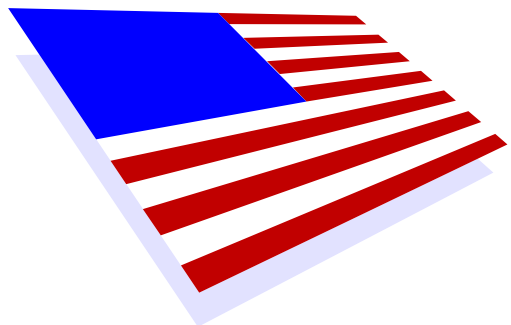
Welcome to
Computer Tools for Engineers



University of South Florida

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Today's agenda:

- Initial comments and discussion of course goal
- Introductions
  - Course and lab instructors
- Boring administrative stuff
  - Syllabus, outline, etc.
- The bad news ☹
- The good news ☺
- Show me the money!
  - Solving for yearly and total salary
  - Using the right tool for the job
  - Mathcad

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On your desk...

You must be able to use both of these tools to be successful

Software in your computer:

-

The goal of this course:

Teach you how to use a computer to solve engineering problems.

→ The computer as a tool...

The specific objectives of this course:

- Mathematics package for *formula crunching*
- Spreadsheet for *number crunching*
- Overview of basic operation of the computer
- *Design methods* (for programming **and** non-programming problems)
- Programming in a high-level language for *general problem solving*

Introduction of instructor:

- **Ken Christensen**
  Assistant Professor
  Computer Science and Engineering
  Ph.D. - N.C. State University, 1991

http://www.csee.usf.edu/~christen

- Background
  - IBM 1983 - 1995
  - USF 1995 - Present

- Publications, patents, and awards
  - 8 journal papers, 15 conference papers, and 10 U.S. patents (IBM)
  - 1997 USF outstanding undergraduate teaching award
  - 1998 USF Teaching Incentive Program (TIP) award
  - 1998 and 1999 ASEE/NASA Summer Faculty Fellowship at NASA-KSC

- Research
  - Performance evaluation of computer networks.

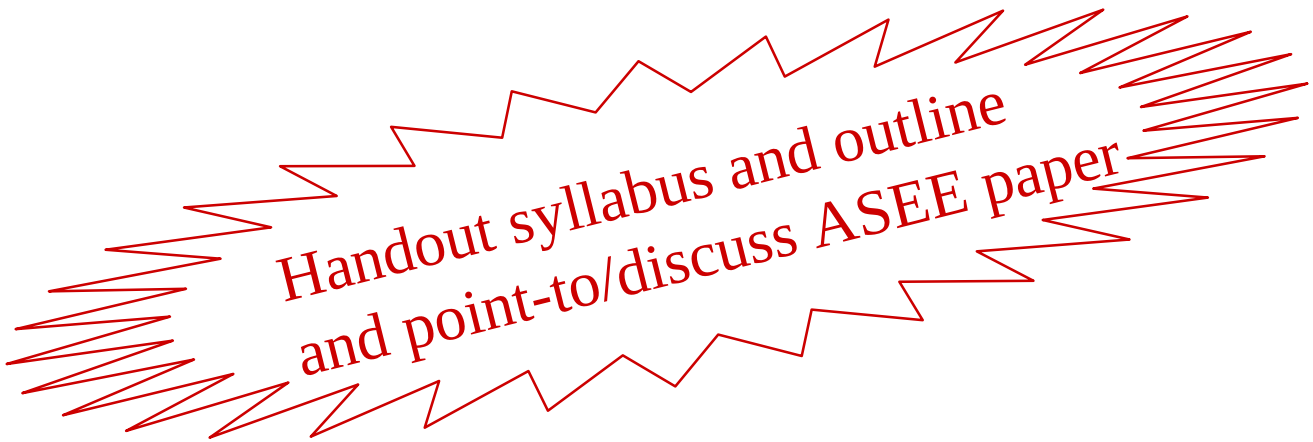
Introduction of teaching assistants:

- **Li Zhou** (20 hrs/wk)
  Graduate student (Computer Science and Engineering)

- **Sujit Vaidya** (15 hrs/wk)
  Graduate student (Computer Science and Engineering)

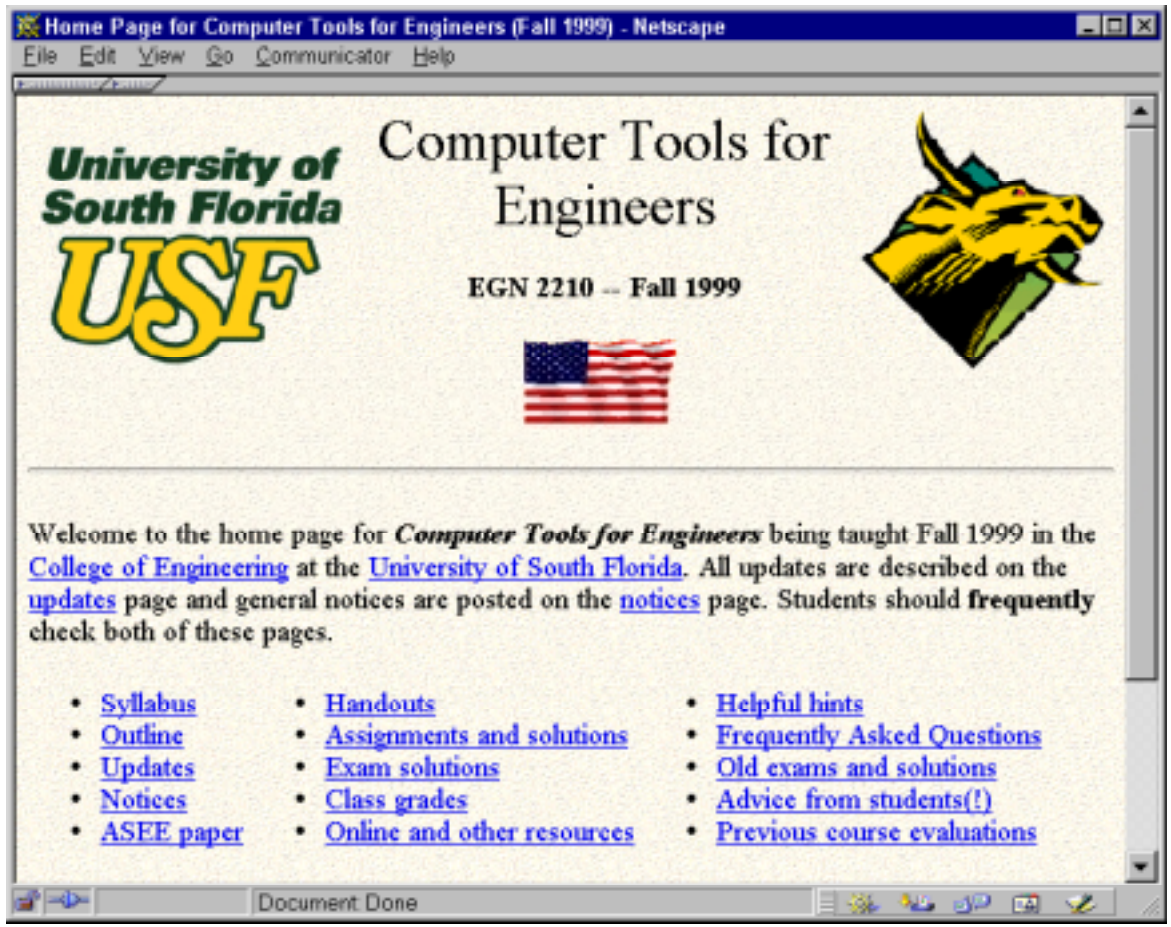
Administrative stuff:

- Goal is to make sure ***you*** understand...
  - Organization of this course (including Web content)
  - Course objectives and assignments
  - Expectations of performance
  - Availability of instructor and teaching assistants



Administrative stuff: (continued)

- Everything is on the Web...
  - *http://www.csee.usf.edu/~christen/class7/class7.html*



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Administrative stuff: (continued)

- Two written exams (given in class)
  - Exam #1 and #2 - Both will be two-hour written exams

- Five “hands-on” quizzes (given in lab)...
  - Assignment of 6 problems one to two weeks before quiz
  - Quiz will be a random selection of 1 of the 6 problems and 1 new problem
    - » A student will roll a die to select the random problem

- Six lab exercises (given in lab)...
  - Short lecture
  - Then, a simple problem
  - Complete problem in lab and get checked-off before end of lab

Administrative stuff: (continued)

- Need to buy and bring to lab...
  - Large manila envelope (9 in by 13 in)
  - Diskette

Buy ***several*** of each

Do it this week!!!

Do student surveys

Do roll with 3x5 cards

Do signature forms

Pens for misteaks

The “bad news”:

- No strain, no pain, no gain

- This course requires a lot of continuous work
  - Is not a “cram the night before” course

- How do you train for a sport?
  - 1 hour everyday for 20 days?
  - Or, 20 hours the day before the competition?
  - Why?

Think about this!

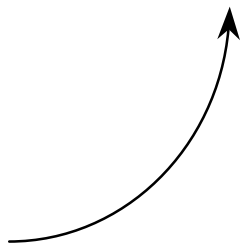
The “good news”:

- No strain, no pain, no gain

- This is a very rewarding course… you will learn useful material
  - It will help you in your future engineering courses
  - It will help you find a job

- I believe that this is…
  - THE MOST IMPORTANT ENGINEERING CORE COURSE

Which is why I love to teach this course!



The "good news": (continued)

- No strain, no pain, no gain
- Why do this?
- Why not just become a business major?
  - Advantage = less work and higher grade point
  - Disadvantage = LOWER STARTING SALARY
  - Disadvantage = LOWER PROFESSIONAL SATISFACTION

Show me the money!

Show me the money...

- Invest $1000 in the bank at 10% compounded yearly

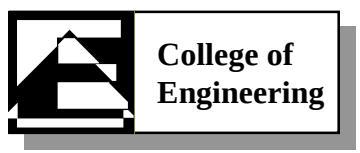
End of year #1 … $1100

End of year #2 … $1200 or $1210?

End of year #3 … $1300 or $1331?

End of year #n … What is the formula?

Same way we compute salary growth



Show me the money… (continued)

- Salary growth works in the same way (with compounding)

- Let's derive the formulas for,
  - Yearly salary for year N
  - Total salary after N years

Compute the $$$ value of an engineering degree versus some other type of degree

Show me the money… (continued)

- Inputs are:
  - Starting salary
  - Yearly raises
  - Number of years in career

- Outputs are:
  - Salary for a given year
  - Total salary for a given year

Engineering start = $35,000
Business start = $28,000
Yearly raise = 10% (given at the end of a year)

Show me the money… (continued)

raise = 0.10 for 10%

- Deriving the formulas...

Salary year #1 = start_salary * $(1 + raise)^{1-1}$

Salary year #2 = start_salary * $(1 + raise)^{2-1}$

Salary year #3 = start_salary * $(1 + raise)^{3-1}$

...

Salary year #n = start_salary * $(1 + raise)^{n-1}$

How much money you made at the end of the year

Show me the money… (continued)

- Deriving the formulas...

$$\text{Total\_salary} = \sum_{j=1}^{N} \text{start\_salary} * (1 + \text{raise})^{j-1}$$

Total amount of money
at the end of N years

Show me the money… (continued)

- Let's do an example...

Engineering starting salary = $35,000
Business starting salary = $28,000
Yearly raise = 10% (given at the end of a year)

Compute the total amount of money earned after 10 years for both majors.