Data Science Course Content

R-Language:

- ✓ **Introduction to R**
  - **What is R?**
  - **Downloading and installing R**
- ✓ **Getting data into R**
  - **Typing in small data sets**
  - **Concatenating data with the c function**
  - **Combining variables with c, cbind & rbind functions**
  - **Combining data with the vector Function**
  - **Combining data with the matrix Function**
  - **Combining data with the data.frame function**
  - **Combining data with the list Function**
  - **Importing data**
- ✓ **Accessing variables and managing subsets of data**
  - **Accessing variables from a data frame**
  - **Accessing subsets of data**
  - **Combining two data sets**
  - **Exporting data**
- ✓ **Simple functions**
  - **The tapply function**
  - **The sapply and lapply functions**
  - **The summary function and table function**
- ✓ **An introduction to basic plotting tools**
  - **The plot function**
  - **Symbols, colors, and sizes**
  - **Adding a smoothing line**
- ✓ **Loops and functions**
  - **Introduction to loops**
  - **Loops**
  - **Functions**
- ✓ **Graphing tools**

- **Pie chart**
- **Bar and strip chart**
- **Box plot**
- **Cleveland dot plots**
- **Revisiting the plot function**
- **The pair plot**
- **The co plot**

✓ **An introduction to the lattice package**

- **High-level lattice Functions**
- **Multi panel scatterplots: xy plot**
- **Multi panel boxplots: bw plot**
- **Multi panel cleveland dot plots**
- **Multi panel histograms: histogram**
- **Panel functions**
- **3-D scatterplots and surface and contour plots**

✓ **Statistics basics with R**

- **Probability & Distributions**
- **Random Numbers**
- **Descriptive Statistics and graphics**

✓ **Simple regression and correlation**

- **Simple linear regression**
- **Residuals and fitted values**
- **Prediction and confidence bands**

✓ **Analysis of variance and the kruskal-wallis test**

- **One-way analysis of variance**
- **Kruskal–wallis test**
- **Two-way analysis of variance**
- **The Friedman test**

✓ **Multiple regression**

- **Plotting multivariate data**
- **Model specification and output**
- **Model search**

- ✓ **Logistic regression**
  - **Generalized linear models**
  - **Logistic regression on tabular data**
  - **Likelihood profiling**
  - **Logistic regression using raw data**
  - **Prediction**
  - **Model checking**
- ✓ **Rates and poisson regression**
  - **Basic idea**
  - **Fitting Poisson models**
  - **Computing rates**
- ✓ **Non-linear curve fitting**
  - **Basic usage**
  - **Finding starting values**
  - **Self-starting models**
  - **Profiling**
- ✓ **Common R mistakes**
  - **Problems importing data**
  - **Attach misery**
  - **Non- attach misery ($) & log of zero**
  - **Log of zero**
  - **Miscellaneous errors**

Data Science- R Language Implementation

- ✓ **Points and space**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**
- ✓ **Set theory**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**
- ✓ **Vectors**

- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Matrices**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Graphs**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Differential equations**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Linear algebra**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Generalized linear models**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Multinomial data**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Data pre-processing**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Data transformations**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

- ✓ **High dimensional data**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Dimensionality reduction**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Data visualization**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Stationary processes**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Frequency distribution**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Measures of dispersion**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Skewness**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Normal distribution**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Binomial distribution**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Probability**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Conditional probability**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Subjective probability**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Multiplication law of probability**
  - **Concept**
  - **Application of the concept**
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- ✓ **Mutually exclusive events and independent events**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Bayes theorem**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Random variables**
  - **Concept**
  - **Application of the concept**
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- ✓ **Correlation and regression**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Logistic regression**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**

- **Visualization**

- ✓ **Multinomial logistic regression**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Count regression or poisson regression**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Non parametric regression**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Multivariate analysis**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Single factor studies**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Multi factor studies**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Specialized study designs**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Testing of hypothesis**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Sampling**
  - **Concept**
  - **Application of the concept**

- **R language implementation**
- **Visualization**

✓ **Design and analysis of experiments**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Analysis of variance (ANOVA)**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Linear regression**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Non-linear regression**
- **Concept**
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- **Visualization**

✓ **Design of experiments**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Multivariate analysis**
- **Concept**
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- **Visualization**

✓ **Canonical correlation**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Discriminant analysis**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Factor analysis**
- **Concept**

- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Cluster analysis**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Multivariate analysis of variance (MANOVA)**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Time series analysis**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Forecasting analysis**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Quality control**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Linear programming problem**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Game theory**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Transportation problem**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Simulation**

- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Decision analysis**
- **Concept**
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- **Visualization**

✓ **Decision trees**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Assignment problems**
- **Concept**
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✓ **Predictive analysis**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Data mining concepts**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

✓ **Neural networks**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Weka data mining**
- **Concept**
- **Application of the concept**
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- **Visualization**

✓ **Item set mining**
- **Concept**
- **Application of the concept**
- **R language implementation**
- **Visualization**

- ✓ **Sequence mining**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Graph pattern mining**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Kernel methods**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Classification tree**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Likelihood theory**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Arbitrage theory**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Machine learning**
  - **Concept**
  - **Application of the concept**
  - **R language implementation**
  - **Visualization**

- ✓ **Ensemble learning**
  - **Concept**
  - **Application of the concept**
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  - **Visualization**

- ✓ **Estimation**
  - **Concept**
  - **Application of the concept**
  - **R Language Implementation**
  - **Visualization**