FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Engineering

Semester II

Course Code: 102430203

Course Title: Data Analytics

Type of Course:Core Course V

Course Objectives: The Course provide get explores of data analysis along with data fetching and data transfer in python and R programming for Signal processing &communication. Further this course will provide exposure to theory as well as practical systems and software used in data analytics.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Internal		External		Total
Lecture	Tutorial	Practical		Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30 / 15	20 / 10	70 / 35	30 /15	150 / 75

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Data Analytics structure, Real time Application, Overview of course components and their Significance.	2
2	Python: Applied Approach for Data Science, Python Foundation, Python Libraries: Numpy, Pandas, Matplotlib. Series and Dataframes: Creation, Arithmatic Between Dtataframe and Series, Functions.	8
3	Python Data Structure: String, set, List, Tuples and Dictionary with operations.	4
4	Data handling and Indexing: Missing Data, Hierarchical Indexing, Reading Data from single and multiple files, Data Loading, Merging and Reshaping Data.	8
5	Data Visualization: Ploting Subplot, Plotting Multiple Figures, AAdding Text, Plotting data frame and Siries.	4
6	Basic Data Analysis Techniques:Basic analysis techniques, Statistical hypothesis generation and testing, Chi-Square test, t-Test, Analysis of variance, Correlation analysis, Maximum likelihood test, Introduction to statistical learning and R-Programming, Practice and analysis with R.	10
7	Advance Data AnalysisTechniques: Regression analysis, Classification techniques, Clustering, Association rules analysis, Practice and analysis with R.	8

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
10	20	20	20	20	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	An Introduction to Statistical Learning: with Applications in R, G James, D. Witten, T Hastie, and R. Tibshirani, Springer, 2013.
2	Data Mining and Analysis, Mohammed J. Zaki, Wagner Meira, Cambridge, 2012
3	Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, Springer.
4	Beginning R: The Statistical Programming Language, Mark Gardener, Wiley, 2013
5	Introduction to Python for Engineers and Scientists, By. Sandeep Nagar, Apress.
6	Data Analytics with R by Bharti Motwani, Wiley Publication .
7	Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics, Apress publication.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand and learn a meaningful pattern in data	Click
CO-2	Graphically interpretation of various data in a form of signal/image.	Click
CO-3	Iimplement the various data analytic algorithms.	Click
CO-4	Handle large scale analytics projects from various domains.	Click
CO-5	Develop intelligent decision support systems.	Click

List of Practicals / Tutorials: Click or tap here to enter text.

1	Develop programs to understand the control structures of python
2	Develop programs to learn different types of structures (list, dictionary, tuples) in python
3	Develop programs to learn concept of functions scoping, recursion and list mutability.
4	Develop programs to understand working of exception handling and assertions.
5	Develop programs for data structure algorithms using python – searching, sorting and hash tables.
6	History of R, Installing R And R studio and required packages in R.
7	Programs on data types, Functions in R .
8	Create and manipulate Vector, Data, Array, List and Matrix in R .
9	Implement operations on data frames in R .
10	Implement operation on list in R .
11	Implement if -else, while and for loop in R.
12	Customizing and saving various graphs in R .
13	Implement a program which uses various types of large file (import/ export) to use in R .

14	Implement regression in R.

Supplementary learning Material:	
1	NPTEL Video lecture on Python Programming.
2	https://www.r-project.org/
3	https://www.tutorialspoint.com
4	https://r-pkgs.org/package-structure-state.html
5	https://r-pkgs.org/r.html
6	https://www.listendata.com/p/r-programming-tutorials.html

Curriculum Revision:	
Version:	**1**
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22