ENES100 Introduction to Engineering Design
Fall 2004 Section 0302
Syllabus

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Textbooks: J.W. Dally and Gary Pertmer
Introduction to Engineering Design
Book 8: Anti-Icing Systems For Highway Bridges
College House Enterprises, LLC, Knoxville, TN, 2003

Class Schedule: M & W 10:00- 11:50; F 10:00-10:50

Locations:

Classroom:	JMP 2202
Assembly room:	JMP 2225
Computer room	JMP 2115

Class Website: https://umd.blackboard.com

Course Objectives

This course introduces entry-level students to the engineering experience, including investigation, design, manufacture, assembly, and product evaluation. These objectives are achieved within the context of a team setting. You will be assigned to a team, and each team will be required to prepare reports and presentations outlining the product design, build the product, and summarize the design process and product performance. You will also be responsible for preparing performance evaluations for yourself and your teammates. Working successfully in teams and developing an understanding of group dynamics are important course objectives. You will learn some basic science and engineering principles, some general and some related to the project. Developing computer skills including use of the internet and library databases for research, and use of basic spread sheet, word processor and graphical presentation software will also be emphasized as they are an integral part of the design process. Additional objectives include learning about the role engineers play in our modern society, and engineering ethics. Throughout the course, there will be opportunities to develop and improve your communication skills including oral, written and visual (engineering drawing) communication

To summarize, this course provides the new engineering student with the answer to one very basic question: What does it mean to be an engineer? This question is answered in this course (and in later courses throughout your curriculum) by focusing on six general topic areas.

1. Teamwork and group dynamics
2. Communication skills - drawing, writing, speaking
3. Computer applications
4. Scientific and technical basics
5. Ethics
6. Basic manufacturing skills
7. Analysis of experimental data

All of these areas are intertwined throughout the course as your team progresses through the design process.

ABET Criteria

ABET Learning Criteria

The Accreditation Board for Engineering and Technology (ABET) is an organization made up of 31 engineering societies that evaluates engineering programs in USA. ABET's web site is www.abet.org. ABET significantly changed its review criteria in 2000. The resulting criteria are generally known as the ABET 2000 criteria a-k. They state that engineering students must demonstrate that they have:

(a) an ability to apply knowledge of mathematics, science and engineering,

(b) an ability to design and conduct experiments, as well as to analyze and interpret data,

(c) an ability to design a system, component, or process to meet desired needs,

(d) an ability to function on multi-disciplinary teams,

(e) an ability to identify, formulate, and solve engineering problems,

(f) an understanding of professional and ethical responsibility,

(g) an ability to communicate effectively,

(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context,

(i) a recognition of the need for and an ability to engage in life-long learning,

(j) a knowledge of contemporary issues, and

(k) an ability to use the techniques, skills and modern engineering tools necessary for engineering.

Peer Evaluations

There will be two peer evaluations during the semester. The results of these evaluations coupled with the recommendation of the Teaching Fellow, the Teaching Assistant and my own judgment will be used to determine the Team Participation score.

Grading

Team Grades		
Product design and performance		10%
(Includes design briefings, team log, etc)		
Team assignments		10%
(Includes website, team homework, etc)		
Preliminary Design Report		
Written		5%
Oral		5%
Final Design Report		
Written		15%
Oral		10%
TOTAL	55%	

Individual Grades		
Team participation		10%
(Peer evaluations)		
Homework		10-15%
Midterm Exam/Quizzes		20-25%
TOTAL	45%	

Financial Requirements

The total cost for the team project must be less or equal to $150.00. This includes a $25.00 fee for the rental of the RCX. Each team member is responsible for contributing no less than $25.00 toward this amount. In order to establish the cost of your product, each team will be asked to produce receipts for goods and services or appraisals for donated items. **Collect your fees as early as possible.** This will minimize the chance of forfeiting income in the event of a team member dropping the course or transferring to other sections.

Homework

Will be assigned weekly and will be due on Monday of the following week at the beginning of class. Late submittals will NOT be accepted.

Attendance: MANDATORY
(**ONE POINT OFF FOR EACH UNEXCUSED ABSENCE**)

Safety

All students must receive safety training before working in the lab.

Academic Integrity:

Do not plagiarize. The University has approved a code of academic integrity. It is available online at:
www.inform.umd.edu/campusinfo/departments/jpo/code_acinteg.html

If you have a registered disability that requires accommodation, please see me immediately

Class Schedule

Introduction – course and learning objectives (one 2-hour session, Chapters 1)
Team formation (one 2-hour session, Appendix A and C)
Engineering design process (two 2-hour sessions, Chapter 3)
Time management (one 2-hour session, Chapter 2)
Basic technical information
- Sensors (Chapter 6)
- Basic circuits (Chapter 5)
- Heat transfer
- Surfaces of Materials
- RCX and ROBOLAB programming (Chapter 7)

Design reports and presentations (one 2-hour session, Chapters 14, 15)
Engineering drawing – sketching (one 2-hour session, Chapters 9, 10)
MS Excel (one 2-hour session, Chapter 11, assign Chapter 11 for reference)
Library Orientation (one 2-hour session, assigned text Chapter 13 for reading)
Engineering Ethics (Tentative) (one 2-hour session, assigned text Chapter 18 for reading)
Co-op and Career Services (one 1-hour session, Friday)
Mid-term exam (one 2-hour session)

Schedule

S3		**Introduction, questionnaire**
5		**Personal Effectiveness Introductory Module**
8		**Forming teams, mini project**
10		**Forming teams, project description**
12		**Forming teams, team structure**
15		**Project Management Introductory Module**
17		**Project documentation**
19		**Grill session #1: Gantt charts**
22		**Engineering Ethics in Product Design**
24		**Engineering Library Orientation**
26		**Grill session #2: conceptual design**
29		**Technical background**
O1		**Technical background; RCX tutorial**
3		**Technical background**
6		**Technical background**
8		**Product development**
10		**Grill session #3: progress report**
13		**Design report tutorial**
15		**Engineering graphics tutorial**
17		**Engineering COOP program**
20		**Interpersonal Effectiveness Assessment I**
22		**Office tools tutorial**
24		**Design Report Presentation I**
27		**Shakedown**
29		**Shakedown**
31		**Design Report Presentation II**
N3		**Testing**
5		**Testing**
7		**Data collection**
10		**Data collection**
12		**Data collection**
14		**Grill session #4: progress report**
17		**Data analysis**
19		**Ethics and Academic Integrity Workshop**
21		**Grill session #5: progress report**
24		**Final Report tutorial**
26		**Engineering and society**
D1		**Safety risk and performance**
3		**Sustainable engineering**
5		**Interpersonal Effectiveness Assessment II**
8		**Final Report I**
10		**Final Report II**
12		**Closure**