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| **Session** | **Topics** |
| 1 | Overview of Big Data - Meaning of Big data, History of Data, Management – Evolution of Big Data, Structuring Big Data |
| 2 | Types of Data, Elements of Big Data, Volume, Velocity, Variety, Veracity |
| 3 | Big Data Analytics, Advantages of Big Data Analytics, Future of Big Data |
| 4 | Databases and Data users Introduction; characteristics of the database approach; actors on the scene(Users) |
| 5 | Workers behind the scene; advantages of using the DBMS approach |
| 6 | Concepts of data models and schemas. E-R (Entity-Relationship) Model |
| 7 | Data Querying and Retrieval using SQL (Structured Query Language) -  Concepts of Data Definition Language (DDL) and Data Manipulation Language (DML) |
| 8 | Data Dictionary, SQL, SQL Data Definition and Data Types |
| 9 | Specifying Basic Constraints in SQL, Schema Change Statements in SQL (DROP, ALTER command) |
| 10 | Basic Queries in SQL |
| 11 | Insert, Delete and Update Statements in SQL |
| 12 | Additional Features of SQL, Views (Virtual Tables) in SQL |
| 13 | Hands-on session with MySQL Database |
| 14 | Introduction to R – Basic Programming with R |
| 15 | Importing data into R – text files, R-Studio interface |
| 16 | Excel, from other statistical software packages, from databases, and from the web, Viewing data |
| 17 | Basic data types in R |
| 18 | Vectors, Matrices, Data frames and Lists |
| 19 | Categorical data – factors, discretizing variables |
| 20 | Hands-on sessions and exercises using R-studio - Descriptive Statistics, Data Visualization |
| 21 | Correlation and Regression |
| 22 | Statistical tests (t-test, Chi-Square test, one-way ANOVA) |
| 23 | Introduction to Python with Practical Sessions –  Programming essentials: Types of programming, Execution process of a program, Installation |
| 24 | working with Python – input, processing, and output, Python script files |
| 25 | correcting syntax errors; data types |
| 26 | expressions – strings, variables, assignment, operators, logical operators, Boolean expressions |
| 27 | type conversions; Control statements: for loops – count-controlled |
| 28 | augmented assignment, steps; if-else statements – one-way, multiway (elif) |
| 29 | While loops – break, loop logic, errors and testing |
| 30 | Using functions arguments and return values |
| 31 | Python Modules and usage |
| 32 | Python: Hands-on sessions –  Operators: Boolean and logical operators |
| 33 | String and text files: string concatenation, subscript operator, indexing, slicing a string; string methods |
| 34 | manipulating files and directories; text files: reading/writing text and numbers from/to a file |
| 35 | Lists, Dictionaries and Tuples [Lists]: Basic operations and commands on Lists, Dictionaries and Tuples. |
| 36 | Lists, Dictionaries and Tuples [Dictionaries]: Basic operations and commands on Lists, Dictionaries and Tuples. |
| 37 | Lists, Dictionaries and Tuples [Tuples]: Basic operations and commands on Lists, Dictionaries and Tuples. |
| 38 | Time series analysis and forecasting: Time series analysis & forecasting model, Time Data Visualization |
| 39 | Text analysis |