## DAY 1

*Logical and Reliable Data Analysis, Descriptive Statistics, and Pivot Tables*

- Importing data into Excel
- Best practice when analyzing data
- Analyzing and representing coded data
- Descriptive statistics and their real meanings
- Performing a frequency analysis
- The use of pivot tables and pivot charts
- Noisy and incomplete data, statistical significance and dealing with outliers

## DAY 2

*Data Mode Shape Analysis*

- Plotting data against time
- Generating data mode shapes
- Fitting curves to data
- Correlating mode shape to time-based events
- Interpreting time series analyses
- Moving average calculations

## DAY 3

*Scenario Analysis and Interactive Spreadsheets*

- Representing analytical problems as multi-input, single-output (MISO) systems
- Deterministic systems analysis
- What if and visual scenario analysis
- Dynamic / interactive spreadsheets and the use of forms control
- Moving window, conditional and adaptive calculations
- Measuring the sensitivity of calculated variables

## DAY 4

*Regression Analysis and Correlation*

- Equations of curves

- The prediction of future behavior using data shape – regression analysis
- Linear, polynomial, exponential and power curve fits
- The dangers of over-fitting
- Data end effects
- Goodness of fit (sum of square error – SSE) and $R^2$
- Evaluating equations, solving equations, and using Solver
- Correlation and causality

## DAY 5

*Data Driven Methods and Analysis of Variance*

- Non-deterministic system
- Data driven methods
- One step ahead future prediction using data science (multivariate correlation)
- Single factor analysis of variance (ANOVA)
- Two factor analysis of variance
- A demonstration of artificial intelligence – the travelling salesman problem