Course code	Programming in R	L	T	P	C
XXXX		3	1	0	4
Pre-requisite		Nil		Version	

Course Objectives:
• To Enhance the programming capability of the students using R. • The students will be able to understand the purpose of using R in the process of data analysis.
Expected Course Outcome:
• Students shall explore R language fundamentals, including basic syntax, variables, and data types • Students shall be able to create and customize visualizations and can also perform predictive analytics using R
Student Learning Outcomes (SLO):
Students will be able to 1. Get a clear understanding of the subject related concepts and of contemporary issues 2. Design a component or a product applying all the relevant standards and with realistic constraints **3.** Use techniques, skills and modern tools necessary for managerial practice

Module	Topics	Hours	SLO
Module:1	**Introduction to R**	**6**	**2**
	Overview and History of R- R Console Input and output Evaluation-Data Types – variables – operators - R Objects and Attributes- Vectors and Lists- Matrices- Factors- Missing Values-Data Frames-Names – Reading data in and out of R – Subsetting R objects – Date and time		
Module:2	**Control Structures and Functions**	**6**	**2**
	If..else – for loops – Nested for loops – while loop – repeat – next- break		
Module:3	**Functions**	**6**	**2**
	Functions in R- Argument Matching – lazy Evaluation – Scoping rules – lexical scoping – dynamic scoping – Loop functions – Strings		
Module:4	**Debugging and Simulation**	**6**	**6**
	Debugging tools in R – using traceback() – debug() – recover() – Generating random numbers – setting the random number seed – simulating a linear model – random sampling		
Module:5	**R data Interfaces, Charts & Graphs**	**8**	**17**
	CSV files – Excel files – Binary files – XML files – Database. Pie chart – Bar chart – Boxplots – Histograms – Line graphs – Scatter plots		
Module:6	**R statistics**	**8**	**17**

	Mean median & mode – Linear & Multiple regression – Normal & Binomial distribution – Logistic and poisson regression – Time series analysis – Non-linear least square – Decision tree – Random forest – Chi square test		
	Total Lecture hours:	**40**	

References:

1. Roger D. Peng (2015), *R Programming for Data Science*, Lean Publications
2. Paul Teetor (2011), *R Cookbook, O'Reilly Publications.*
3. Garrett Grolemund (2014), Hands-On Programming with R: Write your own functions and simulations, O'Reilly Publications.
4. Richard Cotton (2013), Learning R: A step-by-step function guide to Data Analysis, O'Reilly Publications.
5. Sandip Rakshit (2017), R programming for Beginners, McGrawHill publications.

Winston Chang (2018), R Graphics Cookbook, Second Edition, O'Reilly Publications

Course Owner details:

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Recommended by Board of Studies	23.11.2018		
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