Instructors
Bob Tompson, Tushar K. Ghosh, S, Loyalka and Mark A. Prelas

University of Missouri
E2433 Lafferre Hall
Phone: (573) 882-9691
E-Mail: prelasm@missouri.edu  Office hours: questions can be submitted via email

Description
This is a general overview of energy systems, renewable and non-renewable energy sources, and advances in energy applications.

Recommended Text
1. Energy Resources and Systems
   Volume 1: Fundamentals and Non-renewable Resources
   Tushar K Ghosh and Mark A. Prelas, Springer
2. Energy Resources and Systems
   Volume 2: Renewable Resources
   Tushar K Ghosh and Mark A. Prelas, Springer

Course Descriptions and Goals
General overview of energy systems, renewable and non-renewable energy sources, and advances in energy applications.

Grading
Homework 40% (~10)**
Participation 10%
Project 1 20% (midterm exam)
Project 2 30% (final exam), seminar required for the graduate

There will be approximately 10 homework assignments during the semester. Homework will be assigned on blackboard, and must be submitted by due date (usually a week) from the assignment. Later
submission may cause point deduction (50% deduction for one week delay and no point after that) if there are no prior notification or excuse. For the final project, the power point is required for the graduate students.

**Grading scale** (tentative) will be announced when it is fixed

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**Lesson plan (could be changed without notice):**

Lecture 1: Instructor/Course introduction / Energy and Economy
Lecture 2: Engineering economics 1
Lecture 3: Engineering economics 2
Lecture 4: Engineering economics 3
Lecture 5: Physics of units and dimensions
Lecture 6: Heat transfer and thermo-cycle 1
Lecture 7: Heat transfer and thermo-cycle 2
Lecture 8: Coal 1
Lecture 9: Coal 2
Lecture 10: Natural gas 1
Lecture 11: Natural gas 2
Lecture 12: Oil
Lecture 13: Nuclear energy 1
Lecture 14: Nuclear energy 2
Lecture 15: Hubbert model
Lecture 16: **Project review**
Lecture 17: Wind energy
Lecture 18: Solar energy
Lecture 19: Geothermal energy
Lecture 20: Ocean energy
Lecture 21: Bioenergy
Lecture 22: Ethanol
Lecture 23: Hydrogen energy
Lecture 24: Fuel cell 1
Lecture 25: Fuel cell 2
Lecture 26: Environmental effects 1
Lecture 27: Environmental effects 2
Lecture 28: Semester comprehensive review
Lecture 29: *Project review 2*
Lecture 30: *Project review 3 (Final exam week)*