

# International Winter School Manipal University Jaipur (IWSMUJ2022)

## Course Overview

**Name of course: Basics of Data Science with “R”**

Name of instructor: Dr. Vaibhav Bhatnagar

Session: January 2022

Language of instruction: English

Number of contact hours: 36

Credit awarded: 03

### Objective of course

Any data analysis is incomplete without statistics. After getting the data, any statistical analysis starts with descriptive statistics which aims to extract the information hidden inside the data. The tools of descriptive statistics are based on mathematical and statistical functions which are to be evaluated using the software. The statistical software are paid as well as free. Most of the statistical software are paid software. A popular free statistical software is R. What are the basic tools of descriptive statistics and how to use the R software for descriptive statistical analysis is the objective of the course to be taught. The course outcome will be:

1. Understanding concepts of Data Science
2. Understanding concepts of R Language
3. Implementation of Data Science Concepts through R language

### Syllabus

Week 1: Calculations with R Software, Introduction to Descriptive Statistics, frequency distribution, Graphics and Plots

Week 2: Central Tendency of Data, Variation in Data, Moments, Fitting Linear Model

Week 3: Hypothesis Testing. Hypothesis Testing with R

### Organization of course

1st week:	10 hrs (classes)	2 hrs (self-study/project)
2nd week:	10 hrs (classes)	2 hrs (Mid term exam/assessment/discussion)
3rd week:	10 hrs (classes)	2 hrs (End term exam)

**Mode of lectures:** online lecture and hands-on

### Course Plan

Lecture no.	Topic	Lecture mode	Instructor
L: 1-6	Introduction to R Software, Basics and R as a Calculator, Calculations with Data Vectors, Built-in Commands and Missing Data Handling, Variables and Types of Data, Absolute Frequency, Relative Frequency and Frequency Distribution, Bar Diagrams, Pie Diagrams, Histogram Stem - Leaf Plots.	Online and Hand-on	Dr. Vaibhav Bhatnagar
L: 7-12	Arithmetic Mean, Median, Quantiles, Mode, Absolute Deviation and Absolute Mean Deviation, Coefficient of Variation and Boxplots.	Online and Hand-on	Dr. Vaibhav Bhatnagar
L: 13-18	Univariate and Bivariate Scatter Plots, Quantile-Quantile, Skewness and Kurtosis, Correlation Coefficient, Rank Correlation Coefficient.	Online and Hand-on	Dr. Vaibhav Bhatnagar
L: 19-24	Regression, Types of Regression, Least Squares Method - One Variable, Least Squares Method – Multi variable.	Online and Hand-on	Dr. Vaibhav Bhatnagar
L: 25-30	Inferential statistics, Data Normality Test, Confidence Interval, P Value	Online and Hand-on	Dr. Vaibhav Bhatnagar
L: 31-36	T Tests, ANOVA Family, Chi Square test.	Online and Hand-on	Dr. Vaibhav Bhatnagar

#### Brief profile of the instructor

Dr. Vaibhav Bhatnagar is working as Assistant Professor (Senior Scale) in Department of Computer Applications, Manipal University Jaipur. He achieved **Gold Medal in Graduation, Silver Medal in Post-Graduation**. He is one of the youngest persons who completed their Ph.D. in Information Technology in Rajasthan. **His current google citation is 250**. His research interests are in the field of Data Science and Machine Learning. He has expertise in R, Orange, Tableau and Medcalc. He has published more than 20 research papers in SCI, Scopus, Web of Science etc indexed Journal. **He has also completed and submitted research projects funded Department of Science and Technology**. He is also supervising Ph.D. Scholars.



