INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

R-PROGRAMMING FOR BUSINESS ANALYTICS								
II Semester: MBA								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CMBE20	**Elective**	**3**	**0**	**-**	**3**	40	60	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: Basic concepts of Information Technology								
SDGs Mapped: SDG 4 (Quality Education), SDG 9 (Industry, Innovation and Infrastructure)								

I. COURSE OVERVIEW:

This course is designed to know the fundamental skills in R programming and data analysis for effective business decision-making. R is a powerful and widely used programming language for data analysis, and this course will focus on its application in the context of business analytics.

II. COURSES OBJECTIVES:

The students will try to learn:

I. The fundamentals of R programming and its significance in business analytics.
II. The mechanisms of import, clean, and preprocess data for analysis.
III. The basic statistical concepts and apply them to business data.
IV. How to formulate and test hypotheses to make data-driven business decisions.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1 Demonstrate a strong grasp of R programming language fundamentals, including data structures, variables, and functions.
CO2 Create a wide range of data visualizations using R, and effectively communicate insights and findings through charts and graphs.
CO3 Apply statistical techniques using R to analyze data, including descriptive statistics, hypothesis testing, and regression analysis.
CO4 Solve practical business problems by applying R to analyze and make data-driven decisions in various scenarios.
CO5 Interpret data analysis results and translate them into actionable insights for business decision-makers.
CO6 Enhance problem-solving skills, especially in the context of business analytics, to identify opportunities for improvement and innovation.

IV. COURSE CONTENT:

MODULE - I: INTRODUCTION TO R AND RSTUDIO (08)

Introduction to R and RStudio, Installing R and RStudio, RStudio Interface, Basic R syntax and data types, Basic operations in R, Importing and exporting data, Data frames and data manipulation, Sub setting and filtering data, Data cleaning and transformation.

MODULE - II: DATA VISUALIZATION WITH GGPLOT2 (10)

Introduction to data visualization, Creating scatter plots, bar charts, and histograms, Customizing visualizations with ggplot2, Exploratory data analysis (EDA), Measures of central tendency and dispersion, Frequency distributions, Box plots and summary statistics, Data summarization and reporting.

MODULE - III: PROBABILITY, DISTRIBUTIONS AND HYPOTHESIS TESTING (09)

Probability concepts, Probability distributions (normal, binomial, etc.), Sampling distributions, Central Limit Theorem.

Introduction to hypothesis testing, t-tests (one-sample, two-sample), Chi-squared tests, Type I and Type II errors.

MODULE - IV: LINEAR REGRESSION AND TIME SERIES ANALYSIS (10)

Simple linear regression, Multiple linear regression, Model assessment and diagnostics, Predictive modeling, Introduction to time series data, Time series decomposition, Forecasting techniques, Seasonal decomposition and analysis.

MODULE - V: DATA MINING AND MACHINE LEARNING (08)

Introduction to data mining and machine learning, Support vector machines (SVM), neural networks and deep learning, Model evaluation and hyper parameter tuning.

V. TEXTBOOKS:

1. Matt Dowle, Matt. Efficient Data Manipulation with R by Efficient Data Manipulation with R. Matt Dowle, 2023.
2. Hadley Wickham and Garrett Grolemund Wickham, Hadley, and Garrett Grolemund , R for Data Science. R for Data Science. O'Reilly Media, 2022.
3. Christian Albright and Wayne Winston Albright, Christian, and Wayne Winston , Business Analytics: Data Analysis & Decision Making. Business Analytics: Data Analysis & Decision Making. Cengage Learning, 2021.

VI. REFERENCE BOOKS:

1. Text Mining with R: A Tidy Approach by Julia Silge and David Robinson Silge, Julia, and David Robinson. Text Mining with R: A Tidy Approach. O'Reilly Media, 2020.
2. Practical Statistics for Data Scientists by Andrew Bruce and Peter Bruce Bruce, Andrew, and Peter Bruce. Practical Statistics for Data Scientists. O'Reilly Media, 2019.
3. Data Science for Business by Foster Provost and Tom Fawcett Provost, Foster, and Tom Fawcett. Data Science for Business. O'Reilly Media, 2017.
4. Applied Predictive Modeling by Max Kuhn and Kjell Johnson Kuhn, Max, and Kjell Johnson. Applied Predictive Modeling. Springer, 2016.

VII. WEB REFERENCES:

1. http://www.sanfundry.cm/best.reference-books.com
2. http://www.managementhelp.org/management/theories.html

VIII. E-TEXT BOOKS:

1. http://www.bayt.com/en/specialities/q/33147/whatare.com
2. http://www.semesteratsea.org<spring2017.com
3. https://www.heimkaup.is/contemporary-management
4. https://www.e-elgar.com/shop/gbp/contemporary-issues-in-management-9781783470006.html
5. https://kydopasaci.epaperiesnovel.icu/contemporary-challenges-in-management-book-12917ch.php#