



Instructor

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Office Hours: MWF 8-10
MW 1-3
Or by appointment

Time and Location

Class: TR 2-3:15pm
Industrial Technology Bldg. rm 103

-and-

<http://sulross.blackboard.com>

Course Description

The objectives of this course of study are to provide the student with an opportunity to acquire basic knowledge and understanding in the area of energy, power, and transportation technology. This course will focus on several issues related to those topics. At the completion of this course, students will understand some of the characteristics of energy sources and resources, energy use, energy conversions, energy conservation, and the impact of energy use on the environment and our daily lives. They will gain an understanding of how power is derived from the energy sources, how power is measured, and determine how and where that power is used in our technological world. Students will gain an understanding of power, energy and transportation through research, reading, and classroom discussions.

This course also includes a laboratory component, during which students complete practical exercises designed to further enhance learning by putting theoretical knowledge into action. Students will gain an understanding of power transmission, conversion, and electrical energy in the lab utilizing infrared camera equipment, educational trainers, and group and individual exercises.

Student Learning Outcomes

Upon completion of this course the student will be able to demonstrate an understanding of the following topics by correctly answering various styles of questions presented on worksheets and tests, and completing a variety of lab and written exercises:

1. Define Types and Characteristics of Energy
2. Types and availability of resources.
3. How and where energy is used.
4. Power theory and measurement, including efficiency.
5. Renewable forms of energy.
6. Solar energy.
7. Wind and other renewable energy sources.
8. Fossil fuels.
9. Nuclear Energy.
10. Internal and External combustion engines.
11. Fluid power, including hydraulic and pneumatic.
12. Energy and power conversion, including Laws of Thermodynamics.
13. Energy conservation principles.
14. Social, Economic, and environmental impacts of energy use.
15. Sustainability

Reading

The text required for this course:

Energy and the Environment: Choices and Challenges in a Changing World

by Reza Toossi. Published by: Global Digital Press. (3rd edition)
ISBN 978-1-4276-4989-8

There will also be some reading material in the form of handouts. Students will be responsible for that information at test and quiz time. There are also other books available in the IT office for reference if other sources are required.

Accessibility:

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartze, M. Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8691. E-mail: mschwartz@sulross.edu.

Attendance

Attendance will be taken each scheduled class period in accordance with University and Departmental Policy and will count as part of the daily work grade. After 9 hours of absences the instructor may drop a student from the course with a grade of 'F', in accordance with the Student Handbook. Attendance will be taken at the beginning of each class period. If you are tardy and miss the roll call you will be charged with one absence.

Class Structure

Class will be run in a lecture/lab format. Lectures will utilize overheads, power points, demonstrations, slides, videos, and laboratory experiences. **Lectures are given primarily to enhance the material that should have been studied prior to the class period**, answer questions about the material, and as preparation for the activities that will be completed in the labs. There may be some step-by-step guided practice and individual assistance during the scheduled class time. Students are expected to study, read, and practice in the lab prior to class time. Students will be expected to use and develop their problem solving skills to discern and apply the information assigned. It is essential that everyone be in attendance for the scheduled meetings so questions are answered and demonstrations are not missed. It is important that plans also be made to work in the lab outside scheduled class time.

Time Commitment

Students should be prepared to spend 4-6 hours per week outside of class on assignments that will include: Homework, Reading Assignments, Lab work and studying for tests and quizzes.

Phones & Electronic Devices

No electronic devices other than calculators are allowed in the class or lab.

Assignments

Daily work will consist of reading, worksheet pages, building in the lab, lab record sheets. Daily work and lab activities must be completed in preparation for classroom discussions and tests.

Late Work

Grades

Grades will be earned on the basis that "C" is average work, "B" is above average work, and "A" is well above average work. Grades will be based on written examinations, research projects, lab work, and daily activities. Barring extraordinary circumstances, there will be no "Incomplete" grades assigned.

Grading Scale

A = 90-100% B = 80-89% C = 70-79%
D = 60-69% F = below 60%

Academic Honesty

All students are expected to do their own work at all times. Any dishonest conduct will be promptly rewarded with an "F".

Lab Time

There will be required lab work in this course. The lab will be open for use during normal business hours (usually 8 - 5 daily). The lab may be open some evenings as well when the lab assistant schedules are complete. No one will be left in the building without a lab assistant.

Equipment and Supplies

Most of the equipment needed for this course and lab work will be supplied through the department. Safety glasses or goggles are required for this course.

Storage

The lockers in the hallway may be checked out and used for storing your equipment and supplies. These lockers must be signed out with the secretary in the IT main office. You must supply your own lock.

Quizzes

Everything we discuss and in the assigned reading, including laboratory material is fair game for quizzes. You will not be given notice for quizzes. They will be primarily written in nature, but may include practical components. There will be no make-up quizzes.

Tests

Everything we discuss and in the assigned reading, including laboratory material is fair game for tests. You will be given notice for all unit tests. They will be primarily written in nature covering terminology, but you can expect some practical exercise portions on each exam. Makeup tests will not be given, although tests will be administered early in case of a planned absence (sports, etc.).

Final Exam

The final exam will is scheduled for Monday Dec 5, 2014 at 12:30 pm. There will be no make-up exam.

IT 1309 POWER TECHNOLOGY
Fall 2016

Tentative Assignment and Test Schedule

The following is a tentative test schedule for the semester. The dates provided are the dates the test will be given. The tests will not necessarily be the only scheduled events for the day – there should be some time for lab work as well.

Date	Topic/Learning Experience	Reading
Week 1 Aug 22-26	<ul style="list-style-type: none"> • Course Intro/Expectations • Consumption, production, and reserves; Exponential growth 	Read Ch. 1 Introduction
Week 2 Aug 29-Sep 2	<ul style="list-style-type: none"> • Work and power, kinetic and potential energy Levers, mechanical efficiency and effectiveness 	Read Ch. 2 Mechanical Energy
Week 3 Sep 5-9	<ul style="list-style-type: none"> • Power Theory and • Measurement 	Test 1 Ch. 1&2, work, energy and power calculations
Week 4 Sep 12-16	<ul style="list-style-type: none"> • Carbon cycle, conventional fossil fuels petroleum • Peak oil, natural gas, • Unconventional fossil fuels, synthetic fuels 	Read Ch. 3 Fossil Fuels
Week 5 Sep 19-23	<ul style="list-style-type: none"> • Heat and temperature, modes of heat transfer • Laws of Thermodynamics, efficiency • Power plants, heat engines, and refrigerators 	Read Ch. 4 Thermal Energy Test 2 Ch. 3&4
Week 6 Sep 26-30	<ul style="list-style-type: none"> • Electricity and magnetism, motors and generators • Generation to distribution, smart grids 	Read Ch. 5 Electricity Test 3 Ch. 5
Week 7 Oct 3-7	<ul style="list-style-type: none"> • Power requirement, ICE, emission from ICE • Electric and Hybrid Vehicles, fuel cells 	Read Ch. 6 Transportation Test 4 Ch. 6
Week 8 Oct 10-14	<ul style="list-style-type: none"> • Atomic structure, fission, • Nuclear reactors, waste disposal, fusion 	Read Ch. 8 Nuclear Energy
Week 9 Oct 17-21	<ul style="list-style-type: none"> • The Earth, geothermal resources, geothermal heat pumps, effect on environment 	Read Ch. 9 Geothermal Test 5 Ch. 8&9
Week 10 Oct 24-28	<ul style="list-style-type: none"> • The Sun, passive and active solar energy, • solar concentrator, solar thermal • Photovoltaics 	Read Ch. 10 Solar Energy

Week 11 Oct 31-Nov 4	<ul style="list-style-type: none"> • Photosynthesis, food chain • Power from biomass, biofuels 	Read Ch. 11 Bioenergy Test 6 Ch. 10&11
Week 12 Nov 7-11	<ul style="list-style-type: none"> • Origin, wind rose, energy and power in the wind • Wind turbines, wind farms 	Read Ch. 12 Wind Energy
Week 13 Nov 14-18	<ul style="list-style-type: none"> • Hydroelectric energy, pumped-storage • Waves, underwater currents, tidal energy • OTEC, solar ponds, salinity gradients 	Read Ch. 13 Hydro Energy Test 7 Ch. 12&13
Week 14 Nov 21-25	<ul style="list-style-type: none"> • Sustainability: neoclassical and environmentalist views, a blueprint for sustainable future 	Read Ch. 15 Sustainability
Week 15 Nov 28-Dec 2	<ul style="list-style-type: none"> • Wrap up/Review 	
Mon Dec 5 12:30pm	<ul style="list-style-type: none"> • Final Exam 	Comprehensive