RC201

Energy and the Environment

3 Credits

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Energy and the Environment

Calendar Description

This course examines the global aspects of energy movement in the natural environment, and where and how products like carbon are naturally stored and cycled. Our current energy production practices are reviewed in this context, and the potential environmental concerns associated with them are identified, including greenhouse gases and other potential contaminants. The course draws linkages to where we are at today, and where we may be in the future if changes are not implemented.

Rationale

This is a required course for the Renewable Energy and Conservation program. Human activities consume large amounts of energy. As the availability of energy resources changes, and the consequences of energy use become better understood, energy production practices are being re-evaluated. Knowledge of how the planet uses, stores, and transfers energy is essential to making optimal decisions on energy production practices. The student will acquire an overview of the energy sources available, the advantages and limitations of their use, and the environmental effects associated with each. This course provides context for the courses following in the Renewable Energy and Conservation program.

Prerequisites

None

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. summarize the concept of energy.
2. recognize how much energy the world is consuming.

3. describe the general physical characteristics and energy relationships of the geosphere, atmosphere, hydrosphere, and biosphere, and how human activities can affect these spheres.
4. describe the processes of the hydrologic, carbon, nitrogen, sulphur and phosphorus cycles, and how human activities can affect these processes.
5. describe the application, benefits, and disadvantages of each non-renewable energy source (coal, oil, gas, non-conventional hydrocarbons, nuclear energy).
6. describe what renewable energies are currently being used or developed.
7. describe the application, benefits, and disadvantages of each renewable energy source (solar, wind, tidal, wave and ocean, hydroelectric, biomass and biofuels, geothermal and ground source).
8. describe factors to be considered when integrating renewable energy.

Resource Materials

***Required Text(s)*:**
This text will be mailed out to registered students:
Peake, S. (editor). 2018. Renewable Energy: Power for a Sustainable Future. 4th ed.

Oxford University Press, Oxford, England.

***Reference Text(s)*:**
None

Conduct of Course

This course consists of the equivalent of 45 hours of lecture delivered through the Internet using an online learning manager program. Course content modules and links to assigned readings will be available on-line. A course facilitator will be available to guide the student through the course, answer any questions, and grade assignments. Students are expected to participate in on-line discussion forums and synchronous conference discussions with other classmates and the course facilitator. Assignments will be submitted electronically by email or through the learning manager program. Exams will be taken on-line. In order to complete the course on time, deadlines for assignments, exam, and projects will be enforced.

Evaluation Procedures

Grades will be assigned with the following weightings:

Evaluation Tool	Weighting
20 Assignments/Assessments/Discussions worth 3% each	60%
Midterm Exam	20%
Final Exam	20%
Total	100%

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Active participation is required in all courses within the Renewable Energy and Conservation certificate and diploma programs. Each facilitator designates these requirements through the use of tools within the management system and personal contact with learners.

These expectations can be given marks as part of the assessment process. Each course outlines these expectations within the course structure.

For example, learners can be asked to demonstrate their participation/attendance through discussion forums, sharing research results, contributing relevant information, submitting assignments, communicating with colleagues and the facilitator, and participating in synchronous meetings or asynchronous activities.

Attendance is considered vital to the learning process. Absenteeism is recorded. For example, if a discussion forum is organized; the learner is expected to attend as per the guidelines set by the facilitator.

Students can request for an excused absence. An excused absence is one that is verified with your facilitator.

NOTE: Any exceptions to the above attendance policy (e.g. family or work-related issues) **must** be approved in writing by the Department Chair **prior** to the beginning of the course.

It is the student's responsibility to know their own absentee record.

Course Units/Topics

1. Energy
    1. Introduction
    2. Energy
    3. World Energy Use

2. The Environment
    1. Environment
    2. Geosphere
    3. Atmosphere
    4. Hydrosphere
    5. Biosphere
    6. Carbon Cycle
    7. Water Cycle
    8. Nitrogen, Sulphur & Phosphorus Cycles

3. Non-Renewable Energy Sources
    1. Non-Renewable Energy
    2. Coal
    3. Oil
    4. Gas
    5. Non-conventional Hydrocarbons
    6. Nuclear Energy

4. Renewable Energy Sources
    1. Renewable Energy
    2. Solar Thermal Energy
    3. Solar Photovoltaics
    4. Biomass and Biofuels
    5. Hydroelectric Power
    6. Tidal Energy
    7. Wind Energy
    8. Wave and Ocean Energy
    9. Geothermal Energy and Ground Source Heat Pumps
    10. Integrating Renewable Energy

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