

**ETES 5110/7110 – Applications of Engineering in Technological Studies  
Spring Semester 2006**

**Location & Schedule**

Rivers Crossing 156

Wednesday; 7:30 – 10:15 p.m.

Final Examination – Wednesday, May 3<sup>rd</sup>, 7:30 – 10:15 p.m.

Course Web site – <http://www.coe.uga.edu/~rhill/etes5110>

*Note: The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.*

**Instructor**

Name: Roger B. Hill, Ph.D.

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Office Hours: by appointment

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**Required Textbooks**

Eide, A. R., Jenison, R. D., Mashaw, L. H., & Northup, L. L. (2002). Engineering fundamentals and problem solving (4<sup>th</sup> edition). ISBN 0-07-243027-3.

**Other Required Materials**

scientific calculator

engineering design notebook

microphone for online class sessions using Horizon Wimba

**Description of Course**

Systematic approach to solving technological problems using engineering design processes. Applications of engineering design principles to guide, collect data, and evaluate the design process. Focus on creativity, resourcefulness, and the ability to visualize and think abstractly.

**Objectives of the Course**

Students who successfully complete this course will be able to:

1. Identify the major components of the engineering design process
2. Identify and discuss the fundamentals of engineering statics, dynamics, and thermodynamics
3. Develop engineering design strategies that incorporate creativity in engineering based problems
4. Produce models of engineering designed solutions to specific technological problems
5. Analyze engineering design solutions based on ISO 9000 design criteria
6. Construct prototypes of engineering design solutions
7. Connect class concepts and knowledge with community-based problems

8. Integrate engineering applications into the technology education curriculum

*Additional Graduate Level Objectives*

9. Develop engineering design-based instructional materials
10. Evaluate technology education curriculum and teaching materials to assess engineering design content
11. Describe a rationale for considering engineering as a focus of technology education.

**Topics Covered**

1. Understanding the Engineering Design Process
  - a. Consideration of the designed world
  - b. Establishment of engineering design principles
  - c. Overview of the engineering design process
2. Engineering Fundamentals
  - a. Estimation and approximations
  - b. Dimensions, units, and conversions
  - c. Statistics
  - d. Mechanics
  - e. Material balance
  - f. Electrical theory
  - g. Energy
  - h. Economics
3. Creativity and Problem Solving
  - a. Problem identification
  - b. Focus on design problem
  - c. Proposing an engineering design solution
4. Modeling and Material Processing
  - a. Analysis of systems, components, and parts
  - b. Design requirements and technical drawings
  - c. Planning for models and testing
  - d. Constructing models and testing solutions
5. Prototyping
  - a. Constructing working prototypes
  - b. Evaluation and testing of prototypes
  - c. Final presentations
6. Community Learning - Service Learning
  - a. Identification of community based engineering problem
  - b. Proposed engineering design to solve community problem
  - c. Developing model of designed engineering solution
  - d. Construction of engineered prototype of community based problem
7. Curriculum Integration
  - a. Rationale for engineering application in the technology education curriculum
  - b. Strategies and methods of implementing engineering application in the middle school and high school
  - c. Analysis techniques for engineering application in the technology education curriculum

*Additional Graduate Level Topics*

8. Prepare, design, and present specialized topics related to engineering applications.

9. Identify alternative engineering applications useful for the technology education classroom.
10. Develop prototype solutions to additional engineering problems.
11. Serve as leaders of class activities related to engineering design processes

**Student Activities**

1. Study of assigned readings.
2. Completion of assigned exercises, projects, and problems.
3. Participation in class discussions.
4. Completion of periodic papers and examinations.

**Evaluation**

Class participation.....	5%
Assigned case studies, lab assignments, and learning activities .....	45%
Mid-Term examination .....	25%
Final examination (comprehensive exam) .....	25%

Grading Scale: A ----- 90-100  
 B ----- 80-89  
 C ----- 70-79  
 D ----- 60-69  
 F ----- 0-59

**Class Participation**

Punctuality and attendance are important to successful completion of requirements for this course. For that reason, attendance will be taken at each class meeting. The class participation portion of the course evaluation will be based on punctual attendance to all class meetings, participation in class discussions, and appropriate care of computer equipment.

*Note: Students with disabilities who require reasonable accommodations in order to participate in course activities or meet with course requirements should contact the instructor during regular office hours or by appointment.*

**Case Studies, Lab Assignments, and Learning Activities**

A variety of case studies and other assigned activities will be utilized throughout the term to provide problem solving experience and opportunities for enriching the content covered in class. All written work should be prepared using appropriate word processor and printing technology and should be checked for correct spelling, punctuation, grammar, and usage.

**Graduate Student Project**

A graduate student project will be completed to fulfill additional course objectives for ETES 7110. This project allows students investigate and develop strategies for implementing and assessing an engineering design focus for technology education. Details of this project will be discussed and arranged in consultation with the instructor.

### **Examinations**

There will be two (2) examinations during the term, a midterm (covering material from the first class meeting to the date of the exam) and a final (a comprehensive exam related to any/all material covered during the term).

### **Late Assignments**

Completed case studies, learning activities, and papers should be submitted by the end of the class period on the date they are due. Late assignments are generally penalized 10% for each day they are late unless arrangements are made to submit the materials at a later time.

### **Dishonesty**

All academic work must meet the standards contained in *A Culture of Honesty*. Each student is responsible to be informed about those standards before performing any academic work.

Dishonesty of any type, related to completion of course assignments, examinations, or other required activities is a serious offense. Should such an instance occur, it will be handled in accord with University regulations as described in the current edition of the *Graduate Bulletin*.

### **Drop Policy**

The drop policy is described in the Spring Semester *Schedule of Classes*. If circumstances arise that will prevent a student from adequately fulfilling course requirements, it is important to address procedures to drop the class prior to the mid-point of the semester.