ENRG 51 – Excel for Energy Auditing

COURSE DESCRIPTION: Overview of Microsoft Excel as used for common engineering applications, with a focus on energy savings calculations. It covers Excel basics, such as navigation techniques, key-pad short cuts, graphing, and calculations. Advanced topics include regressions, pivot tables, lookup, dates and macros.

36 Hours (18 lecture, 18 lab)

LEARNING OUTCOMES:

- Demonstrate fundamental use of spreadsheet basics.
- Create and interpret graphs.
- Illustrate the use of Excel's built-in functions and the functions commonly used by engineers
- Interpret simple regression analysis directly from graph data using various trend lines
- Create and apply macros and pivot tables on existing data

COURSE TOPICS:

I. Excel fundamentals
   - A. Starting Excel
   - B. Basic concepts and terminology
   - C. Spreadsheet basics
   - D. Formatting, printing, saving, opening and editing new and existing workbooks

II. Creating and interpreting graphs
   - A. Importing text files
   - B. Creating an XY scatter plot
   - C. Editing an existing graph
   - D. Creating graphs with multiple curves
   - E. Printing graphs

III. Excel Functions
   - A. Introduction to Excel functions
   - B. Excel's built-in functions
     1. Elementary math functions
     2. Advanced math functions
     3. Date and time functions
     4. String functions
     5. Lookup and reference functions
     6. File-handling functions
     7. Functions for working with database
   - C. Using the CONVERT ( ) function to convert units
   - D. Error function

IV. Regression Analysis
   - A. Introduction to linear regression function
   - B. Exploring linear regression with Excel's trend line capability
   - C. Evaluating two-coefficient linear regression models
   - D. Analyzing polynomial regression
   - E. Applying regression analysis to energy data

V. Excel Macros
   - A. Introduction to common macros commands, formulas, and functions
   - B. Programmed macros
     1. Module, subs, and functions
     2. Running macros
     3. Saving a macro project
     4. Using a programmed macro from another workbook

TYPES OF ASSIGNMENTS:

I. In-class
   A) Class discussions
   B) Solve problem sets from real world energy data using Excel
   C) Analyze energy savings calculations with Excel
   D) Analyze imported data such as Typical Meteorological Year, version 3 (TMY3)

II. Out-of-class
   A) Readings from text, websites or instructor handouts
   B) Solve problem sets from real world energy data using Excel
   C) Prepare written report to "client" explaining energy calculations or analysis performed using Excel

TEXTBOOKS & RESOURCES:

- MS Word and Excel help resources
- Instructor generated handouts on topics such as Regression Analysis or Macros

BEST Center Curricula, Resources & Recordings

Academic Programs
Georgia Piedmont Technical College - Building Automation Systems
Milwaukee Area Technical College - Sustainable Facilities Operations
Laney College - Commercial HVAC Systems
City College San Francisco - Commercial Building Energy Analysis & Audits

Professional Development Materials, Presentations & Videos
National Institutes
Building Automation Systems Instructor Workshops
Webinars (e.g., BEST Talks)

Faculty Profile Videos
Reports & Case Studies
Marketing Resources

BEST
Building Efficiency for a Sustainable Tomorrow

NSF National Science Foundation