For a video presentation of our class, please visit

https://emagenit.com/microsoftexcelengineer.htm >

Questions? 1.805.498.7162

Microsoft Excel
for Engineers and Scientists
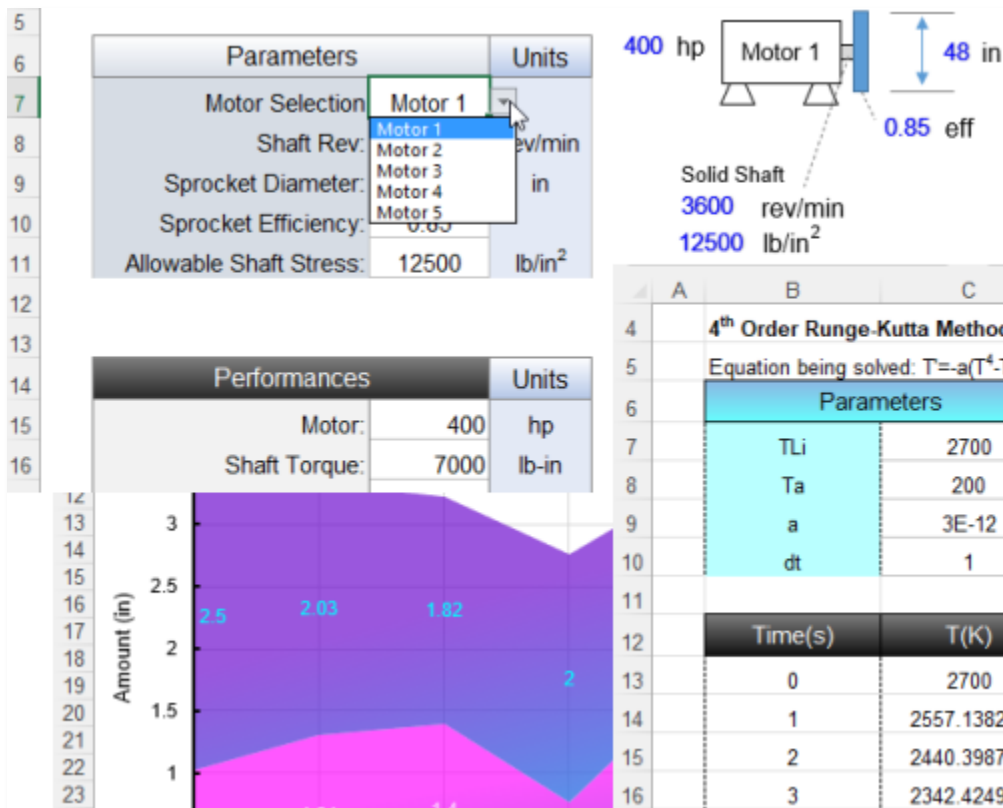
Learn to harness Excel's powerful calculation, charting, display, and UI abilities to rapidly build modeling and analysis tools.

How our class can help you.

Our 1-day class shows the essential Excel skills you need to assemble a wide variety of hi-tech model and analysis tools that can be rapidly scaled and upgraded.

From laying out model and analysis problems; to building high-powered formulas, lookups, and logic; to implementing numerical techniques and design optimization; to building adaptive interfaces, displays, and charts; our class covers a wide range of must know Excel topics.

Join us and our class will show you the design strategies, assembly methods, and Excel features that you can use to rapidly solve a variety of problems.

Key Excel topics covered in class.

- Complete formula, debugging, cell reference, and cell naming review
- How to layout model / analysis problems, build input / output ranges, and link team data in workbooks
- Creating Excel and worksheet tables to store and filter data
- Using Excel table slicers to rapidly filter table data
- How to use key Excel worksheet functions in engineering and science problems
- Performing table lookups and interpolation with the VLOOKUP, XLOOKUP, INDEX... functions
- How to toggle between lookup tables in a formula
- Creating formula logic that toggles equations, detects blank cells and errors, performs If...ElseIf logic...
- Using Data Validation to create cell drop down lists and control worksheet cell entry in your UIs
- Using ActiveX controls, shapes, and Conditional Formatting to build UIs and dynamic technical illustrations
- Performing integration and differentiation, solving ODEs, solving linear / nonlinear equations, using Solver... on the worksheet
- How to format and create charts, limit lines, secondary axis, carpet plots...

Excel skills needed for the class.

Select this Excel training if you or your group have:

- Used Excel's Ribbon interface, dialog boxes, and shortcut menus

- Opened and saved a workbook file
- Entered data in a worksheet cell before
- Copied and pasted data in Excel
- Created worksheet formulas like =A1+(A2*A3)

Who should attend?

- Engineers, scientists, and technicians. Class examples determined by those in attendance.

How we run the class.

We focus our training on what our customers need. When training begins, we analyze those needs and shift our outline appropriately. We will stress topics or add topics that our customers want. No two training sessions are ever the same with EMAGENIT.

Detailed class syllabus.

Problem Formulation on the Worksheet

- How to organize problem input and output ranges on the worksheet
- Rapid formula construction and debugging methods for engineers and scientists
- Using various relative, mixed, and absolute cell references effectively in formulas
- Dragging and filling formulas over 1-d and 2-d range problems
- How to manage and use cell / range names in your formulas to track model info and data
- How to organize and transmit large amounts of data between problem / team worksheets and workbooks
- Using string concatenation to assemble text "on-the-fly" in your formulas; used in lookups, logic conditions...

Creating Excel and Worksheet Tables to Store and Filter Data

- Designing worksheet and Excel tables for easy lookups and data storage
- How to create an Excel table and control its formats, filters, rows, columns...
- Using Excel table structured references to build worksheet functions that adapt to changing data structure

- Using Excel's Sort, Filter, Copy, and PasteSpecial features to rapidly organize data
- Using an Excel table's quick analysis tools and Slicers to quickly calculate and filter report data

Using Key Excel Worksheet Functions in Engineering / Science Problems

- How to create and use basic functions like SUM, COUNTA, AVERAGE, MAX, MIN, SUBTOTAL... in your formulas
- How to nest worksheet functions in your formulas to perform advanced engineering / science calculations
- Using functions like SUMIFS, COUNTIFS, MAXIFS... in your formulas to analyze data based on logic
- Performing trig and math operations in your formulas using functions like RADIANS, COS, ATAN2, ROUND, SQRT, LN, LOG...
- Using the IMAGINARY, COMPLEX... complex number functions in your formulas
- How to use statistical functions like STDEV.S, SKEW, FREQ, RANK... in your engineering / science formulas
- Designing formulas and using functions like MINVERSE, MMULT, TRANSPOSE... to perform array operations

Performing Table Lookups and Interpolation with Functions

- Using VLOOKUP, XLOOKUP, and HLOOKUP to perform basic engineering / science table lookups
- Using XMATCH and INDEX to perform complex table lookups as well as return entire rows and columns
- Using functions to perform interpolation on a worksheet table
- Using the INDIRECT function and string concatenation to toggle worksheet tables in formulas

Creating Logic Formulas for Model / Analysis Problems

- Logic review for engineers and scientists including how to figure out logic triggers in problems
- How to use the relational operators: <, >, <=, >=, < >, = and IF, AND, OR, NOT... to build logic formulas
- Using simple logic to activate and deactivate a worksheet formula

- Using the IF and IS functions to determine if cells are blank, contain numbers, contain text, have errors...

- Creating formulas that appear and disappear when needed using the IF and IS functions

- Creating IF...ELSEIF logic in formulas using nested IF's or the IFS function

- Using the IF functions to toggle between different engineering and science formulas in a cell

Building Worksheet UIs and Dynamic Displays for Your Problems

- Using Data Validation to create cell drop down lists and control number, date, and text entry in your UIs

- How to create self-adjusting cell drop down lists using dynamic names and names piggy backed on Excel tables

- Creating and integrating ActiveX and Form controls in worksheet UIs

- Using Conditional Formatting to flag (i.e., format) cells in your problems based on logic triggers

- Dynamically displaying cell values in shapes and creating linked pictures that update in your UIs

Performing Integration and Differentiation on the Worksheet

- Performing numerical integration in Excel using the Trapezoid, Simpson's 1/3, and Simpsons 3/8 rule

- Performing differentiation in Excel using the Forward Difference, Central Difference, and Backward Difference expressions

Solving Linear and Non-Linear Equations on the Worksheet

- Performing Newton's method on the worksheet to solve a non-linear equation

- Using Goal Seek to solve a non-linear equation on the worksheet

- Performing the Gauss Seidel method on the worksheet to solve a system of linear equations

- Using the Inverse Matrix method on the worksheet to solve a system of linear equations

Performing Simulations and Using Solver on the Worksheet

- Performing the 4th Order Runge Kutta method on the worksheet to solve single and coupled ODE's

- Using the Equilibrium method to solve a boundary value problem on the worksheet

- Using Goal Seek to solve a Shooting method boundary value problem on the worksheet

- What is Solver and how can it be used in engineering and science to perform design optimization?

- Design optimization problem / constraint formulation on the worksheet

- How to load and run Solver on single and multiple worksheets

Building and Formatting Engineering / Science Charts

- How to create XY Scatter, Log, Column, Line, Pie... charts on a worksheet or chart sheet

- Formatting chart data series, data labels, gridlines, axis limits...

- Creating limit lines and a secondary axis for your charts

- How to display multiple tables in a chart, great for trade studies, differing x axis increments...

- How to combine two or more chart types in one chart (i.e., combo chart)