# LECTURE PLAN



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| **Institute/Department** | UNIVERSITY INSTITUTE OF ENGINEERING (UIE) | **Program** | **Bachelor of Engineering - Computer Science & Engineering (CS201)** |
| **Master Subject Coordinator Name:** | Urvashi | **Master Subject Coordinator E-Code**: | **E12312** |
| **Course Name** | Big Data Analytics | **Course Code** | **21CSH-471** |

| Lecture | Tutorial | Practical | Self Study | Credit | Subject Type |
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| Course Type | Course Category | Mode of Assessment | Mode of Delivery |
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| Major Elective | Graded (GR) | Hybrid | Hybrid (HYB) |

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| Mission of the Department | M1: To provide practical knowledge using state-of-the-art technological support for the experiential learning of our students.<br>M2: To provide industry recommended curriculum and transparent assessment for quality learning experiences.<br>M3: To create global linkages for interdisciplinary collaborative learning and research.<br>M4: To nurture advanced learning platform for research and innovation for students' profound future growth.<br>M5: To inculcate leadership qualities and strong ethical values through value based education. |
| Vision of the Department | To be recognized as a leading Computer Science and Engineering department through effective teaching practices and excellence in research and innovation for creating competent professionals with ethics, values and entrepreneurial attitude to deliver service to society and to meet the current industry standards at the global level. |

| Program Educational Objectives(PEOs) | |
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| PEO1 | Engage in successful careers in industry, academia, and public service, by applying the acquired knowledge of Science, Mathematics and Engineering, providing technical leadership for their business, profession and community. |
| PEO2 | Establish themselves as entrepreneur, work in research and development organization and pursue higher education. |
| PEO3 | Exhibit commitment and engage in lifelong learning for enhancing their professional and personal capabilities. |

| Program Specific OutComes(PSOs) | |
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| PSO1 | Exhibit attitude for continuous learning and deliver efficient solutions for emerging challenges in the computation domain. |
| PSO2 | Apply standard software engineering principles to develop viable solutions for Information Technology Enabled Services (ITES). |

| Program OutComes(POs) | |
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| PO1 | Engineering knowledge: Apply the knowledge of Mathematics, Science, Engineering fundamentals and computer science fundamental and strategies which have the solution of complex computer science engineering problems. |
| PO2 | Problem analysis: Identify, formulate, research literature, and analyze complex computer science engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| PO3 | Design/development of solutions: Design solutions for complex database and software engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | Conduct investigations of complex problems: Use research-based knowledge and research methods including design of software engineering &networking based experiments, analysis and Interpretation of data, and synthesis of the information to provide valid conclusions. |
| PO5 | Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern Computer science engineering and IT tools including prediction and modeling to complex database or software engineering activities with an understanding of the limitations. |
| PO6 | The engineer and society: Apply reasoning informed by the contextual knowledge to assess Social, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Professional Computer Science & Engineering practice. |
| PO7 | Environment and sustainability: Understand the impact of the professional computer science and engineering solutions in social and environmental contexts, and demonstrate the knowledge of, and need for sustainable development goals. |

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| PO8 | Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of computer science engineering practice |
| PO9 | Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO10 | Communication: Communicate effectively on complex computer science engineering activities with the engineering community like CSI society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO11 | Project management and finance: Demonstrate knowledge and understanding of the computer science engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO12 | Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context to technological change. |

**Text Books**

| Sr No | Title of the Book | Author Name | Volume/Edition | Publish Hours | Years |
|---|---|---|---|---|---|
| 1 | Big Data Analytics with Spark | Mohammed Guller | 1st edition | Apress | 2015 |
| 2 | Machine Learning | Tom Mitchell | 3rd Edition | McGraw Hill | 1997 |
| 3 | Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business | Michael Minelli, Michehe Chambers | 1st Edition | Ambiga Dhiraj, Wiely CIO Series | 2013 |
| 4 | Big Data Analytics: Disruptive Technologies for Changing the Game | Arvind Sathi | 1st Edition | IBM Corporation | 2012 |

**Reference Books**

| Sr No | Title of the Book | Author Name | Volume/Edition | Publish Hours | Years |
|---|---|---|---|---|---|
| 1 | Understanding Big data | Chris Eaton, Dirk deroos et al | 2nd Edition | McGraw Hill | 2012 |
| 2 | Big Data Analytics with R and Hadoop | Vignesh Prajapati | 1st edition | Packet Publishing | 2013 |
| 3 | Big Data and Business Analytics | JyLiebowitz | 1st edition | CRC press | 2013 |

**Course OutCome**

| SrNo | OutCome |
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| CO1 | Understand key concepts of Big Data, including the characteristics. |
| CO2 | Master Big Data Architecture and Tools |
| CO3 | Explore the Hadoop Ecosystem and Data Processing Models |
| CO4 | Develop Data Science Skills and Tools |
| CO5 | Implement Real-Time Data Analytics and Visualization |

**Lecture Plan Preview-Theory**

| Unit No | LectureNo | ChapterName | Topic | Text/ Reference Books | Pedagogical Tool** | Mapped with CO Numer (s) |
|---|---|---|---|---|---|---|
| 1 | 1 | Understanding Big Data and the 5 V's | Introduction to Big Data and Its Characteristics | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO1 |

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| 1 | 2 | Understanding Big Data and the 5 V's | The 5 V's of Big Data: Understanding Volume, Velocity, and Variety | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO1 |
| 1 | 3 | Understanding Big Data and the 5 V's | Veracity and Value: Trust and Insights in Big Data | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 1 | 4 | Understanding Big Data and the 5 V's | Challenges and Opportunities in Big Data | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO1 |
| 1 | 5 | Understanding Big Data and the 5 V's | Real-World Applications of Big Data | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | Case Study,PPT | CO2 |
| 1 | 6 | Big Data Architecture | Understanding Big Data Architecture: Key Components and Layers | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | Case Study,PPT | CO2 |
| 1 | 7 | Big Data Architecture | Data Ingestion and Storage in Big Data Architecture | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | Case Study,PPT | CO2 |
| 1 | 8 | Big Data Architecture | Data Processing and Visualization in Big Data Architecture | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | Case Study,PPT | CO2 |
| 1 | 9 | Big Data Architecture | Streaming Data in Big Data: Frameworks and Use Cases | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | Case Study,PPT | CO2 |
| 1 | 10 | Big Data Architecture | Architectural Patterns in Big Data: Lambda, Kappa, and Hybrid Models | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO1 |
| 1 | 11 | The Hadoop Ecosystem | Understanding the Hadoop Ecosystem: An Overview | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 1 | 12 | The Hadoop Ecosystem | HDFS (Hadoop Distributed File System): Architecture and Functionality | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |

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| 1 | 13 | The Hadoop Ecosystem | MapReduce Programming Model: Workflow and Applications | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 1 | 14 | The Hadoop Ecosystem | YARN: Resource Management in Hadoop | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 1 | 15 | The Hadoop Ecosystem | Advanced Tools in the Hadoop Ecosystem and Data Processing | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 16 | Big Data Frameworks | Big Data Frameworks: Hadoop and Apache Spark – Concepts and Comparison | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 17 | Big Data Frameworks | Introduction to NoSQL Databases: MongoDB, Cassandra, and HBase | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 2 | 18 | Big Data Frameworks | Big Data Visualization Tools: Tableau, Power BI, and Apache Zeppelin | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 2 | 19 | Big Data Frameworks | Real-Time Big Data Processing: Apache Storm and Flink | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Understanding Big data | PPT | CO3 |
| 2 | 20 | Big Data Frameworks | Emerging Trends in Big Data Technologies | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Understanding Big data | PPT | CO3 |
| 2 | 21 | Big SQL and NO SQL Databases | SQL vs. NoSQL: Differences, Features, and Use Cases | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 22 | Big SQL and NO SQL Databases | Introduction to Big SQL: Bridging SQL and Big Data | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 23 | Big SQL and NO SQL Databases | Query Optimization Techniques in Big SQL | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |

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| 2 | 24 | Big SQL and NO SQL Databases | Exploring NoSQL Database Types and Applications | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 25 | Big SQL and NO SQL Databases | Advantages and Limitations of Big SQL and NoSQL Databases | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 26 | AI in Big Data | Introduction to IBM Watson: AI Capabilities and Big Data Synergy | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 2 | 27 | AI in Big Data | Exploring Watson Services: Discovery, Studio, and Assistant | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 2 | 28 | AI in Big Data | Integrating IBM Watson with Big Data Tools and Workflows | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 2 | 29 | AI in Big Data | AI and Machine Learning Applications in Big Data: Natural Language Processing (NLP) and Beyond | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 2 | 30 | AI in Big Data | Sentiment Analysis and Predictive Analytics with Watson AI | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 31 | The Iterative Nature of Data Science Projects | Introduction to Data Science Projects: Stages and Lifecycle | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 32 | The Iterative Nature of Data Science Projects | Introduction to Data Science Projects: Stages and Lifecycle | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 33 | The Iterative Nature of Data Science Projects | Refinement and Deployment in Data Science Projects | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 3 | 34 | The Iterative Nature of Data Science Projects | Importance of Iteration: Continuous Improvement and Error Correction | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |

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| 3 | 35 | The Iterative Nature of Data Science Projects | Tools Supporting Iteration in Data Science: Notebooks, Version Control, and CI/CD | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 36 | Notebooks in Data Science | Introduction to Data Science Notebooks: Features and Workflow | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 3 | 37 | Notebooks in Data Science | Programming Languages for Data Science: Python and R | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 38 | Notebooks in Data Science | Exploring Notebook Functionality: Code Cells, Markdown, and Widgets | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 3 | 39 | Notebooks in Data Science | Extending Notebook Capabilities: Extensions and Tools | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 3 | 40 | Notebooks in Data Science | Integrating Notebooks with Git and Data Science Workflows | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 41 | Notebooks and Data Science tools in Big Data | Major Data Science Notebooks: Jupyter Notebook, Google Colab, and Zeppelin | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 3 | 42 | Notebooks and Data Science tools in Big Data | Getting Started with Jupyter Notebook: Installation and Basics | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 3 | 43 | Notebooks and Data Science tools in Big Data | Advanced Features of Jupyter: Extensions, Widgets, and Multilingual Support | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO4 |
| 3 | 44 | Notebooks and Data Science tools in Big Data | Introduction to Tableau: Building Dashboards for Data Insights | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,T-Machine Learning,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |

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| 3 | 45 | Notebooks and Data Science tools in Big Data | Collaboration and Presentation Tools for Data Insights | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO3 |

## Lecture Plan Preview-Practical

| Unit No | ExperimentNo | Experiment Name | Text/ Reference Books | Pedagogical Tool** | Mapped with CO Numer(s) |
|---|---|---|---|---|---|
| 1 | 1 | Write a Program to Analyze a dataset to identify the 5 V's of Big Data. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO1 |
| 1 | 2 | Write a Program to store and retrieve data in Hadoop HDFS. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO2 |
| 1 | 3 | Write a program to use Spark and Apache Hive to query structured data stored in HDFS. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO3 |
| 1 | 4 | Write a program to create an interactive dashboard to visualize insights from a dataset. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO3 |
| 2 | 5 | Write a program to understand the working of Tableau and PowerBI. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO5 |
| 2 | 6 | Write a program to evaluate the performance of Big SQL and No SQL database for the same dataset. | ,T-Big Data Analytics with Spark,T-Big Data Analytics: Disruptive,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO1 |
| 2 | 7 | Write a program to evaluate the performance of Watson AI with Big Data. | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO2 |
| 3 | 8 | Write a program for building and iterating a Predictive Model: A Hands-On Approach to the Data Science Lifecycle | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO3 |
| 3 | 9 | Write a program to explore the capabilities of Jupyter Notebook for a sample data | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic,R-Understanding Big data | PPT | CO3 |
| 3 | 10 | Write a program to compare Google Colab and Apache Zeppelin for a sample data analysis project | ,T-Big Data Analytics with Spark,T-Big Data, Big Analytics: Emerg,R-Big Data Analytics with R and ,R-Big Data and Business Analytic | PPT | CO4 |

## Assessment Model

| Sr No | Assessment Name | Exam Name | Max Marks |
|---|---|---|---|
| 1 | Hybrid Course All | Practical Evaluations | 40 |
| 2 | Hybrid Course All | End Term Hybrid Theory | 60 |

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| 3 | Hybrid Course All | Attendance Marks | 2 |
| 4 | Hybrid Course All | Surprise Test | 12 |
| 5 | Hybrid Course All | Practical MST | 10 |
| 6 | Hybrid Course All | Practical Worksheet/Projects 1 | 30 |
| 7 | Hybrid Course All | Practical Worksheet/Projects 2 | 30 |
| 8 | Hybrid Course All | Practical Worksheet/Projects 3 | 30 |
| 9 | Hybrid Course All | Practical Worksheet/Projects 4 | 30 |
| 10 | Hybrid Course All | Practical Worksheet/Projects 5 | 30 |
| 11 | Hybrid Course All | Practical Worksheet/Projects 6 | 30 |
| 12 | Hybrid Course All | Practical Worksheet/Projects 7 | 30 |
| 13 | Hybrid Course All | Practical Worksheet/Projects 8 | 30 |
| 14 | Hybrid Course All | Practical Worksheet/Projects 9 | 30 |
| 15 | Hybrid Course All | Practical Worksheet/Projects 10 | 30 |
| 16 | Hybrid Course All | Quiz | 4 |
| 17 | Hybrid Course All | Assignment/PBL | 10 |
| 18 | Hybrid Course All | MST-1 Hybrid | 20 |
| 19 | Hybrid Course All | MST-2 Hybrid | 20 |