At the end of the course students will be required to present a seminar on Renewable Energy and Distributed Generation related application. The presentation slides will be available for everyone in the class.

Final Project

A final project (individual) approaching a case study analysis, design and modeling. A proposal for your final project will be due by the middle of semester. The seminar must be supported with a comprehensive technical paper formatted in IEEE style.