COURSE OUTLINE

UTI111	ALTERNATIVE ENERGY SOURCES	3
Course Number	**Course Title**	**Credits**

3	Ready for ENG101 and MAT135	15 week
Hours: lecture/Lab/Other	**Pre-requisite**	**Implementation sem/year**

Catalog description (2006-2009 Catalog):

An introduction to electrical energy generation and its impact on the environment and society. Various energy alternatives are examined, along with the positive and negative aspects of each.

Required texts/other materials: N/A

Revision date:
2008

Course coordinator: **Professor Dominick DeFino, Office: ET130**
E-mail: defino@mccc.edu

Information resources:
Books
Websites

Other learning resources:

Course Competencies/Goals:

The student will be able to:

- Describe current trends in electrical energy production.
- Describe the need for alternative sources of energy.
- Demonstrate, through written examples, an understanding of the history of the energy generation industry.
- Demonstrate ability to use the internet to research current alternatives to fossil fuels.
- Work with one or more team members to create a report detailing the impact of fossil fuels on the environment and society.
- Demonstrate an understanding of why it is important for energy companies to focus on " going green"
- Use the internet to define job opportunities in the industries related to alternative energy sources.

Course-specific General Education Knowledge Goals and Core Skills.

- **Goal 1. Communication.** Students will communicate effectively in both speech and writing.
- **Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
- **Goal 3. Science.** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
- **Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
- **Goal 8. Diversity.** Students will understand the importance of a global perspective and culturally diverse peoples.

MCCC Core Skills

- **Goal A. Written and Oral Communication in English.** Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.
- **Goal B. Critical Thinking and Problem-solving.** Students will use critical thinking and problem solving skills in analyzing information.
- **Goal D. Information Literacy.** Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
- **Goal E. Computer Literacy.** Students will use computers to access, analyze or present information, solve problems, and communicate with others.
- **Goal F. Collaboration and Cooperation.** Students will develop the interpersonal skills required for effective performance in group situations.
- **Goal G. Intra-Cultural and Inter-Cultural Responsibility.** Students will demonstrate an awareness of the responsibilities of intelligent citizenship in a diverse and pluralistic society, and will demonstrate cultural, global, and environmental awareness.

Units of study in detail.

Unit I: Electric Power Generation and Transmission

The student will be able to…

- Describe the history of electrical energy production.
- Describe the current status of the industry as it pertains to the methods of energy production.
- Describe the effects on the climate and society of current production techniques.
- Transmission and distribution networks.
- Write a report detailing the Pennsylvania, New Jersey, and Maryland Power Pool (PJM).
- List the primary methods of energy production used today.
- Describe the advantages and disadvantages of each method.
- Calculate power usage given sufficient information.
- Describe the capacity factor of a power generating plant.
- Describe why it is important for energy companies to focus on energy conservation and alternative energy sources.

Unit II: Energy Efficiency and Renewable Energy

Learning Objectives

The student will be able to…

- Describe energy efficiency and why it is important.
- List the viable renewable energy sources and the advantages and disadvantages of each.
- Report on Department of Energy commitment to developing renewable energy.
- Write a summary report related to Government Mandated standards relative to
- Energy Efficiency and Renewable Energy (EERE).
- List and describe ways energy conservation can be accomplished in the home.
- List and describe ways energy conservation can be accomplished in business.
- List and describe ways energy conservation can be accomplished in the industry.
- Prepare a report on industry/job growth in energy efficiency and conservation.
- Describe federal initiatives related to carbon regulation and RGGI.
- Report on renewable portfolio standards and policies related to efficiency and renewable energy sources.

Unit III: Solar Power Generation

The student will be able to…

- Describe how solar power is generated.
- List the advantages and disadvantages of solar power.
- Calculate the efficiency of a solar panel system.
- Describe how solar power generation fits into conservation initiative.

Unit IV: Passive Solar Heating

The student will be able to…

- Describe passive solar heating.
- List the advantages and disadvantages of passive solar heating.
- Calculate heat loss from a building given sufficient information.
- Describe how passive solar heating fits into the conservation initiative.

Unit V: Fuel Cells

The student will be able to…

- Describe how a fuel functions.
- List the basic parts of a fuel cell.
- Calculate the efficiency of a fuel cell.
- Describe the viability of fuel cells as a source of electric power.

Unit VI: Wind Energy

- ***The student will be able to…***
- Describe how a wind powered generator functions.
- List the advantages and disadvantages of wind power.
- Calculate the efficiency of a wind farm system.
- Describe how wind power generation fits into the conservation initiative.

Unit VII: Ocean Energy

The student will be able to…

- List the various types of alternate water powered energy sources.
- Describe the advantages and disadvantages of each.
- Calculate the efficiency of the listed types.
- Describe how water powered generation fits into the conservation initiative.
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Unit VIII: Geothermal Energy

The student will be able to…

- Describe how geothermal energy sources and devices function.
- Describe the advantages and disadvantages of these systems.
- Calculate the efficiency of these systems.
- Describe how these systems fit into the conservation initiative.

Unit IX: Biofuels

The student will be able to…

- Describe the general areas of use of biofuels.
- Calculate the efficiency of biofuel systems.
- Describe the advantages and disadvantages of biofuels in general and as it relates to electric energy production.

Unit X: Hydroelectric Power

The student will be able to…

- Describe the current status of this technology.
- Calculate the efficiency of a hydroelectric system
- Describe how these systems fit into the conservation initiative.
- Describe the advantages and disadvantages of hydroelectric power.

Unit XI: **Nuclear Power**

The student will be able to…

- Describe the current status of this technology.
- Calculate the efficiency of a nuclear system.
- Describe how these systems fit into the conservation initiative.
- Describe the advantages and disadvantages of nuclear power.

Evaluation of student learning:

Students' achievement of the course objectives will be evaluated through the use of the following:

- Active participation in class.
- Four Unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives. (CG1&2)
- Two papers assessing students' comprehension of terminology and practices related to the unit objectives. (GA&B, CG1&2)
- Three research reports [Unit 1 (E), Unit 2 (C) and (H).

Evaluation Tools	Percentage Of Grade
4 Unit Tests	40%
2 Unit papers	20%
3 Reports	30%
Class Participation	10%
Total	100%

Academic Integrity Statement:

Students are expected to comply with the college-wide requirements for academic integrity. Mercer County Community College is committed to Academic Integrity—the honest, fair, and continuing pursuit of knowledge, free from fraud or deception. This implies that students are expected to be responsible for their own work. Presenting another individual's work as one's own and receiving excessive help from another individual will qualify as a violation of Academic Integrity. The entire policy on Academic Integrity is located in the Student handbook and is found on the college website (http://www.mccc.edu/admissions_policies_integrity.shtml).

Students with Disabilities

Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community College are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic Support Services. Ms. Stinson's office is LB221, and she can be reached at (609) 570-3525.