

## Business Analytics Course Content

### Chapter1: Business Statistics

- Different types of data
- Data summarization methods
- Tables
- Graphs
- Charts
- Histograms
- Frequency distributions
- Relative frequency measures of central tendency and dispersion
- Box Plot
- Chebychev's Inequality
- Basic probability concepts
- Conditional probability
- Bayes Theorem
- Probability distributions
- Continuous and discrete distributions
- Sequential decision-making
- Sampling and estimation
  - Estimation problems
  - Point and interval estimates
- Hypothesis testing
  - Null and alternate hypotheses
  - Types of errors, Level of significance,
  - Power of a test
  - ANOVA Test for goodness of fit
  - Non-parametric tests.

### Chapter2: Predictive Analysis

- Simple linear regression
  - Coefficient of determination
  - Significance tests
  - Residual analysis

- Confidence and Prediction intervals
- Multiple linear regression
  - Coefficient of multiple coefficient of determination
  - Interpretation of regression coefficients
  - Categorical variables, heteroscedasticity
  - Multi-collinearity
  - outliers
  - Auto regression and Transformation of variables
- Logistic and Multinomial Regression
  - Logistic function
  - Estimation of probability using logistic regression
  - Deviance, Wald Test
  - Hosmer Lemshow Test Forecasting
  - Moving average, Exponential smoothing,
  - Trend, Cyclical and seasonality components
  - ARIMA (autoregressive integrated moving average).
  - Application of predictive analytics in retail,direct marketing, health care, financial services, insurance, supply chain, etc.

### **Chapter3: Optimization Analytics**

- Introduction to Operations Research (OR)
- linear programming (LP)
- Formulating decision problems using linear programming,
- Interpreting the results and sensitivity analysis.
- Multi-period LP models
- Applications of linear programming in product mix
- Blending, cutting stock
- Transportation
- Transshipment
- Assignment,
- Scheduling,
- Planning and revenue management problems
- Network models and project planning
- Integer Programming (IP) problems
- mixed-integer and zero-one programming
- Applications of IP in capital budgeting,
- location decisions, contracts.
- Multi-criteria decision making (MCDM) techniques
- Goal Programming (GP) and analytic hierarchy process (AHP) and applications of GP and AHP in solving problems with multiple objectives.
- Non-linear programming, portfolio theory.

#### Chapter4: Stochastic Models

- Introduction to stochastic models
- Markov models
- Classification of states
- Steady-state probability estimation,
- Brand switching and loyalty modeling
- Market share estimation
- Poisson process
- Cumulative Poisson process,
- Applications of Poisson and cumulative Poisson in operations,
- marketing and insurance
- Renewal theory
- Applications of renewal theory in operations and supply chain management
- Markov decision process
- Applications of Markov decision process in sequential decision-making

#### Chapter5: Advanced Analytics

- Principal component analysis
- Factor analysis
- Conjoint analysis
- Discriminant analysis
- ARCH (autoregressive conditional heteroscedasticity) and GARCH (autoregressive conditional heteroscedasticity)
- Monte Carlo simulation
- Survival analysis and its applications:
- Life tables,
- KapMeier estimates
- Proportional hazards
- Predictive hazard modeling using customer history data
- Six Sigma as a problem solving methodology
- DMAIC and DMADV methodology
- Six Sigma Tool Box
- Seven quality tools
- Quality function deployment (QFD)
- SIPOC
- Statistical process control
- Value stream mapping, TRIZ
- Classification and regression trees (CART),
- Chi-squared automatic interaction detector (CHAID) Lean thinking

- Lean manufacturing
- Value stream mapping

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Know more about [Business Analytics](#)



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