1. **SYLLABUS**

AM3101PC/DS3101PC: R PROGRAMMING

Course Objectives:

- Understanding and being able to use basic programming concepts
- Automate data analysis
- Working collaboratively and openly on code
- Knowing how to generate dynamic documents
- Being able to use a continuous test-driven development approach

Course Outcomes:

- Be able to use and program in the programming language R
- Be able to use R to solve statistical problems
- Be able to implement and describe Monte Carlo the technology
- Be able to minimize and maximize functions using R

UNIT–I

Introduction: Overview of R, R data types and objects, reading and writing data, subsettingRObjects,EssentialsoftheRLanguage,InstallingR,RunningR,PackagesinR,Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients,Variablenamesandassignment,Operators,Integers,Factors,Logicaloperations

UNIT– II

Controlstructures,functions,scopingrules,datesandtimes,IntroductiontoFunctions,a preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes

Vectors: Generating sequences, Vectors, and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices, and Arrays asVectorsVectorArithmeticandLogicalOperations,VectorIndexing,CommonVectorOperations

UNIT–III

Lists:CreatingLists,GeneralListOperations,ListIndexingAddingandDeletingListElements, Getting the Size of a List, Extended Example: Text Concordance Accessing ListComponentsandValuesApplyingFunctionstoLists,DATAFRAMES,CreatingDataFrames,Acc essingData Frames, Other Matrix-Like Operations

UNIT-IV

FACTORSANDTABLES,FactorsandLevels,CommonFunctionsUsedwithFactors,Workingwith Tables,Matrix/Array-LikeOperationsonTables,ExtractingaSub table,

Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions

UNIT-V

OBJECT-ORIENTEDPROGRAMMING:S Classes,SGenericFunctions,WritingSClasses,UsingInheritance,SClasses,WritingSClasses,Imple mentingaGenericFunctionon an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation

TEXTBOOKS:

1. R Programming for Data Science by Roger D.Peng
2. The Art of R Programming by Prashanth Singh, Vivek Mauryan, CengageLearningIndia.