SAM HOUSTON STATE UNIVERSITY
COLLEGE OF SCIENCE and ENGINEERING TECHOLOGY

DEPARTMENT OF ENGINEERING TECHNOLOGY

COURSE SYLLABUS
ONLINE COURSE

ETEC 4340 ALTERNATIVE ENERGY TECHNOLOGY

Spring - 2018

Department: Engineering Technology
Course Type: Online - Distance Learning
Course Name/Title: ETEC 4340 Alternative Energy Technology
Semester: Spring 2018
Credit: 3 Hours
Location/Time: Online Course - Blackboard
Instructor: Faruk Yildiz
Office: Fred Pirkle Engineering Technology Center, Room 400G
Email: fxy001@shsu.edu
Phone: 936-294-3774
Office Hours: By email or phone

Course Catalog Description: This course examines existing and potential ambient alternative energy sources, production capacities, energy harvesting, conversion, and storage techniques. The course will also examine fundamental concepts, terminology, definitions, and nomenclature common to all energy systems. Prerequisite: ETEE 1340 or senior standing.

Course Text Book: *No textbook is required for the course*. Variety of online resources will be accessed in this course. Additional handouts, readings, and course materials will be available on-line via Blackboard, accessible only by those students who are enrolled in the course.

Reference Books:

- *Renewable Energy Systems*, David Buchla, Thomas Kissell, Thomas Floyd, Prentice Hall, 2015, ISBN 13: 978-0-13-262251-6
- *Introduction to Wind Principles*, Thomas E. Kissell, Prentice Hall, 2011, ISBN 10: 0132125331, ISBN 13: 9780132125338.
- *Hydrogen Energy and Vehicle Systems*, Scott E. Grasman, CRC Press Taylor & Francis Group, 2012, ISBN: 978-1-4398-2681-2
- *Renewable Energy A Frist Course*, Robert Ehrlich, CRC Press Taylor & Francis Group, 2013, ISBN: 978-1-4398-6115-8.
- *Photovoltaic Systems 2nd Edition*, James P. Dunlop, National Joint Apprenticeship and Training Committee for the Electrical Industry, American Technical Publishers, 2010. ISBN: 978-0-8269-1308-1.
- *Introduction to Wind Principles*, Thomas E. Kissell, Prentice Hall, 2011, ISBN 10: 0132125331, ISBN 13: 9780132125338.
- *Alternative Energy Systems and Applications*, B.K. Hodge, Wiley Publication, 2010, ISBN: 9780470142509.
- *Alternative Energy Systems in Building Design*, Peter Gevorkian, McGraw-Hill, 2010, ISBN: 9780071621472.
- *Electric Energy: An Introduction 2nd Edition*, Mohamed A. El-Sharkawi, CRC Press Taylor & Francis Group, 2010, ISBN: 9781420062199.
- *Energy Systems Engineering: Evaluation & Implementation*, Francis M. Vanek, Louis D. Albright, McGraw-Hill, 2008, ISBN: 9780071495936.
- *Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living,* Schaeffer, John. 2007.

- Boyle, Godfrey. 2004. *Renewable Energy (2nd edition).* Oxford University Press, 450 pages (ISBN: 0-19-926178-4).
- Boyle, Godfrey, Bob Everett, and Janet Ramage (eds.) 2004. *Energy Systems and Sustainability: Power for a Sustainable Future.* Oxford University Press, 619 pages (ISBN: 0-19-926179-2)

Course Objectives: Energy systems play a critical role in everyday life, and as such are an important part of engineering and technology. This course serves as an introductory course in alternative energy with emphasis on energy harvesting, conversion, and storage systems. This course will be a combination of lecture, demonstrations, student inquiry, in-class problem solving, and hands-on lab projects. The students will be required to complete a series of exercises/lab projects and/or tests that will reflect their knowledge of the stated objectives. This course is one of the essential components for the employability of IT students, especially in industry and construction fields. This type of course is becoming essential part of engineering and engineering/industrial technology program curricula. Because students graduate from these programs will be involved in at least buying, managing, and or trading alternative energies during their careers as part of their jobs requirements. It is essential that students at least needs to be familiar with alternative energy sources and their applications. The course concludes with a general review of how to integrate energy harvesting technologies into a system providing a continuous uninterrupted power stream.

- Be familiar with traditional energy sources
- Learn characteristics of renewable energy resources
- Distinguish renewable energy resources according to their capacities
- List and generally explain the main sources of energy and their primary applications
- List and describe the primary renewable energy resources and technologies
- Describe/illustrate basic electrical concepts and system components
- Understand energy efficiency and conservation

Class Structure and Attendance: This is an online class. The entire information specific to the course will be distributed via Blackboard and students will be prompted to the information links regularly. Lectures with presentations, readings, discussions, projects, homework assignments will constitute the structure of the course. The make-up assignments and exams will be given only in the case of documented physical illness (In this case, students must inform instructor at least 24 hours before the exam and provide medical excuse letter).

Homework Assignments: All assignments are uploaded to blackboard and available for students. Students are required to take assignments through online system before the due date of the assignments. Due dates are indicated below on the tentative schedule. After due date (indicated on the tentative schedule below) the assignment will be unavailable and no further access will be granted. There are specific dates for the assignments. Students must follow these due dates otherwise system will automatically remove the assignment after the due date. No credit will be given for late assignments (except documented physical illness). *Assignments must be submitted through Blackboard system when the submission link is open on specific dates. There are total of **4 HW assignments** for this course. HW assignments are located under specific weeks. When*

students click on the HW#1 the link will take students directly to the assignment for completion and submission.

Grading: Evaluation is a shared responsibility between the teacher and the student. The purpose of the evaluation is to demonstrate how well the professor has taught and the student has learned specific course materials, the principles, concepts and terms relevant to the renewable energy field, and to determine the students' ability to apply that knowledge to specific situations.

Grading Scale: The final grade will be based on the following requirements.

Midterm Test	**30%**
Final Exam	**30%**
Term Project/Poster	**20%**
Homework Assignments	**20%**
Total	**100%**

Percentage range	Grade
90 – 100	A
80 – 89	B
70 – 79	C
60– 69	D
0-59	F

Course Project: A term project must be completed and presented with a poster in this course. At the beginning of the semester, each student will be assigned to a project. Each student will do a project addressing a renewable energy resource/topic by researching, developing, and preparing a renewable energy resource portfolio. The instructor must approve proposed project topics. A technical and an economic investigation of a specific alternative energy source of specific interest to the student will be completed. The project will be worth 20% of the total course score. Student must submit a poster ***(36 X 48 inches)*** about the researched topic. A template for the poster will be posted to blackboard as an example and a reference guide.

Project Format: The project assignment is to research a specific topic assessing a sustainable or renewable energy technology or sub-technology of student's choice. Project research/poster can be based on library research or on real industry/business problems. Upon completing the project, student should be an "expert" on the topic that has been chosen. Further details regarding the project can be found on the course project link on Blackboard. Student must follow directions about the poster format and selected/assigned research topic. For example: If student decided to do research about "geothermal energy", then this topic should be introduced under introduction section with related citations and references. In the following sections of the poster all the types and its applications should be explained and listed. ***Project posters should be supported with graphs, tables, pictures etc***. For all the outsource graphs, tables, and pictures citations must be placed near the item and reference section should have full link to the cited item. For instance, if a picture or graphs copied from a link related to the topic, that source should be listed under references. *Students are not required to print the posters. For grading purposes, an electronic copy of the poster should be submitted via blackboard.*

Poster Format: 36 X 48 inches (Width 36 and Length 48). Use 30 as font size for actual text, 60 font size for headings. If student decide to use different format, instructor approval is required before design of the poster. For the poster design, Microsoft Publisher is a suggested software tool. If the software is not available then any freeware software is acceptable after instructor approval. The suggested formats in the case Microsoft Publisher is unavailable to student are: Photoshop (PSD) and Microsoft Power Point (PPTX). A template for the format will be posted to SHSU

online. All the work should be submitted through SHSU-Blackboard or via email. Student should check his/her emails and Blackboard for updates. Poster must have at least following titles/subtitles in order to be considered for a grading.

- Introduction
- Body (several sections - Details)
    - Types
    - Applications
    - Components
    - Advantages and Disadvantages
- Summary and Conclusions
- References

Project Topics

- Photovoltaic (Solar) Energy
- Solar Tracking Systems
- Solar Thermal Systems – Active/Passive Air Heating
- Solar Thermal Systems – Active/Passive Water Heating
- Wind Energy (include Horizontal Axis and Vertical Axis Wind Turbine Technologies)
- Geothermal Energy (include dry steam, flash steam, and binary cycle etc. systems)
- Fuel Cell Technology
- Energy Conservation and Efficiency
- Energy Storage Technology – Batteries
- Energy Storage Technology – Ultra-capacitors
- Energy Storage Technology – Flywheels
- Hydroelectric Energy (include Damless Hydropower technology)
- Nuclear Energy
- Fossil Fuels - General
- Natural Gas - Details
- Coal and Oil - Details
- Ocean Energy (Wave & Tidal)
- Bio Energy - Bio-mass
- Bio Energy – Bio-fuel (for example Bio-diesel, Ethanol etc.)
- Hybrid and Electric Vehicles
- Green Buildings (Energy-Efficient Building Design)
- Renewable Energy Safety (Only Renewable Energy Related Safety Covered)
- Economic Assessment of Renewable Energy Technologies

Note:

Students must use online system to record the preferred project topics selected from the list below. Same list is available online under Term Project Topic.

COURSE CONTENT → Term Project Topic → Term Project Topics → Edit Wiki Content

ETEC 4340 Alternative Energy Technology		
Week	**Date**	**Subject**
1	1/17-1/19	Introduction to the Course
2	1/22-1/26	Traditional Energy Systems Forms of Energy & Fossil Fuels (Oil & Coal) & Natural Gas
3	1/29-2/2	Nuclear Energy **HW#1 is available online (Due 3/15)**
4	2/5-2/9	Hydroelectric Power
5	2/12-2/16	Photovoltaic (Solar) Technology ***Project/Poster Topic Decision Deadline (Friday, 2/16)***
6	2/19-2/23	Solar Thermal Technology **HW#2 is available online (Due 4/6)**
7	2/26-3/2	Wind Energy Technology
8	3/5-3/9	Energy Storage & Conversion Technology (Batteries, Ultra-capacitors, Flywheels, Charge Controllers, Inverters)
9	3/12-3/16	Spring Recess for Students and Faculty – No Classes
10	3/19-3/23	Geothermal Energy Systems **HW#3 is available online (Due 4/27)** **Midterm Test – Wednesday, March 21** **(will be open 24 hours – 12:00am - 11:59pm)**
11	3/26-3/30	Fuel Cell Systems
12	4/2-4/6	Ocean Energy (Wave & Tidal)
13	4/9-4/13	Bio Energy (Bio-mass, Bio-diesel, Ethanol etc.)
14	4/16-4/20	Hybrid & Electric Vehicle Technology
15	4/23-4/27	Green Building (Energy-Efficient Building Design) **HW#4 is available online (Due 5/7)**
16	4/30-5/4	Energy Efficiency and Conservation
17	5/7-5/10	***Project/Poster Submission Deadline (Monday. 5/7)*** **FINAL Test – Wednesday, May 9** **(will be open 24 hours – 12:00am - 11:59pm)**

"The above/below schedule, policies, and assignments in this course are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students."

Academic Dishonesty: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Student Absences On Religious Holy Days Policy: Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student who is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

Disabled Student Policy: It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:
http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

Tobacco Policy: In order to promote a healthy, safe, and aesthetically pleasing work, educational, and living environment, Sam Houston State University (SHSU) will endorse a smoke free and tobacco free environment. The primary purpose of this policy is to establish guidelines prohibiting smoking and the use of all tobacco products. Tobacco products include cigarettes, cigars, pipes, smokeless tobacco, and all other tobacco products. This policy applies to all faculty, staff, students, employees of contractors, and visitors of Sam Houston State University on the premises of the university.