DMAIC → **Define** → **Measure**

Description:
Clearly identify the business problem / performance gap (output measure), customer, scope, goals and resources.

Key Concepts:
$y = f(x)$
Types of data
Descriptive statistics and soft tools

Project:
Complete Problem Definition Worksheet

Tools:
Process map
SIPOC
Descriptive statistics
Thought process map
Affinity diagram
Sigma Quality Level (SQL)

Description:
Validate your measurement system and collect baseline data.

Key Concepts:
Mapping a process/value-stream, forms of waste, measurement error, reproducibility, repeatability

Project:
Identify potential inputs, develop operational definitions, develop data measurement/collection plan, validate measurement system, collect baseline data, calculate SQL.

Tools:
Operational definitions
Kappa
Process map (detailed)
Data measurement plan
Data stratification tree
Histogram
Trend/ line chart
Pareto chart
Fishbone (cause/effect) diagram

Week 1 → **Week 2**

Analyze

Description:
Analyze, describe, and present the data to discover the root cause(s), identify/prioritize critical inputs (x's), determine the inputs impact on the output.

Key Concepts:
Inferential statistics, common distributions, developing a hypothesis, determining the likelihood some event happens based on a sample (calculating probabilities), Using the normal distribution as the "go to" distribution.

Project:
Write a null and alternative hypothesis statement.

Tools:
Hypothesis testing
Chi-square test for independence

Key Concepts:
Collecting sample data, how confidence intervals and sample size are related.

Project:
Utilize the sample size formula.

Tools:
Confidence intervals.

Key Concepts:
Determining input's (x) impact on the output (y).

Project:
Use regression to identify relationships between the output (y) and inputs (x's).

Tools:
Correlation
Simple linear regression
Multiple regression
Scatterplot
Trend/ line chart
Pareto chart
Fishbone (cause/effect) diagram

Week 3 & 4 | **Week 5** | **Week 6 &7**

Improve

Control

Description:
Develop potential solutions, select best solution, pilot solutions, measure results, document new process.

Key Concepts:
Discover y= f(x)

Project:
Implement a solution, run a pilot, evaluate the results, complete a hypothesis test.

Tools:
Affinity diagram
Fishbone cause/effect diagram
Pareto
Control charts
Hypothesis testing
Process map
Solution selection matrix

Description:
Implement process changes and controls. Verify expected performance was achieved, monitor performance to sustain new levels.

Key Concepts:
Xbar/R and ImR control charts, Different control charts applicable to different processes, time series forecasting methods predict future performance.

Project:
Utilize an appropriate control chart and /or time series forecasting method

Tools:
Control charts
Time series analysis
Operational definitions
Process map
Sigma Quality Level (SQL)

Week 8

Week 9