

“The capacity to design includes more than mere technical competence. It involves a willingness to attack a situation never seen or studied before and for which data are often incomplete; it also includes an acceptance of full responsibility for solving the problem on a professional basis.”

Report of the Committee on Evaluation of Engineering Education, “The Grinter Committee”, 1955.

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TEACHING ASSISTANT: Chris Harper Weil 465

DESCRIPTION: Advanced topics in structural steel design. Simulation of a design office experience through the completion and presentation of a comprehensive steel building design. Students will work in groups to complete a total structural building system design.

TEXTS: Required: *LRFD Manual of Steel Construction*, 3rd ed, AISC
Class notes and references (Available through ASCE)
Class CD (Contains additional reference materials)

TIME: M, W, F 2nd Period
Occasionally other times and places for special topics and field trips

PREREQUISITES: Working knowledge of basic steel and concrete design
Working knowledge of basic structural analysis
Working computer knowledge:
(MS Word or Word Perfect; Excel, Frame analysis software) - required
(AutoCad; MathCad) - helpful

COURSE OBJECTIVES:

1. Develop skills in structural steel design and analysis beyond those taught in the basic steel design course.
2. Through the use of student design teams, develop the comprehensive design of a steel-framed building, including connections. Present the results of that design in a professional manner, both written and orally.

TOPICS TO BE COVERED: (Subject to Change - addition or deletion or change of order)

Technical

1. Building Loads
 - a. Gravity
 - b. Wind
2. Floor System Design
 - a. Non-composite beam
 - b. Composite beam
 - c. Open web steel joist / joist girder
 - d. Steel floor deck
 - e. Serviceability (deflection, vibration, camber)
3. Roof System Design
 - a. Non-composite beam
 - b. Open web steel joist / joist girder
 - c. Steel roof deck
 - d. Serviceability (deflection, ponding)
4. Frame Analysis and Design
 - a. Theory, analysis, and design of beam-columns
 - i. Effective length factors
 - b. Frame analysis
 - i. 1st order and 2nd order
 - c. Serviceability (building drift)
5. Connections
 - a. Basics of bolts and welds
 - i. Concentric and eccentric loading
 - ii. Prying action
 - b. Shear connections
 - i. Single plate (shear tab)
 - c. Moment connections
 - i. Flange plate
 - ii. Column web / flange strengthening
 - d. Column base plates
6. Foundation design

COURSE “RULES”

1. **Please be nice.** As a class, you will only get out of this what you collectively put in. You have the opportunity to learn about engineering practice from a practicing engineer. Take advantage of this opportunity!
2. Attendance at lecture is “*mandatory.*” **The instructor retains the right to reduce final letter grades for excessive absences or lack of participation, regardless of total points earned.**
3. Be on-time to class. The instructor will start class on-time. The instructor will endeavor to end class on-time, however, class is over when the instructor says it is over. Do not start closing books, etc., as a way of informing the instructor that you feel that class is over. The instructor takes **great offense** to this.

4. **Each lesson requires preparation by the student prior to the lecture. Study / read the assigned material prior to the lecture.**
5. The textbooks and notes are required for all lectures. HEY, This means you!
6. Homework will be neatly written on engineering paper, or printed on clean white paper (if using MathCad, Excel, etc.) Number, staple and label all pages. **No re-used paper! No exceptions.**
7. No make-up work will be allowed, except in cases of emergencies or civic responsibilities (jury duty, etc.), provided that the instructor is notified by e-mail in advance. Provisions for make-up work will be determined on a case-by-case basis.
8. Some class communication will be by means of e-mail. Check your e-mail regularly (at least daily). Keep the instructor informed of any changes to your e-mail address. Failure on the part of the student to keep-up with e-mail communications is not excusable.
9. Grade Appeals:
 - General: At any time that you do not understand the solution to a homework problem, please see either Chris Harper or Dr. Sputo. We will be happy to assist. However, if you believe that a grade was assigned in error, please comply with the following procedures:
 - Homework: Please carefully consider what you did wrong. If you still believe that an incorrect grade has been assigned, you must make your case in writing only. Verbal requests will not be considered. You must provide substantial information as to why your grade should be changed. Your request for re-grade must be received no later than 10 calendar days after the homework due date. After that date, no requests will be considered. Turn in your request to Chris Harper.

General Grading Rules

It is not the responsibility of the course instructor or TA to try to decipher your work. It should be clear what your intent is, and easy to follow in a logical sequence. Due to recurring problems each semester, the following criteria are set.

The following criteria will be used in grading homework:

Homework with more than 1 problem per sheet:	Minus 1 point out of 10
Lines drawn freehand (i.e.: no straightedge)	Minus 1 point out of 10
Work otherwise sloppy or difficult to follow	Minus 1 to 7 points out of 10

These point deductions will be applied as the instructor or TA sees fit. We like to assign partial credit for problems with incorrect answers, but if we cannot follow or otherwise decipher your work to find the incorrect step without expending excessive effort, we cannot assign partial credit.

GRADING: GRADING SCALE: (May be relaxed at the option of the instructor)

93 - 100	A
90 - 92.99	B+
85 - 89.99	B
83 - 84.99	C+
77 - 82.99	C
75 - 76.99	D+
70 - 74.99	D
00 - 69.99	E

Homework and Assignments 30%

Final Project 70 % (Includes presentation and written submittal) - **GET STARTED EARLY !**

IMPORTANT UNIVERSITY INFORMATION

Academic Honesty:

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

Accommodations for Students with Disabilities:

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

CALCULATOR POLICY FOR QUIZZES AND IN-CLASS WORK

In order to curb problems with students programming equations into their calculators for quizzes, only the following calculators which are approved for the FE exam (plus one additional calculator) will be allowed to be used for in-class quizzes or other in-class work. **NO EXCEPTIONS WILL BE MADE. PERIOD.** No other models of calculators will be allowed. Only the models listed below may be used.

Hewlett Packard - HP 33s

Hewlett Packard - HP 9s

Casio - FX 115 MS and FX 115 MS Plus (Note: Models with "-SR" designation at end are also allowed.)

Texas Instruments - TI 30X IIS and TI 30X IIB

Texas Instruments - TI 36X Solar

Texas Instruments - TI 30X or TI 30XA

The instructor routinely uses a TI-30XA to design \$10 million buildings. So you should be able to work your simple quiz problems with something equivalent.

This short paper by Professor Yao from Texas Tech is a pretty good summery of my thoughts and philosophy on grades. I could not have said it better than this.

Sputo

ON GRADES AND GRADING

by James T. P. Yao for his students and interested colleagues

The grade in a given course is a measure of the student's performance in that endeavor. The overall grade point averages are indeed important considerations for all students. When I was a student at the University of Illinois in Urbana-Champaign, I did care about my grades at that time. However, I never complained about any of my grades though, at times, I felt that the grade I received in a particular course might not be fair. The fact is, on the average, the overall grade point average did reflect the knowledge gained and the effort that I put into my college education. There were courses for which I thought that I deserved a better grade than the one on my record. On the other hand, I also had grades that were better than what I expected and/or deserved. In the long run, they all averaged out at the end of my college career. Most importantly, I learned from each professor and from each course that I had.

A few years after I graduated, I forgot all my grades. No one has ever asked for my grades just a few years after I graduated from college. To date, however, I have kept all the basic knowledge that I gained from my college education. Especially, the method of learning new things on my own has been useful. If the students aim at learning as much as they can from each course and each professor, the good grades will come as a result of their diligent work, on the average. On the other hand, if the students waste their time arguing about their grades, they will lose time for studying new lessons and thus hurt their future grades.

As a teacher, I try very hard to be fair and consistent in grading student papers. The student will get a perfect score if he/she gives a correct answer. If the answer is not correct, the teacher is the one who judges how serious the error is and assigns a partial score accordingly. As a student, I had several professors who did not give partial scores. The reason was that, the engineering system could fail with the wrong answer, no matter how close the answer is to the correct one (e.g., exactly the same number but with a wrong sign). I do not agree with that policy but respect their judgement in those courses. In any event, partial scores are subjective depending on the experience and viewpoints of the individual teachers. It is counter-productive to argue about it.

Please be careful in doing your homework, tests, and other assignments. People's lives and properties will depend on your work someday in the near future. Try to learn as much as you can while you are in school. Communicate with your teachers and classmates frequently, and concentrate on the learning process. With knowledge, you will become a successful and proud engineer soon. **HAVE KNOWLEDGE, WILL SUCCEED!**

OCCAM'S RAZOR
by John H. Lienhard
The University of Houston

There is a wonderful old Shaker tune,

'Tis a gift to be simple, 'tis a gift to be free;
'Tis a gift to come down where you ought to be

Those lines should make up the first chapter in any book on engineering design. But how do we find the natural threads of simplicity that run through the world around us?

Simplicity in design was a lesson I fell into when the Army drafted me -- after I'd finished college. They assigned me to the Signal Corps Engineering Labs and put me to work designing research equipment. There I met a fine designer, Jules Soled, a person who could clearly teach me things. So I said to him, "Teach me, and I'll work for you." He taught me many things I hadn't learned in school, and his central lesson was always this:

Do a first design. Then attack it. Your first design will be elegant and complicated, but it'll always work better when you get rid of complication. In a really good design you eventually make the very design itself unnecessary. And that is very hard to do because we like complication.

That idea is really quite old. The towering 14th-century philosopher William of Occam put it this way: "Multiplicity ought not to be posited without necessity." William was telling us **we should make no more assumptions than we really need to explain anything -- the simplest explanation is best.** We call that idea Occam's Razor because it helps slice away the junk in our thinking.

Look at the safety razor. For years designers fought with the problem of loading, mounting, and unloading a blade in a holder. If you're old enough, you'll remember Schick's "push-pull, click-click" advertisement for its mechanism. Keeping the action workable, and the blade solidly in place, was a big problem. Then some bright person applied Occam's razor to the razor-mounting problem. That designer realized you could simply mold the blade right into the plastic packaging. Now who buys replaceable razor blades? Instead, the blades are set, very solidly and with great precision, right into a cheap throwaway piece of plastic. We've designed blade-holding mechanisms out of existence. That's what Soled meant when he said that good design makes the design itself unnecessary.

But to take that last step -- to walk the plank from a clever design to no design at all -- takes nerve as well as imagination. **We're so tempted to look smart by mastering complication instead of simplicity.** If we go back to our Shaker tune,

'Tis a gift to be simple, 'tis a gift to be free;

the second line says:

'Tis a gift to come down where you ought to be

Good design exacts a price from our egos, but it really is a gift -- it really is freedom -- to find the simplicity in things and finally to reduce an engineering design down to where it ought to be.