

“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.

INSTRUCTOR: Thomas Sputo, Ph.D., P.E.
Senior Lecturer of Structural Engineering and Owner, Sputo Engineering
Campus Office: Weil 480B 392-9537 x 1496
Consulting Office Phone: 378-0448 Fax: 373-1331
E-mail: sputo@ufl.edu or sputoeng@mindspring.com

TEACHING ASSISTANT:

OBJECTIVE: Study of advanced topics in reinforced concrete design, culminating in the comprehensive design of a complete reinforced concrete structural system for a small building, completed as part of a group effort. Group effort will include study of alternate solutions, structural analysis and design, preparation of drawings, and written presentation of solutions.

PREREQUISITES: Proficiency in basics of concrete design (flexural design, shear design, bond and anchorage, short columns), structural analysis (including ability to utilize available analysis software), and utilization of computer tools (word processing, spreadsheets, and MathCad).

TIME: M, W, F 5th Period Weil 238

TEXTS : *Simplified Design - Reinforced Concrete Buildings of Moderate Size and Height*, 3rd Edition, Portland Cement Association, 2004

McCormac and Nelson, *Design of Reinforced Concrete*, 6th Edition, Wiley, 2005
ISBN: 0471487368

ACI 318-02, *Building Code Requirements for Structural Concrete*, American Concrete Institute, 2002 (Available for purchase thru instructor during first week of class - approximately \$58.00)

Class Notes and Class CD

MAXIMUM 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

GRADING CRITERIA:	One (1) Fundamentals Test	10%
	Two (2) Tests @ 20% each	40%
	Final Term Project	30%
	Homework	20%

FINAL TERM PROJECT: Will deal with the design of a multi-story concrete building. Further information will be provided as the semester progresses. ***Date of final submission to be determined.***

RULES FOR BETTER LIVING:

1. Attendance at lecture is mandatory and timeliness is important. Absences and tardiness will be considered by the instructor as a lack of professional motivation, and will be dealt with accordingly at the time grades are assigned.
2. Each lesson requires preparation by the student prior to the lecture. At a minimum, read the assigned material prior to the lecture.
 - a. The textbooks and ACI 318 are required for all lectures.
3. Homework will be occasionally assigned. Working with fellow students on homework will be allowed as “self-help”, but the final homework which is turned in must represent the work of the individual student. Do not copy another student’s work. Homework will be compared and violations will be dealt with. Homework will be due on the assigned date. **Late homework will be accepted up to 2 days late with a 25% penalty.**
 - a. Homework will be submitted on engineering computation paper or as computer output (**DO NOT RE-USE PAPER!**) Number and label all pages. **Work neatly. All work will be graded on the basis of content and neatness.** Use straightedges, reasonable scales, use pencil (that means also using an eraser), and print and label clearly. Reference equations to ACI 318 or textbook (i.e.: ACI Eqn. 10-2). List assumptions or rationale for your work. **Sloppy or difficult to follow work will be returned ungraded. No exceptions.**
4. 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.
5. 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.

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.

TENTATIVE LECTURE SCHEDULE: (Subject to modification)

Reference Key:	SD	<i>Simplified Design</i>
	McC	<i>McCormac</i>
	318	<i>ACI 318-02</i>
	CN	Class Notes
	CRSI	CRSI section of CD
	PCA	PCA section of CD
	WRI	WRI section of CD
	FBC	FBC section of CD

Lecture #	Topic	Reference
1	Introduction	CN; Syllabus
2	Review of Concrete Design	SD (3); McC (4, 5, 8, 9, 10)
3	Review of Concrete Design	SD (3); McC (4, 5, 8, 9, 10)
4	Review of Concrete Design	SD (3); McC (4, 5, 8, 9, 10)
5	Frame Analysis Software	CD
6	Project Development	CN; SD (1)
7	Building Loads	SD (2.2) ; FBC (16)
8	Building Loads	SD (2.2) ; FBC (16)
9	Analysis - Approximate Methods	SD (2.3, 2.4, 2.6); McC (14.3, 14.7, 14.8)
10	Analysis - Approximate Methods	SD (2.3, 2.4, 2.6); McC (14.3, 14.7, 14.8)
11	Analysis - Continuous Members	SD (2.3, 2.4, 2.6); McC (14.3, 14.7, 14.8)
12	Floor Design - One Way Joist	SD (3.8, 8, 9); PCA (Beams); CRSI (43, 46); WRI (208, 209); McC (5.2-5.5)
13	Floor Design - One Way Joist	SD (3.8, 8, 9); PCA (Beams); CRSI (43, 46); WRI (208, 209); McC (5.2-5.5)
14	Floor Design - One Way Slab	SD (8, 9); PCA (Beams); WRI (208, 209); McC (4.7)
15	Floor Design - Two Way Slab	SD (4), PCA (2 Way Slab, Two Way Slab); McC (16)
16	Floor Design - Two Way Slab - DDM	SD (4), PCA (2 Way Slab, Two Way Slab); McC (16)

17	Floor Design - Two Way Slab - DDM	SD (4), PCA (2 Way Slab, Two Way Slab); McC (16)
18	Floor Design - Two Way Slab - DDM	SD (4), PCA (2 Way Slab, Two Way Slab); McC (16)
19	Floor Design - Two Way Slab - DDM	SD (4), PCA (2 Way Slab, Two Way Slab); McC (16)
20	Floor Design - Two Way Slab - 318-63 Coeff. Method	CN
21	Floor Design - Two Way Slab - Finite Element Method	CN
22	Floor Design - Two Way Slab - Finite Element Method	CN
23	Floor Design - Two Way Slab - Shear	SD (4); McC (16.5, 16.9, 16.12)
24	Floor Design - Two Way Slab - Shear	SD (4); McC (16.5, 16.9, 16.12)
25	Continuous Beams	CN; McC (4.8, 14.11)
26	Torsion	SD (3.7); McC(15)
27	Torsion	SD (3.7); McC(15)
28	Torsion	SD (3.7); McC(15)
29	Torsion	SD (3.7); McC(15)
30	Short Columns	SD (5), PCA (Columns, Col-Wall); McC(10)
31	Short Columns - Bi-Axial Bending	SD (5), PCA (Columns, Col-Wall); McC(10)
32	Short Columns - Bi-Axial Bending	SD (5), PCA (Columns, Col-Wall); McC(10)
33	Frames - Moment Amplification	McC (11)
34	Frames - Computer Modeling	McC (11)
35	Walls - Axial Design	SD (6), PCA (Walls); McC (18.1-18-4)
36	Walls - Axial Design	SD (6), PCA (Walls); McC (18.1-18-4)
37	Walls - Shearwall Design	SD (6), PCA (Walls); McC (18.5)
38	Foundations	SD (7); McC (12)
39	Foundations	SD (7); McC (12)
40	Foundations	SD (7); McC (12)
41	Foundations	SD (7); McC (12)
42	Stairs	CN

General References on Design and Reinforcement Detailing:

CRSI 30, 32, 40, 44, 47, 50
PCA Design1
WRI 208, 209
SD 8, 9

This short paper by Professor Yao from Texas Tech is a pretty good summary 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.