STATE UNIVERSITY OF NEW YORK !
COLLEGE OF TECHNOLOGY !
CANTON, NEW YORK !

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
AREA 110 - INTRODUCTION TO ALTERNATIVE ENERGY

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Canino School of Engineering Technology !

Department: Mechanical & Energy Technology !

Semester/Year: Fall/2018 !

A. **TITLE**: Introduction to Alternative Energy

B. **COURSE NUMBER:** AREA 110

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 3 **per week**
 # Lab Hours: **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER !
***If course satisfies more than one*:** GER !

F. **SEMESTER(S) OFFERED: Fall** ☒ **Spring** ☐ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

Students will discuss the usefulness of various types of energies as they relate to the future of this planet. Topics will include passive and active solar systems, fuel cells, hydroelectric power, geothermal heat transfer, and wind energy.

H. **PRE-REQUISITES: None** ☒ **Yes** ☐ **If yes, list below:**

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
Identify the basic attributes of each form of energy	SO #1 An appropriate mastery of the knowledge, techniques, and skills, and modern tools of their disciplines utilizing renewable energy systems and design parameters		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA Subsets Subsets Subsets
Identify the basic equipment necessary to produce energy from each alternative energy source.	SO # 6 An ability to identify, analyze and solve technical problems.		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	IA Subsets Subsets Subsets
Make simple cost comparisons between fossil based and alternative based energies.	SO # 7 An ability to communicate effectively through written, oral, and graphic methods related to renewable energy systems.		1-Comm Skills 5-Ind, Prof, Disc, Know Skills ISLO	W Subsets Subsets Subsets
Describe the benefits for each type of alternative energy for a local and global economy.	Program SO #10: A knowledge of the impact of engineering technology solutions in a societal and global context.		1-Comm Skills 4-Soc Respons ISLO	W GL Subsets Subsets
			ISLO ISLO ISLO	Subsets Subsets Subsets Subsets

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator !

J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Aubrecht, Gordon, Energy Physical, environmental, and Social Impact, 3rd edition, Prentice Hall 2006

L. REFERENCES:

Deffeyes, Kenneth S., Hubbert's Peak: The Impending World Oil Shortage, 2003.
Goodstein, David, Out of Gas: The End of the Age of Oil, 2005

M. EQUIPMENT: None ☐ **Needed:** Technology enhanced classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Tests, quizzes, homework, written essays in and outside of class.

P. DETAILED COURSE OUTLINE:

I. Defining alternative and renewable energy
- **a. What is energy and why is it necessary**
- **b. Identify alternative and renewable energies.**
- **c. Overview of the global energy demands.**

II. A look at fossil fuels
- **a. How fossil based fuels are formed**
- **b. Global reserves of oil, natural gas, and coal**
- **c. Discover the limits of a finite resource**

III. Solar energy
- **a. Passive**
- **b. Photovoltaic**
- **c. Equipment that makes it possible to gather**

IV. Fuel cells
- **a. History of fuel cells**
- **b. What are fuel cells?**

c. Different types currently used and being developed
d. Fuel storage

V. Wind energy
a. How wind is formed
b. How to predict wind based on different factors
c. Looking at different locations and identifying an optimal site
d. Wind farms
e. Equipment necessary for energy conversion

VI. Hydroelectric
a. What is hydroelectric energy?
b. Environmental impacts
c. Amount of energy production vs. demand
d. How a hydroelectric dam functions

VII. Geothermal
a. What is geothermal energy?
b. Ideal locations on planet Earth for large scale production
c. Small scale residential use of geothermal energy !
d .Heat transfer to produce useable energy !
e. Cost comparison to fossil fuels
f. Is this the only energy needed to heat and cool a home?

VIII. Bio-fuels
a. Define bio-fuels
b. What works best?
c. Cost
d. Advantages vs. disadvantages

IX. Cost comparisons
a. Simple cost comparisons of fossil based and alternative energies.
b. Government support for both types
c. Cost to consumers
d. Hidden cost of each fuel (environment, military defense, taxes, etc.)

X. Current topics in alternative energy

Q. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐