530.106 – Computing in Mechanical Engineering  
Spring 2007

MTW 9-10, Hodson 210

Instructor  Prof. Lester K. Su  
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Office hours  M 3-4, F 9-10; plus lunch Friday, also come by whenever my door’s open

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Web page  http://www.imaging.me.jhu.edu/courses106.html

Text  Gilat, A., Matlab: An Introduction with Applications, 2nd ed., Wiley (easy to find online; will also be at the bookstore; we won’t need it for several weeks anyhow)

Grading  Homework (~10)  50%  
Quizzes (~9)  10%  
Midterms (2)  20%  
Final  20%

The homework assignments include programming assignments and projects. I will drop your lowest quiz grade.

Goals  This course introduces the use of computers in approaching mechanical engineering problems. It is not a programming course in the usual sense of focusing on the syntax and organization of a particular programming language. When we talk about ‘computing’, we really mean that we want to get computers to do math for us. That is, we’re interested in using computers for analyzing data and solving problems. We first need to learn to express math problems in a way that computers can understand. We will begin, then, by covering elementary mathematical topics that are relevant to computing. Specifically, we’ll cover discrete analysis, including series expansions, differentiation, and integration; statistics, including fundamental statistical quantities, and curve fitting; and basic ideas in the numerical solution of ordinary differential equations. We will then apply these concepts to a variety of realistic problems in mechanical engineering, using the MATLAB programming environment. By the end of the semester, you will be conversant with the data-analysis capabilities of computers, and will be comfortable with developing your own programs to deal with diverse engineering problems.
Office hours. Besides the office hours posted, any time my door is open you should feel free to stop in and ask questions. I reserve the right not to answer my door if it’s closed. Also, on Fridays anyone is welcome to join my research group and me for lunch (meet in my office at noon – we go somewhere on or near campus).

Course text and lecture notes. A significant amount of the material covered in lectures will not follow what’s in the text by Gilat. (We won’t be using the text at all until about the sixth week.) When I consider that concepts are sufficiently difficult, I will attempt to produce lecture notes to distribute in class and post on the website, but you are responsible for anything that I cover in class whether or not it’s in the notes or text. Make sure that you take good notes, and that you have access to notes for those classes that you might miss.

Homework. Homework will always be due at 5 pm in my office on the given date. I don’t make homework due in class because I don’t like people working on homework in class. So don’t work on homework in class.

Any assignments turned in late will be automatically subject to 50% deductions, unless prior permission has been requested and granted. Such permission will only be given in the case of unavoidable conflicts – your inability to manage your own time effectively doesn’t qualify. Please note that the Health and Wellness center will not provide letters excusing students from individual classes, so don’t count on getting homework extensions for any illnesses not requiring hospitalization. No credit will be given for homework submitted after solutions have been posted on the website or distributed in class, or obviously after graded homework has been returned.

Quizzes. I will give in-class quizzes periodically during the semester to make sure that people are staying on top of the material. They will be given at the start of class (usually Wednesdays) and will last no more than 10 minutes.

Exams. Exams will be open book, open notes. In fact, you can bring any books you want to the exams. My philosophy on exams is that I want them to rank accurately your understanding of the material. This requires that my grade distributions be wide and that the average scores be relatively low. This is just a heads-up that I’m not actually trying to demoralize people with hard exams.
Course philosophy – Computing in Mechanical Engineering – Su

Academic ethics. The following is our mandatory syllabus insert on ethics.

Cheating is wrong. Cheating hurts our community by undermining academic integrity, creating mistrust, and fostering unfair competition. The university will punish cheaters with failure on an assignment, failure in a course, permanent transcript notation, suspension, and/or expulsion. Offenses may be reported to medical, law or other professional or graduate schools when a cheater applies.

Violations can include cheating on exams, plagiarism, reuse of assignments without permission, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Ignorance of these rules is not an excuse.

On every exam, you will sign the following pledge: "I agree to complete this exam without unauthorized assistance from any person, materials or device. [Signed and dated]"

For more information, see the guide on "Academic Ethics for Undergraduates" and the Ethics Board web site (http://ethics.jhu.edu).

On a more personal note, I detest cheating in any endeavor with every fiber of my being. I personally grade one problem on each assignment, so I can get an idea of how you are all doing, but it will also be very obvious to me when people are cheating. You are encouraged to work together on assignments but what you submit must be your own work. It is also important to remember that facilitating cheating is a punishable offense. As an extreme example, imagine that the person sitting next to you in an exam copies off you. You could be found guilty of an offense too, even though you actually did the work. Why could you be found guilty? Because there’s no real way to know that you didn’t, say, have an agreement to allow the other student to cheat.

Since I don’t want to be put in the position of adjudicating any ethics incidents, any time I suspect that cheating is taking place, I will notify the Associate Dean of Students, Dorothy Sheppard (dsheppard@jhu.edu), and give you two options. The first is to confess and accept a sanction of my choosing (generally a zero on the assignment in question), with a report of the incident being filed by Dean Sheppard. There would be no further punishment in that instance. The second option is to request that Dean Sheppard convene the Undergraduate Academic Ethics Board for a hearing on your case. This could result in your exoneration, or in a more severe punishment than simply a zero on the assignment. An exception to this two-options procedure applies for repeat offenders; if you have previously confessed to or been found guilty of an ethics violation, your case will automatically be referred to the Ethics Board.

I do want to make clear that I’m aware that the vast majority of students are honest, and the last thing I want to do is discourage students from working together. After all, working together on assignments is one of the most effective ways to learn, both through learning from and explaining things to others. The ethics rules are in place to ensure that the playing field is level for all students. The following examples will hopefully help explain the distinction between what constitutes acceptable cooperation and what’s not allowable.
**Student *:** Man, you will not believe what just happened to me. I sat down in the HAC lab to work on the Matlab program for the homework...

**Student &:** You’re right, this does sound exciting (yawns)...

**Student *:** ...and it turns out that someone from the class had been using the same computer before me, and that person’s saved program was just sitting there on the desktop! Neat, huh?

**Student &:** So...you just copied it?

**Student *:** Yeah!

**Student &:** Cool.

This is not cool. Student * clearly isn’t submitting his own work. Plus, whoever left his/her assignment on the machine could conceivably be sanctioned too, since we don’t know that person’s motives.

**Student 1:** Yo, I dunno how to do problem 2 on the homework, can you clue me in?

**Student 2:** Well, to be brief, I simply applied the **** principle that is thoroughly explained in Chapter **** in the course text.

**Student 1:** Dude, thanks! (Goes off to work on problem.)

This scenario describes an acceptable interaction. There’s nothing wrong with pointing someone in the right direction.

**Student Y:** The homework’s due in fifteen minutes and I haven’t done number 5 yet! Help me!

**Student Z:** Sure, but I don’t have time to explain it to you, so here. Don’t just copy it, though.

(Hands over completed assignment.)

**Student Y:** I owe you one, man. (Goes off to copy number 5.)

This scenario is a textbook ethics violation on the part of both students. Student Y’s offense is obvious; student Z is guilty by virtue of facilitating plagiarism, even though he/she is unaware of what student Y actually did.

**Joe Student:** Geez, I’m so swamped, I can’t possibly write up the lab report and do the lab data calculations before it’s all due.

**Jane student:** Well, since we were lab partners and collected all the data together...maybe you could just use my Excel spreadsheet with the calculations, as long as you did the write-up yourself....

**Joe Student:** Yeah, that’s a great idea!

That is not a great idea. By turning in a lab report with Jane’s spreadsheet included, Joe is submitting something that isn’t his own work.