COURSE INFORMATION FORM

DISCIPLINE: Geology
COURSE TITLE: Energy and the Environment

CR.HR: 5  LECT HR: 3  LAB HR: 4  CLIN/INTERN HR: 0  CLOCK HR: 0

CATALOG DESCRIPTION
Introduces fundamental concepts of energy generation and environmental impact. Analysis of energy fundamentals, fossil fuel exploration and use, atmospheric pollution, global warming, nuclear energy, alternative energy sources and energy conservation. Optional field trips.

PREREQUISITES
None

EXPECTED STUDENT OUTCOMES IN THE COURSE
Upon completion of this course, the student will be able to:

1. List, define, and apply energy fundamentals involving motion, work, power, temperature, and heat
2. Assess U.S. and global energy use patterns
3. Demonstrate an understanding of Earth’s physical and atmospheric processes
4. Explain the origin, location, and use of fossil fuels
5. Evaluate environmental consequences of fossil fuels for the present and the future
6. Evaluate global climate change
7. Analyze the positive and negative uses of nuclear energy and its impact to the environment
8. Assess alternative energy sources and their environmental impacts
CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Exams (1-8)
2. Laboratory Exercises (1-8)
3. Laboratory project (8)
4. Research papers (1-8)

PROGRAM-LEVEL OUTCOMES ADDRESSED
1. Use the scientific method to develop and test hypotheses and to draw defensible conclusions
2. Evaluate scientific evidence and argument
3. Describe and apply the current theoretical explanations of the origin of the physical universe and the laws governing it
4. Explain how human choices affect Earth and living systems

General Education Outcomes
Specify which general education outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes and assessment measures.

Occupational Program Outcomes
Specify which occupational program outcomes, if any, are substantially addressed by the course by completing the “Course/Program Assessment Matrix” to show the relationship between course and program outcomes to assessment measures.
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Foundations of Energy
   A. Fundamental concepts of energy
   B. Energy resources
   C. Energy use patterns

II. Energy mechanics
   A. Motion
   B. Work
   C. Power
   D. Conservation of energy
   E. Heat
   F. Laws of thermodynamics

III. Principles of Electricity
   A. Electrical units
   B. Currents
   C. Circuits
   D. Ohm’s Law
   E. Superconductivity*

IV. Earth processes
   A. Plate tectonics
   B. Structural Geology
      1. Folding
      2. Faulting
   C. Earth materials

V. Fossil fuels
   A. Oil
   B. Natural Gas
   C. Coal
   D. Other oil sources*
      1. Oil shale
      2. Tar sands
      3. Coal gasification
   E. Oil and gas exploration*
      1. Topographic maps
      2. Geologic maps
      3. Seismic exploration

VI. Environmental effects of fossil fuels
   A. Earth’s atmosphere
   B. Air pollution
   C. Global climate change
VII. Nuclear Energy
A. Radioactivity
B. Waste
C. Biological effects
D. Fusion

VIII. Alternative energy sources
A. Geothermal
B. Wind
C. Solar
D. Hydroelectric
E. Biomass