

# Course Syllabus

## Energy Sources and Power

William E. Cattin Instructor

**Course:** Energy Sources and Power, IET 210, 3 credits

**Hours:** MWF 9:00AM – 9:50AM

**Room:** Power Technology Lab

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**Text:** Energy: Its Use and The Environment, Roger A. Hinrichs; Saunders College Pub.

### Course Description:

A study of energy sources, energy conversion, power production, power transmission, and applications of power. Emphasis will be on the application of energy to manufacturing, construction, domestic and municipal power technology. Students will be able to experience and see actual commercially available products and processes in addition to leading edge alternative energy sources.

### COURSE OBJECTIVES:

Upon completing the course, the student will be able to:

1. Explain, connect and operate electrical contactors to control AC or DC motors.
2. Explain and give examples for “energy sources, energy conversion, power production, power transmission, and power applications”.
3. Define and calculate energy, power, work, horsepower, mechanical advantage, energy conversion efficiency ratio.
4. Describe the operation of the four stroke, two stroke and compression ignition engines. This will include the application of theory on compression ratio, octane, burn rate, and flame front.
5. Explain the SAE designations on a typical container of automotive oil.
6. Describe the systems included in a four stroke Otto cycle engine and identify 25 components included in the systems.
7. Explain the flow of electrons “through” a lead acid battery.



8. Describe the function of photocells, solar absorber plates, and thermocouples.
9. Visually identify ten hydraulic and pneumatic components.
10. Calculate an output force, given and output cylinder area, input force, and cylinder area for either a hydraulic or pneumatic system.
11. Describe the operation of the basic refrigeration cycle and perform a heat-loss calculation for a student designed house.

### **SPECIAL EQUIPMENT AND SUPPLIES:**

**Safety Glasses** (available at bookstore, lumberyards, auto parts store)  
Shop apron or equivalent  
Small cans, boxes, bags to store small parts and pieces  
Roll of shop towels (local auto parts retailer)  
Padlock for locker

### **GRADING PROCEDURE:**

1. All assignments will be turned in on the day designated during class time for the course. No grade will be given for late work.
2. No make-up assignments or examinations will be allowed unless provisions for circumstances are made in advance of the date in question.
3. All written work will be evaluated on the following criteria:
  - a. neatness
  - b. spelling
  - c. content quality
  - d. completeness
4. Please ask questions if assignments are unclear. The final responsibility for misunderstandings and late work rests with the student.
5. Points will be assigned for each student's work. The total points obtained throughout the course will then be evaluated according to the following chart:

A	100-90%
B	90-80%
C	80-70%
D	70-60%
6. Missing class is **not** "OK". Discussion questions, safety instruction, and instruction on equipment and instruments are all valuable and should not be missed.



7. Students are expected to perform ongoing cleaning and minor maintenance on equipment in the laboratory. Work areas should be straightened up and clean before leaving the lab area.
8. All written work will be typed or word-processed double-spaced, with 1" margins. Papers will be stapled in the upper left-hand corner.
9. Appointments can be directly made with the instructor or E-Mail.
10. "Close" grades will be determined by attendance patterns, enthusiasm and willingness to learn.

### **Course Assignments:**

- 500 A. Examination** (2 @ 250 points each). A portion of these points will be earned by completing a professional article summary. It must be from an energy or power production periodical, it is not to be from the internet, the intent is for the student to use the University Library.
- 250 B. Laboratory Experiments.** These will be evaluated on a Mastery Learning basis. Mastery will be judged by actually completing to specifications a portion of the project. Other project proposals must be made in writing and approved by instructor.
- 250 C. Project Report** paper including an electronic version e-mailed to the instructor, a hard copy turned in on the due date.
- 100 D. Project Team presentation.** This presentation will be a formal report to the class on the objectives met and missed with the decisions underlying the process used to complete the project.
- 100 E. Homework** will be assigned on a regular basis; the due date will be announced in class.

## **Safety**

You will be working in an educational laboratory that is well equipped with machine tools and equipment. That a lab of this nature has potential hazards for injury is self evident. It is my goal to prevent all accidents and minimize hazard potential in this course. Therefore **SAFETY** of all students and faculty will be an integral part of this course. Proper use and control of all lab facilities will be taught, demonstrated and practiced by all that use this lab. There are and will be **no exceptions!** Thank you in advance for your cooperation.



## MET 355 Class Schedule Spring 2006

Date	Subject	Home Work Assignment	Due Date
29-Mar	<b>Week 1:</b> First Day of Class-Background cards	Chap. 1 & 2	3-April
31-Mar	Energy definitions and usage		
3-April	<b>Week 2:</b> Energy Mechanics	Chap. 3	5-April
5-April	Conservation of Energy		
7-April	Energy conversion	Chap. 4	10- April
10-April	<b>Week 3:</b> Heat and Work		
12-April	Heat engines		
14-April	Lab Demonstration	Chap. 6	17-April
17-April	<b>Week 4:</b> : Solar Energy		
19-April	Lab Demonstration	Chap. 12	21-April
21-April	Operation of Solar Cells		
24-April	<b>Week 5:</b> SAE designations		
26-April	Review		
28-April	Exam #1 on Friday	Chap. 7	1-May
1-May	<b>Week 6:</b> Coal, Petroleum, Natural Gas		
3-May	Finite sources of Oil		
5-May	Bio Diesel	Chap. 10	8-May
8-May	<b>Week 7:</b> Electrical Power		
10-May	Generation and Common circuits		
12-May	Batteries	Chap 13	15-May
15-May	<b>Week 8:</b> Building Blocks of Matter		
17-May	Fission		
19-May	Fusion		
22-May	<b>Week 9:</b> Fluid Power Transmission	Vickers trainer circuits	31-May
24-May	Hydraulic and Pneumatic		
26-May	Lab Demonstration		
31-May	<b>Week 10:</b> Directed Lab Work		
2-June	Presentations of Project Due	Last Day to Turn-in Project	
6-June	Final Exam Week	8:00AM—10:00PM Tuesday	

