Linwood Holton Governor's School Syllabus

Introduction to Engineering
Fall 2008

Instructor: Dr. Steve Rapp

Location: Linwood Holton Governor's School at the Southwest Virginia Higher Education Center, second floor

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Textbook: *Foundations of Engineering*, by Holtzapple & Reece, McGraw-Hill, 2003

Relevant Web Sites: http://www.hgs.k12.va.us, http://steverapp.pageout.net

Minimum Computer Requirements:
IBM compatible, 300 MHz processor, 128 Meg of RAM, 1 Gigabyte Hard drive space, 56 K modem or cable modem (T1 line preferable)

Other Materials:
Scientific Calculator, Windows 98 or later, ILink 7.0, Microsoft Word 97 or later, Microsoft Excel 97 or later, and other materials TBA

Course Delivery:
This course will be taught via the Internet using interactive audio and streaming video. Tests will be administered on-line and homework will be collected via email.

Grade Distribution:
Exams: 50%
Projects: 50%

Team Grades: The TEAM must insure that all members of the team contribute to and understand the contents of team project submissions. All team members will receive equal credit for that team project (assuming all team members contribute). A grade of zero will be assigned to any member of the team who does not contribute to the project submission. The TEAM grade will include an evaluation by your peers.

Event Schedule:

For detailed information on weekly schedule, announcements, and assignments contact: http://steverapp.pageout.net.

Policies:

Prerequisites: Algebra II or permission of Instructor

Academic Dishonesty: Collaboration on examinations, in class assignments, and homework assignments is forbidden except where specifically specified as "Team" activities. In general, one team may not collaborate with another team on "Team" activities. Students violating this policy will be subject to disciplinary action and a failing grade in the class.

Unexcused absences: Students who miss class without prior approval of their instructor will receive a grade of zero on the missed in class assignment.

In Class Assignments: All in class assignments must be completed by the end of the class period and emailed to the instructor. It is the discretion of the instructor to grant additional time if deemed necessary.

All Assignments: All assignments should be completed on time and turned in on the due date. ASSIGNMENTS WILL BE ACCEPTED UP TO 3 DAYS LATE, BUT THERE WILL BE A PENALTY OF 10 POINTS FOR EVERY DAY LATE. THIS MEANS THE MAXIMUM SCORE THAT CAN BE RECEVIED IS 70%. AFTER 3 DAYS A GRADE OF ZERO WILL BE RECORDED. It is the discretion of the instructor to grant additional time if deemed necessary.

Grading System: The regular university grading scale will be use:
90-100 = A; 80-89 = B; 70-79 = C; 60-69 = D; 59 or below = F.

Objectives of the Course

- Excite the student about engineering.
- Provide a strong foundation in engineering fundamentals.
- Cultivate problem-solving skills.
- Challenge students.
- Provide reference material.
- Introduce the design process.
- Emphasize the importance of communication skills.

Curriculum Framework

- **What is an Engineer?**
  - The technology team
  - Engineering disciplines
  - The Engineering method
  - Formal education
- **Engineering Ethics**
  - Interaction rules
  - Moral theories
  - Case studies

- **Problem Solving**
  - Types of problems
  - Problem solving approach
  - Techniques for error-free problem solving
- **Understanding and Using Computers**
  - A brief history of computers
  - Creating computer programs
  - Design concepts in digital computers
- **Introduction To Design**
  - The engineering method
  - Robotic hand for the space shuttle
  - Zero emission vehicle
- **Engineering Communications**
  - Preparation
  - Oral presentations
  - Writing
- **Newton's Laws**
  - Analysis of motion
  - Forces
  - First, Second, and Third laws
- **Introduction to Thermodynamics**
  - Forces of nature
  - Structure and states of matter
  - Temperature, pressure, density
  - Thermodynamic laws
  - Gas laws
  - Heat capacity
- **SI System of Units**
  - Historical background
  - Dimensions and units
  - Rules for writing SI units
- **Unit Conversions**
  - What is does it mean to "measure" something?
  - Conversion factors
  - Mathematical rules governing dimensions and units
  - The datum
- **Accounting**
  - Systems: subsets of the universe
  - Intensive and extensive quantities
  - State and path quantities
  - Special types of systems
  - Universal accounting equation
- **Accounting for Mass**
  - Conservation of Mass
  - Generation and consumption of mass
  - Chemical reactors
- **Accounting for Linear Momentum**
  - Conservation of Linear Momentum
  - Systems without net linear momentum

Tentative Test Schedule

Chapter Number	Date of Test
Chapter 1	August 29
Chapter 2	September 8
Chapter 3	September 16
Chapter 4	September 23
Chapter 5	September 30
Chapter 6	October 8
Chapter 10	October 15
Chapter 11	October 21
Chapter 13	November 12
Chapter 14	November 19
Chapter 17	November 25
Chapter 18	December 5
Chapter 20	December 12

Tentative Completion Dates for Engineering Projects

Project Name	Date of Completion
Project 1: Hubble Report	September 22
Project 2: Designing a Bridge Challenge	October 20
Project 3: Building a Geodesic Dome	November 17
Project 4: Using Computer Aided Drafting Software	December 12
NASA Aeronautics Competition (Tentative)	TBA