



UNIVERSITY OF
SAN FRANCISCO



A/B Testing and Beyond: Designed Experiments for Data Scientists

**A Continuing Education Certificate Offered by The University of San Francisco's
Data Institute**

September 4 – October 16, 2018

Schedule of Topics

Week 1: Tuesday September 4th

- Introduction
 - Structured Problem Solving
 - Advantages and Disadvantages of Experimentation
 - Fundamental Design Principles: Replication, Randomization, Blocking
 - Statistical Prerequisites

Week 2: Tuesday September 11th

- A/B/n Testing Part I
 - Two-group comparisons
 - Hypothesis testing via t -tests, z -tests and χ^2 -tests
 - Power analysis and sample size calculations

Week 3: Tuesday September 18th

- A/B/n Testing Part II
 - Multiple group comparisons
 - Hypothesis testing via F -tests and χ^2 -tests
 - Multiple testing issues and the Bonferroni correction

Week 4: Tuesday September 25th

- Factorial Experiments
 - Efficient investigation of multiple factors
 - Design and analysis of full factorial experiments
 - Design and analysis of 2^k factorial experiments

Week 5: Tuesday October 2nd

- Fractional Factorial Experiments
 - The importance of economically designed screening experiments
 - Design and analysis of 2^{k-p} fractional factorial experiments

Week 6: Tuesday October 9th

- Response Surface Methodology
 - Response optimization via Central Composite Designs

Week 7: Tuesday October 16th

- Multi-Armed Bandit Experiments
 - Exploration of the Bayesian alternative to standard hypothesis testing and A/B/n experiments