Policies and Procedures

ES205 Analysis and Design of Engineering Systems

Objectives

This course is designed to help students integrate the material learned in ES202, ES203, ES204, and MA222 and to deepen students' understanding of engineering systems modeling, simulation, analysis, and design. To meet this objective, a certain level of expertise in both mathematics and conservation and accounting principles is required. It is assumed that you have taken the prerequisite courses and have acquired better than a superficial level of proficiency in applying the principles and methods taught in these courses. If you are having trouble in these areas, consult with your instructor to determine an appropriate course of action, but do not expect class time to be devoted to this material.

Exams and quizzes

Exams are comprehensive, closed-book, and closed-notes. Laptop computers are prohibited on exams; bring your calculators. You may bring a one-sided, 8.5x11 help-sheet to the exam. You are allowed one help-sheet for exam 1, two help-sheets for exam 2, and three help-sheets for the final exam. Help-sheets must be signed and turned in with each exam. Handwritten, typed, or reduced photocopies of reference information are permitted. Help-sheets may not contain problem solutions. Students violating these requirements will receive a zero for the exam.

Ten-minute, unscheduled quizzes (readiness assessment tests) are given, sometimes daily and sometimes weekly, covering homework and lecture material. No makeup quizzes are given. Quizzes missed due to excused absences will not affect your grade.

Make-up work

Makeup of required coursework is considered only for those students who consult with their instructor prior to an absence, or who, in the event of unforeseeable circumstances, contact their instructor as soon as practicable. For example, if you are participating in an Institute-related activity, or if you have a court appearance or a scheduled hospital visit, let your instructor know before the absence that you'll be gone and for how long. If you get sick on the day of an exam, call in sick. If you have a family emergency, call your instructor as soon as it is convenient. Failure to follow these guidelines results in a grade of zero for the work missed.

Final course grade

Your final course grade is based on the following weighted average:

Quizzes & Homework	15%
Laboratory	19%
Exams 2@18%	36%
Final exam	30%
	100%

Note: You must pass the exams to pass the class.

A weighted average score of 90% is guaranteed to be an A, 80% a B, 70% a C, and 60% a D. Below 60% is failing.

Labs

The laboratory experiences support the course learning objectives in modeling, simulation, analysis, and design of engineering systems. Laboratory time is used also to support the course objectives in teaming, writing, oral presentations, and computing. Some lab periods are largely computational, others are experimental, and some involve demonstrations. The experiments (both "hands-on" and demonstration) produce data that students use in model validation and parameter identification, generally related to lecture topics being covered at the time.

It is not uncommon for students to have had lab experiences in other courses in which the mode of "collect the data and get out" was both efficient and rational. The ES205 lab experience is neither conceived nor implemented with this mode in mind. Your instructors designed the lab as a time and place to provoke thought, train critical thinking, and engage one another in active learning. The three hours of lab per week are put to full and active use. Please come to lab with this "active" mode in mind.

Bring your laptops to every lab period, unless noted otherwise by your instructor.

Office hours

While your instructor is typically available most hours that he or she is not in class, lab, or Institute or departmental meetings, it happens occasionally that a student and instructor have conflicting schedules and cannot find a convenient time to meet. In response to this problem, and to provide our students with ample opportunity for student-teacher interaction, *all* ES205 students are welcome to seek assistance from *all* ES205 instructors.

Homework

Introduction

A large part of this course is concerned with problem solving and applying conservation principles to a variety of situations. For this reason, mastery of the homework is essential for the successful completion of this course. Treat homework as an opportunity to practice and learn new skills, not just an exercise in acquiring a grade.

- Homework generally is assigned daily and collected as sets on a regular basis as indicated in the schedule. Solutions for most of these assignments will be available in the library AFTER they are turned in.
- Homework is collected on the due date indicated in the course schedule. The time of day that homework is collected is determined by your instructor.
- Points are deducted if the homework format is not followed.
- If you use software (Matlab, Simulink, Maple) in a homework solution, include the software "input" and "output" elements to support your solution. A penalty is assessed on each problem that references software but that does not include the relevant documentation.
- Late homework is not accepted without prior approval from the instructor.

A problem solution is a form of technical communication and must be clear and easy to understand. For this reason, you are required to follow the same homework structure used in ES201. A detailed description of the homework format can be found in Appendix A of the ES201 notes. This section summarizes the relevant requirements.

Requirements

- Use standard size (8.5 x 11 inch) engineering paper.
- Write on one side only.
- Start each problem on a new page.
- Emphasize your final answer by double underlining it or by boxing it in. Include units.
- If you use a computer program in your solution, cut and paste a copy of the relevant section of the computer session in sequence in the problem solution. Present the final answer on the engineering paper.
- Staple the pages of each homework set together in order and include a cover page as described below.

Structure

Every problem should have the following sections:

1. Known
2. Find
3. Given
4. Analysis
5. Comments

A photocopy of the basic problem statement can be cut out and taped to your solution. For additional discussion, see Appendix A of the ES201 notes.

Comments on analysis

- Be sure to *identify the system* or systems you will be analyzing. For many problems this process involves drawing a free body diagram, a kinetic diagram, and other appropriate schematic drawings. Problems may require more than one system. Be liberal in your use of sketches to make your solution clear and easy to understand.
- Clearly *label coordinates and variables* such as displacement, velocity, current, voltage, volumetric flow rates, heat flow rate, and points of static equilibrium.
- As you proceed through your solution process *insert descriptive comments to explain your procedure.*
- Identify *assumptions* as you proceed through the solution.
- Be sure to *state in words what principle you are using* or if you're using a kinematic or constraint relationship.
- Include a table of *Unknowns/Equations* if appropriate. Number the independent equations to help determine when you have enough equations to solve for the unknowns.
- Does the *number of unknowns equal the number of equations*? Once the number of unknowns equals the number of equations you should be able to solve for the unknowns. If you have more unknowns than equations identify an additional system if there is one or identify additional equations (often these come from kinematics or constraints).
- *Solution of equations and final answer*. Solve the resulting equations manually or using a computer algebra system (whichever is easiest for the particular problem being solved) and clearly indicate the answer. If the solution of the equations fails to give a reasonable answer there is probably a problem in the equations.
- *Check your answer*. Your solution should be checked to make sure it is reasonable. Ask yourself, "Does the answer make sense?". If not, check your analysis, then check if your model is correctly implemented in the software package you are using, if any. Checking, like engineering practice, has to be meticulous.

Keys to success

- *Do the homework daily*! This requires discipline! You are encouraged to attempt these problems on your own first, before discussing them with your peers. The single most important piece of advice from students from prior years is:

> Start your home problems on the day they are assigned.

- *Get help from your professor*. If he or she isn't in when you drop by, leave some sort of communication: send an email, leave a note on the door, or call and leave a message on voicemail. Visit another ES205 instructor. The time to learn the material is now, not the night before an exam.

> If you get stuck on a home problem, go to the next problem.
> Get help from your professor early and often.

- The *process of obtaining a solution* is as important as obtaining a correct answer. In engineering practice, an "answer" without supporting documentation demonstrating a process consistent with established practice is meaningless.
- If your answer is incorrect, go back over your solution looking for errors in sign, in units, or in the application of a principle.
- Pay attention to making your solution a *clear technical communication*.
- *Get help from your classmates* (but do not copy). There is no penalty for working as a group (unless you let everyone else do the work—the penalty is that you learn nothing). Working with other students in this class is encouraged. The only condition placed on working with others is that you acknowledge their help. (This is one purpose of the honor statement.) Working in a group on the homework can be an excellent way to learn the material. It is important to note that every student will be individually accountable for the material via the exams and in-class quizzes. Do not "divide up the problems", but help each other when you get stuck.

Cover sheet

The last page of this handout is the cover sheet to be used on every homework assignment. Include one of the two honor statements shown, as appropriate, if it is required by your instructor. The cover sheet may be typed.

I.M. Studious
CM 9999

Analysis and Design of Engineering Systems
ES205-0
HW #1
March 6, 2008

1.1 _____
1.2 _____
1.3 _____

I pledge my honor that I did not copy any of this homework, but I did receive help from (the names of your helpers go here).

(your signature)

OR

I pledge my honor that I did not copy any of this homework and this work is entirely my own.

(your signature)