Welcome to
Computer Tools for Engineers
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
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

- **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

Handout syllabus and outline and point-to/discuss ASEE paper
Administrative stuff: (continued)

- Everything is on the Web...
  - [http://www.csee.usf.edu/~christen/class7/class7.html](http://www.csee.usf.edu/~christen/class7/class7.html)
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)

- 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}

raise = 0.10 for 10%

How much money you made at the end of the year
Show me the money… (continued)

- Deriving the formulas...

\[
\text{Total_{salary}} = \sum_{j=1}^{N} \text{start}_{salary} \times (1 + \text{raise})^{j-1}
\]

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.