Course Introduction

Larry Caretto
Mechanical Engineering 209
Programming for Mechanical Engineers
January 24, 2017

Outline

• First class day items: roll, outline, etc.
• Class goals and learning objectives
• Excel exercise
• Initial Discussion of Excel
  – Spreadsheet navigation
  – Entering data and formulas
  – Copying formulas to get tables
  – How many decimal places?

Self Introductions

• Take picture of next student in serpentine order and sign roll in same order
• In same order introduce yourself with following information
  – Name and school attended before CSUN
  – Career goals/technical interests
  – Rate your familiarity with Excel (1=none to 5=expert)
  – Give one interesting fact about yourself

Basic Information

• Larry Caretto, Jacaranda part-time faculty office, lcaretto@csun.edu
  – Send questions by email outside of class and office hours
• Office hours: TTh 1:25 – 1:55 pm in classroom
• http://www.csun.edu/~lcaretto/me209
• Excel references on outline and web site

Excel Learning Objectives

• Be able to do basic operations on Excel worksheet: navigation, entering text, data and formulas, formatting cells and text, worksheet functions, plotting charts, and printing worksheets
• Be aware of other Excel tools that you can use with aid of help system: data validation, data tables, conditional formatting, range names, audit formulas

VBA Learning Objectives (1/2)

• As a result of taking this course you should be able to
  – write simple programs in Visual Basic that can be used as user defined functions (UDF) or macros for Excel spreadsheets.
  – use the VBA editor to create programs that interface with the worksheet
  – write code that declares and uses different variable types: long, double, date, string and Boolean
VBA Learning Objectives (2/2)

• As a result of taking this course you should be able to
  – create statements that do arithmetic calculations in correct order of precedence
  – construct logical expressions and use them in if statements and loops
  – construct logical and count-controlled loops
  – use one- and two-dimensional arrays and be able to transfer arrays between the worksheet and VBA array variables

Prerequisites

• Concurrent enrollment in Math 150A
  – Will consider problems using numerical approximations to calculus
• Although there is no Excel prerequisite, students usually have some background
  – Will give overview of Excel from the start, but will proceed quickly with optional practice exercises for students new to Excel
• Will have assessment quiz later today

Class Operation

• Classes will have lecture material and time to work on exercises/assignments
• Six programming assignments
• Five 30-minute quizzes at start of class on selected dates
• Midterm exam (April 6)
• Programming exam (May 11)
• Final Exam (May 18)
  – Quizzes, midterm and final will be closed book with information sheet on VBA commands

Programming Assignments

• Six programming assignments to be submitted by email (11:59 pm deadline)
  – Due 2/7, 2/28, 3/16, 4/18, 4/25, 5/9
• Two students can choose to submit a common submission for their grade
  – If you do this, make sure that you understand everything in the assignment
• See schedule in course outline for assignment deadlines and in-class quizzes

Assignment Deadlines

• Email submission by deadline with Excel file
  – Contents of Excel file will be specified in the assignment
• Two deadlines: first has no late penalty
• Second deadline has 30% late penalty
• Zero score if submitted after second deadline

In Class Quizzes

• Held on following dates at start of class: Feb 2, Feb 23, Mar 14, Apr 20, May 2
• Thirty minutes, closed book, students use instructor-supplied list of VBA language commands
• Based on previous lecture and current programming assignments
• May have some computer use which will be open book and help system
# Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Programming assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exam (April 6)</td>
<td>15%</td>
</tr>
<tr>
<td>Programming exam (May 11)</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam (May 18)</td>
<td>25%</td>
</tr>
<tr>
<td>Plus/minus grading will be used</td>
<td></td>
</tr>
<tr>
<td>Grading criteria/details in course outline</td>
<td></td>
</tr>
<tr>
<td>No make-up quizzes or exams</td>
<td></td>
</tr>
</tbody>
</table>

# See the Course Outline

- Download from course web site
  - [http://www.csun.edu/~lcaretto/me209](http://www.csun.edu/~lcaretto/me209)
- Contains lecture schedule and reading assignments
- Also read information on the following items
  - Class participation and courtesy
  - Collaboration versus plagiarism: students found cheating receive F grade in course
- Students are responsible for changes to outline announced in class

# Goals for this Course

- My goal is to help all students discover within themselves sufficient knowledge of Excel and VBA programming so that they will all get an A grade in the course
- What is your goal for this course?
- What will we do to help us achieve our mutual goals?

# How to get your A

- Spend 2 to 4 hours per week outside class on study and course assignments
- Prepare for class and be ready to ask questions
  - Download, print, and review the lecture presentations before class
  - Use presentations instead of writing notes
  - Listen to the lecture and ask questions
  - Write additional notes on presentations
  - Read the assigned reading before class

# How to Get your A, Part II

- Study with fellow students and try to answer each other’s questions
- Do the programs as well as you can before asking for help
  - Make sure you understand the help you get
- Contact me by email or office visits to ask questions
- Work with a group of classmates to help each other learn

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We cannot teach people anything; we can only help them discover it within themselves

*Galileo Galilei* (1564-1642)

[https://www.brainyquote.com/quotes/authors/g/galileo_galilei.html](https://www.brainyquote.com/quotes/authors/g/galileo_galilei.html) (Accessed January 5, 2017)
What I will do to help

• Arrive at class a few minutes early to answer any questions you may have
• Give lectures that stress application of basics to writing correct programs
• Return programs and exams promptly so that you can learn from your errors
• Be available for questions in my office (no office telephone) or email
  – Send entire class emails as appropriate

Excel Exercise

• Designed to assess your Excel skills
  – Compute values of \( y = Ax^2 + Bx + C \) for \( x = 0 \) to \( x = 20 \) with \( \Delta x = 1 \)
  – Enter the values of \( A \), \( B \), and \( C \) in single cells so that they can be easily changed
    • Use \( A = 3 \), \( B = 2 \), and \( C = -5 \)
  – Plot the results
• Will call time before most students have finished

Spreadsheet History

• Mainframe programs in 1960s-1970s
• VisiCalc 1979 on Apple II followed by
  – Borland Quattro Pro (1983)
  – Microsoft Multiplan (1983)
  – Excel (1985)
• Macros initially used to memorize a series of keystrokes
• Excel adopted VBA for macros in 1997
Excel Basics

- Ribbon with icons for commands
- Quick access toolbar (a set of your icons)
- Name box shows selected cell
- Click boxed x in lower right corner of groups for more choices
- Home tab selected here
- Different ribbon commands for each tab

What is a Range?

- A range is a single cell or a group of cells
  - Refer to rectangular array of cells by (upper left):(lower right), e.g.: A6:C42
  - Group of cells need not be contiguous
    - Use repeated control-click selections for these
    - Example shows font color change for selection

Ribbon Selections

- Some ribbon icons have choice of click or pulldown menu
  - Click gives single default choice
  - Pulldown gives multiple choices.
- Example: Font group
  - Click fill or font color to give selected color
  - Pulldown for choices

Tabs for Many Worksheets

- Arrows only for moving one sheet in either direction
- Dots indicate additional sheets
- Add sheet to right of active sheet
- Change spacing available for tabs and slider (for left-right moves)

More on Multiple Worksheets

- Arrows only for moving one sheet in either direction
- Hover mouse over arrows to see these choices
- Right-click on tab to get menu for worksheet items
- Double-click on tab to highlight worksheet name then type new name

Name Box and Formula Bar

- Use triple dot on top of spreadsheet to adjust relative spacing for cell and formula
- Short formula, use up arrow to get one-line display
- Long formula, use down arrow to get two-line display
- When formula has more than two lines, smaller up and down arrows can be used to show other lines
**Entering Information**

- Data, text, or equations can be entered into a single cell (click cell to select first).
- After typing the desired information, you conclude by one of the following:
  - Press enter
  - Move the mouse and click on another cell
  - Click on the check mark between the name box and the formula bar
- Press “Esc” or click “x” to cancel entry.

**Entering Formulas**

- Instead of typing formula cells, you can point and click cells.
- In the figure above, the user typed the equal sign, then clicked cell C3 and typed the “*” for multiplication.
- What next step to get $F=ma$?
  - Click cell C4 and use one of the three completion methods on previous slide.

**Copying Formulas**

- Prepare a table of $y = 3x^2 + 2$ for $x = 0$ to 10 in steps of $\Delta x = 0.5$

1. Enter headers, initial $x$ value, and initial equation for $y$ at $x = 0$.
2. Enter increment equation for $x$ (A3).
3. Select equation for $x = 0$ (B2). Click on “Fill Handle” (small square in lower right corner) and drag down one cell to get new formula. Is this the correct formula?
4. Select cells A3:B3 and drag fill handle down to complete table. (See next page.)

**Copying Formulas (2/2)**

- Results shown here for equation view (on left) and normal (results) view on right.
- Default number formats show only necessary numerals – no trailing zeroes after decimal point.
- Click boxed $x$ in lower right corner for more choices (next class).