TRIBHUVAN UNIVERSITY

INSTITUTE OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICAL SCIENCES

Bachelor in Mathematical Sciences (B.Math.Sc.)

Course of Study

Code No.: MSCS 351 | Full Marks: 75

Paper: **R Programming** | Pass Marks: 30

Nature: Theory and Practical | Credit: 3

Course Description:

The course covers introduction of R, various statistical distributions, functions, loops, various vectors, simulations, linear model and graphics.

Learning Objectives:

On successful completion of this subject, a student will be able to:

1. Program in R widely used open software and apply a range of techniques to solve business problems in the areas of syllabus covered by the subject.
2. Apply R programing for large data
3. Link statistical distribution with R
4. ApplyR programing in data analysis and actuarial field.

*Mode of Delivery***:**

The course will be taught by lecture, class discussion. There will be a project and students will prepare a model as per the instructor/lecturer.

Contents:

Unit 1 Introduction **12 hrs**

R in basics, installation of Console &environment, gettinghelp, CRAN, datastructures; logical, integers, factors, build in functions, basic arithmetic operations, sum, divide ,multplications and division, mean, median, mode, vectors, vectors arithmatics, matricis, matricsarithmatic, subsetting vectors, factors,data frame, short data frame,basic graphics, customizing plots,multiple plots.

Unit 2 Excel and its Functions **10 hrs**

Use of various excel functions like sum,count,sumifs,coutifs,basic airthmatic,referring the cell,range,shortcut keys,merge, wrap,row, column,filter,font,colour,advanced filter,conditional formatting,date and time,text to column,vlookup,hlookup,index & match,pivot table, tables and charts

Unit 3 Random Numbers and Distribution **8 hrs**

Random numbers, Poisson distribution, binomial, normal distribution, simulations, complex system, MCMC, rnorm, runif, PRNG, rgamma, complex & random fluctuations, Monte Carlo simulation.

Unit 4 Constructing, Reading, Writing, Working and Manipulating the Data **15 hrs**

Column, sequence, rep, combine, rbind, cbindlogicalindex, properties of vector and matrix for all data types, reading data and importing from Excel, SPSS, text, SAS,

working directory, scan and readlines, data import from Excel, SAS, SPSS, textfilesink, dump, dput, save&load, dataframes, adding and removing the column, merge, getting dimension and information working with text, textmining, date , time and Objects, customization, transform, summarystastics, groupedmeans, masking R objects, the function, tabling data.

Unit 5 Control Flow and Loops **5 hrs**

For loop,vector,list,data frame and matrix,the while loop for vector,listnad repeat loop.lapply and sapply functions for vectors and matrix.

Unit 6 Models and Graphics **10 hrs**

Dependent and independent variable, stostatic term, error term, coefficients, plottingdata, lines, modeldiagnosis, linear model and lm function,general and genarilizedmodel,types of response variable,logisticregression,classificationmodels,graphics in R,ggplot2 package, lattice, base, quickplot, ggmap package

References:

1. Introduction to actuaries N.D.Silva Microsoft Cop
2. R course university of Wisconsin
3. Introduction to R Mike Marin

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