

Energy Systems

ETES 5060/7060

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TEXTBOOK

Power Surge by Flavin, C. & Lensen, N. (1994) Worldwatch Institute & W. W. Norton & Co., New York
Energy Technology: Sources of Power by Schwaller & Gilberti (1996), Thompson Learning Tools, Cincinnati, OH

COURSE DESCRIPTION

This course introduces concepts and applications of energy systems, including their present and future applications, as well as advantages and disadvantages of the technical, economic, and environmental aspects of each system. Alternative energy systems will be addressed: wind, water, solar, photovoltaic, energy conservation and bio-fuels will be the primary focus. Special attention will be given to appropriate technology in power production.

COURSE GOALS

At the completion of this course, students should be able to:

1. Identify the various energy sources that provide useful power
2. Differentiate between various methods of controlling energy
3. Compare and contrast energy sources based on the four major classifications of energy
4. Research and develop a paper on the effects and/or sources of energy in our society
5. Compare methods of measuring energy and power
6. Identify and experiment with control devices involved in the transmission of power
7. Develop and construct a terminal project used for teaching energy and power systems using student developed materials
8. Define terminology associated with power and energy systems
9. Identify the device parts that make up the various power systems that are addressed in the course
10. Have knowledge of and apply safety precautions as they relate to the various power systems that are addressed in the course

MY STYLE of TEACHING

Classes will be conducted using the following teaching style:

1. Lectures, general discussions, and demonstrations (this means that you will need to be prepared to discuss course content and interact in class activities at any given time - there will be no passive learning).
2. Student presentations (research shows us that the best way to learn something is to teach it; each graduate student will lead a class discussion and/or demonstration related to course content).

MAJOR COURSE ASSIGNMENTS

Energy Sources Alternatives

In this requirement you will have three (3) options that you may choose from. Select any one (1) of the options below to fulfill this assignment.

1. Develop a short research paper (6-8 pages, typed & double spaced) depicting and describing the source and effect of a particular power/energy source. This paper is to contain information relating to the history, development, and uses of a power source; it should also include how the power source has impacted on our society (both positive and negative perspectives). Your paper should be well documented (use more than 3 reference sources) and include your reference list at the conclusion of the paper. **APA** style format is required for this assignment (APA Manual may be purchased in any reputable book store). Your paper will be evaluated based on its readability, completeness, and references.
2. Develop a book report based from a biography or autobiography of one of the worlds great technological inventors, scientists, engineers of energy systems (e.g., Nikola Tesla, Thomas Edison, Rudolf Diesel, Felix Wankel, George Westinghouse, etc.). The book report should summarize the contribution(s) that the individual(s) has made in the area of energy technology. The book report should be no less than 7 pages in length. **APA** style format is required for this assignment (APA Manual may be purchased in any reputable book store).
3. Join and actively participate in UGA-TECA (Technology Education Collegiate Association) and GITEA (Georgia Industrial Technology Education Association). Both of these professional associations represent technology education at their respective levels. The cost is minimal and participation is well within the limits of most college students. Request application materials from the instructor for further information.

This assignment is worth 5% of your grade.

Electronics Module

Conduct all activities associated with the ScanTech2000 Electronics Module. This will include all student work as prescribed in the module documentation. All assignments will need to be completed using appropriate documentation (i.e., electronic or paper & pencil). In addition, develop a critical analysis of the module (3-5 page paper) describing its strengths and weaknesses as well as your recommendation for ways the module could be improved to better serve a technology education program. **Caution:** There is only one electronics module in the class therefore, students will need to share time on the module to allow everyone adequate time to complete this assignment. A weekly sign up sheet will be available during each class meeting.

This assignment is worth 10% of your grade.

Terminal Project/Presentation

Develop an extensive project that can be used to demonstrate, relate, teach, or stimulate learning in energy & power systems. The project should consist of both hardware and software. The following criteria should be addressed in your terminal project.

- Be prepared to demonstrate your project using the hardware and software you developed. Hardware would be considered the actual project while software would be handout materials, slides, charts, videos, overhead transparencies, audio tapes, bulletin boards, etc.
- Prepare a 2-4 page written overview of the terminal project explaining the project, its importance in power & energy systems, and how it will be used in your classroom. The overview should include the following:
 - Description of the project; what principle you are going to prove or teach; how it will work and how you will use it your classroom.
 - Specific information about the project including descriptions, technical drawings, materials used, and costs.

- Specific software that you intend to use to explain or enhance your project.
- The terminal project must be constructed in such a manner as to be used or operated by anyone. It must implement sound construction practices, it must be clean and neat, and it must be accurate and durable.

Examples/Suggestions for Terminal Projects:

Hydroelectric Dam Working Model
 Windmill
 Solar Powered Vehicles
 Geothermal Experiments
 Greenhouse Effect
 Electrical Circuit Display
 Cut-Away Engine (jet, rocket, rotary, reciprocating)
 Pipelines
 Fossil Fuel Production
 Nuclear Energy
 Alternative Energy Development
 Aerodynamics Testing Device

This assignment is worth 10% of your grade.

Class Participation

Your participation will be vital for your success in this course! You are expected to be on-time and attend all class meetings (I will take role each class period) and participate in all activities and discussion. Absence or tardiness from any class will result in a loss of 1 point per missed class; there are NO excused absences.

In addition, you are expected to post at least one viable comment or question to the WebCT Bulletin Board for this course each week. Not posting to the WebCT Bulletin Board will result in a loss of 1 point per missed posting.

This assignment is worth 5% of your grade.

Laboratory Experimentation/Activities

During the course of the term you will be conducting 8 laboratory experiments and/or activities. Each experiment/activity will be accomplished via in-class work and out-of-class work. Some experiments/activities will incorporate either small team efforts or be accomplished individually. Specific instructions/explanations will be provided for each experiment/activity. The following is a list of the experiments/ activities and their due dates.

- Metric 500 R&D Activity
- Personal Energy Audit
- Phase Change Experiment
- Power from Air Motors Experiment
- Efficiency from Motors and Generators Experiment
- Rocketry Activity
- Internal Combustion Engine Activity
- Solar Power – Appropriate Technology Experiment

Each experiment/activity will be worth 5% and will have a cumulative effect accounting for 40% of your grade.

Final Examination

A final exam will be administered approximately at the end of the semester and will cover text readings and class lectures and discussions from the beginning of the term to the date of the test. The examination will be a combination of objective and subjective questions.

This assignment is worth 30% of the course.

Graduate Student Supplemental:

Each graduate student will be responsible for leading the class discussion during a specified class period. This discussion will include a complete development of the topic assigned for the specific date. Graduate students are required to read, research, and design a well developed lesson plan which will include hand-outs, overheads (preferably electronic presentation – PowerPoint), as well as class lecture/discussion. Specific topical areas will be based on established course outline and will be available on a first-come basis. Evaluation will be based on the level of comprehensiveness, logical presentation, and innovation/interest generation.

This assignment is worth 10% of your grade and will be added to the standard curriculum assignments.

GRADES

GRADE	PERCENTAGE %
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

This scale will be used objectively in assigning grades. There is no grading curve in this course. For example, a student with a final percentage of 89.9% will receive a "B" regardless of how "close" it may be to an "A." You are responsible to give yourself whatever "safety zone" you feel is necessary to attain your targeted grade.

LAB FEES

Lab fee for this class will be \$20.00, make checks payable to: University of Georgia. Payment is to be given to instructor and made no later than the third class meeting.

LATE ASSIGNMENTS

I expect assignments to be completed on time. My standard policy regarding assignments is 10% penalty for late assignments turned in within 1 week of due date and 50% penalty for assignments turned in thereafter until the end of the course (defined as the last regular class session). I use this system even in the event of "excusables," such as minor sicknesses or other unforeseen conflicts. However, any exceptions to this policy are made at my discretion.

HONESTY

Cheating on class assignments, examinations, or other serious forms of academic activities will result in a grade of an "F" (and a required report to University officials). Persons "borrowing" someone else's work on an assignment will receive a zero on that assignment if it is the first offense. A second offense will be considered a serious form of academic dishonesty. (Borrowee is equally subject to penalties.)

DROP POLICY

Drop policy is as described in the university catalog, page 45.