

Solving Business Problems with Statistics

Duration: 3 Days

Overview

Solving Business Problems with Statistics training course teaches participants how to apply appropriate statistical procedures and models to answer business questions and, most importantly, effectively communicate impact to stakeholders. Students participating in this 3-day course will learn how to:

- Decide which tool or technique to use in a given situation
- Apply data gathering and input considerations, including a conceptual groundwork of statistical reasoning
- Set up appropriate hypotheses and run analyses in Excel
- Interpret the results in context of the problem and communicate to stakeholders
- Identify and avoid key pitfalls
- Visualize and communicate the results in a fair, objective and unbiased manner

They will leave the course able to use Excel to build statistical models that answer questions like:

- What's the relationship between a variable and an outcome?
- If I adjust X, what will be the impact on Y? Are there natural limits I should be aware of?
- Are we meeting expectations?
- What's coming next? Are we going up or down and by how much?
- Why are we going up or down? How impactful is each variable? (in other words, what should I focus on first?)
- Are there any unusual outliers? What caused those? Do I need to do something about this?
- How likely is any given idea or decision or campaign to be successful?
- Did any given change or decision make a material business impact?

Class Requirements

Students have access to Microsoft Excel and are familiar with writing calculations and formulas within Excel.

Course Outline

Section I: Background Information

- Why Use Statistics?
- Installing the Data Analysis Tool Pack add-in for Excel

Section II: Analysis Fundamentals

- Exploring and visualizing data
 - Types of variables and how to visualize each
 - Best practices of communicating through visualizations
- Descriptive statistics o Uses for specific measures and how to visualize
- Samples vs. populations
- Average, median, standard deviation, quartiles, percentiles, z-scores
- Looking at the shape of the data and the impact of outliers
- Cautions and common pitfalls (e.g. Anscombe's Quartet)
 - Dealing with bad data and ensuring it's reliable for good decisions
- Examining Relationships
 - How to visualize
 - Communicating the software output
- Overview of Probability
 - Independence
 - Conditional probability
 - Bayesian probability
 - Cautions
- Sampling Distributions and the Central Limit Theorem
- Overview of Inference o Confidence intervals and p-values

Section III: Predictive Models

- Method for Creating Predictive Models
- How to Choose and Assess an Appropriate Model
- Regression
 - Correlation
 - Linear Regression
- When to use it
- How to interpret meaningfully
- For nonlinear data
- Exponential Regression
- Logarithmic Regression
- Polynomial Regression
 - Multivariate
- ANOVA
 - t-Test
 - One-Way ANOVA
 - Two-Way ANOVA
- Chi-Square
 - Goodness of Fit
 - Test for Independence
- Time Series & Forecasting
- Logistic Regression Overview