1. **Statistical Techniques**
    1. Probability Curve, Cumulative Probability, Inverse Cumulative Probability (Example and procedure), Shape, Scale and Location parameters
    2. Types of Distributions (Normal, Weibull, Exponential, Binomial, Poisson) & their interpretation and application
    3. Identifying distributions from data
    4. Central Limit Theorem – Origin, Standard Error, Relevance to Sampling
    5. Example & Application of Central Limit Theorem

2. **Sampling Distributions**
    1. Degrees of Freedom
    2. t-distribution – Origin, relevance, pre-requisites, t-statistic computation
    3. Chi-square distribution – Origin, relevance, pre-requisites, Chi-square statistic computation, Approximation to discrete data
    4. F-distribution – Origin, relevance, pre-requisites, F-Statistic and areas of applications
    5. Point & Interval estimates – Confidence and Predictive estimates for Sampling Distributions
    6. Application of Confidence Estimates in decision making

3. **Sampling of Estimates**
    1. Continuous and Discrete Sample Size Computation for sampling of estimates
    2. Impact of Margin of Error, standard deviation, confidence levels, proportion defective and population on sample size
    3. Sample Size correction for finite population
    4. Scenarios to optimize Sample Size such as destructive tests, time constraints

4. **Advanced Graphical Methods**
    1. Dot Plot
    2. Box Plot
    3. Interval Plot
    4. Stem-and-Leaf Plot
    5. Time Series & Run Chart
    6. Scatter Plot
    7. Marginal Plot
    8. Line Plots
    9. Contour Plot
    10. 3D scatter Plot
    11. 3D Surface Plot
    12. Matrix Plot
    13. Multi Vary Chart

5. **MSA**
    1. Performing Variable GRR using ANOVA/X-bar R method
    2. Precision, P/T, P/TV, Cont %, No. of Distinct Categories
    3. Crossed & Nested Designs
    4. Procedure to conduct Continuous MSA
    5. Performing Discrete GRR using agreement methods for binary and ordinal data
    6. Agreement & Disagreement Scores for part, operator, standard
    7. Kappa Scores Computation for ordinal data and criteria for acceptance of gage

6. **Inferential Statistics**
    1. Advanced Introduction to Hypothesis Tests
    2. Significance and implications of 1 tail and 2 tail
    3. Types of Risks – Alpha and Beta Risks
    4. Significance & computation of test statistic, critical statistic, p-value

7. **Sample Size for Hypothesis Tests**
    1. Sample Size computation for hypothesis tests
    2. Power Curve
    3. Scenarios to optimize Sample Size, Alpha, Beta, Delta such as destructive tests

8. **Hypothesis Tests**
    1. 1Z, 1t, 2t, Paired t Test – Pre-requisites, Components & interpretations
    2. One and Two Sample Proportion
    3. Chi-square Distribution
    4. Ch-square Test for Significance & Good of Fit – Components & interpretations

9. **ANOVA & GLM**
    1. ANOVA – Pre-requisites, Components & interpretations
    2. Between and Within Variation, SS, MS, F statistic
    3. 2-way ANOVA – Pre-requisites, Interpretation of results
    4. Balanced, unbalanced and Mixed factors models
    5. GLM – Introduction, Pre-requisites, Components & Interpretations

10. **Correlation & Regression**
    1. Linear Correlation – Theory and computation of r value
    2. Nonlinear Correlation – Spearson's Rho application and relevance
    3. Partial Correlation – Computing the impact of two independent variables
    4. Regression – Multi-linear Components & interpretations
    5. Confidence and Prediction Bands, Residual Analysis, Building Prediction Models
    6. Regression – Logistic(Logit) & Prediction – Components & interpretations with example

11. **Dealing with Non-normal data**
    1. Identifying Non-normal data
    2. Box Cox & Johnson Transformation

12. **Non-Parametric Tests**
    1. Mann-Whitney
    2. Kruskal-Wallis
    3. Mood's Median
    4. Sample Sign
    5. Sample Wilcoxon

13. **Experimental Design**
    1. DOE terms, (independent and dependent variables, factors, and levels, response, treatment, error, etc.)
    2. Design principles (power and sample size, balance, repetition, replication, order, efficiency, randomization, blocking, interaction, confounding, resolution, etc.)
    3. Planning Experiments (Plan, organize and evaluate experiments by determining the objective, selecting factors, responses and measurement methods, choosing the appropriate design,
    4. One-factor experiments (Design and conduct completely randomized, randomized block and Latin square designs and evaluate their results)
    5. Two-level fractional factorial experiments (Design, analyze and interpret these types of experiments and describe how confounding affects their use)
    6. Full factorial experiments (Design, conduct and analyze full factorial experiments)

14. **Advanced Control Charts**
    1. X-S chart
    2. CumSum Chart
    3. EWMA Chart