SEMESTER – III

BIG DATA ANALYTICS
THEORY

1. Course Description

Programme:	**M.Sc. Data Science**	**Max. Hours: 45**
Course Code:	**P24/CDS/DSE/301**	**Hours per week: 3**
Course Type:	**DISCIPLINE SPECIFIC ELECTIVE**	**Max. Marks: 100**
No. of credits:	**3**	

2. Course Objectives

- To become familiar with the fundamental concepts of big data management and Analytics.
- To become competent in recognizing challenges faced by applications dealing with very large volumes of data.

3. Course Outcomes

On completion of the course the student will be able to:

CO1: ***Explain*** evolution of big data, it's structure, elements and big data analytics (Cognitive level – 2)
CO2: ***Analyze*** & ***Use*** HBase in big data processing and data manipulation using hive and analyze data with pig. (Cognitive level – 3,4)
CO3***: Apply*** analytical approaches and tools to analyze data (Cognitive level - 5)

4. Course Content

MODULE I –INTRODUCTION TO BIG DATA **(15 Hrs.)**

Overview of Big Data: Introduction to Big Data, Evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics. Exploring the Use of Big Data in Business Context: Use of Big Data in Social Networking, Use of Big Data in Preventing Fraudulent Activities, Use of Big Data in Detecting Fraudulent Activities in Insurance Sector, Use of Big Data in Retail Industry. Introducing Technologies for Handling Big Data: Distributed and Parallel Computing for Big Data.

MODULE II–YARN, HIVE AND PIG **(15 Hrs.)**

Understanding Hadoop YARN Architecture: Introduction YARN, Advantages of YARN, YARN Architecture, Working of YARN. Exploring Hive: Introducing Hive, Getting Started with Hive, Hive Services, Data Types in Hive, Built-In Functions in Hive, Hive DDL, Data Manipulation in Hive, Data Retrieval Queries, Using JOINS in Hive. Analyzing Data with Pig: Introducing Pig, Running Pig, Getting Started with Pig Latin, Working with Operators in Pig, Working with Functions in Pig, Debugging Pig, Error Handling in Pig.

MODULE III–OOZIE, ANALYTICAL APPROACHES AND TOOLS TO ANALYZE DATA **(15 Hrs.)**

Using Oozie: Introducing Oozie, Installing and Configuring Oozie, Understanding the Oozie Workflow, Simple Application. NoSQL Data Management: Introduction to NoSQL, Types of NoSQL Data Models, Schema-Less Databases, Materialized Views, Distributed Models, Sharding, Map Reduce Partitioning and Combining, Composing Map Reduce Calculations. Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics, Developing an Analytic Team. Analytical Approaches and Tools to Analyze Data: Analytical Approaches, History of Analytical Tools, Introducing Analytical Tools, Comparing Various Analytical Tools.

5. References

1. DT Editorial Services, Big Data – Black Book(dream tech)
2. Radha S,M. Vijaya lakshmi, Big Data Analytics
3. ArshdeepB and Vijay M, Big Data Science &Analytics–A Hands-On Approach.
4. FrankOhlhorst, Big Data Fundamentals–Concepts, Drivers, Techniques.
5. Kuan-ChingLi, HJiang, LTYang, ACuzzocrea, Big Data Algorithms, Analysis and Applications.
6. Tom White, Hadoop: The Definitive Guide.
7. Shiva Achari, Hadoop Essentials.
8. Alex Holmes, Hadoop in Practice.

6.Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local/Regional/National /Global Development Needs	Relevance
Global Development	Big data analytics plays a crucial role in addressing global development challenges by providing insights, optimizing resources, informing decision-making, and driving innovation across various sectors and regions.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 1	Learn structure, elements, applications, and uses of big data analytics.
EMP	Modules 2 and 3	Analyzing and testing data using Pig, Hive.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars
2.	Experimental	Quiz
3.	Problem solving	Troubleshoot (debug) code

PROFESSOR
Department of Computer Sciences & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 1 – Written	Written Exam
CO2	CIA 2 – Assignment	
CO3	CIA 2 – Lab	

b) Model Question Paper- End Semester Exam

BIG DATA ANALYTICS

MODEL QUESTION PAPER

THEORY

Course Code:P24/CDS/DSE/301 **Max Marks: 60**
Credits: 3 **Time: 2 ½ Hrs.**

SECTION – A

I. Answer the following **3 x 12 = 36**

1. Define Big Data. Explain in detail about the structure of big data and explore the use of big data in business.

OR

2. Explain the various technologies for handling big data.

3. Define YARN. Explain in detail about YARN architecture and its working.

OR

4. Explain in detail about analyzing data with PIG.

5. Explain in detail about OOZI configuration and its workflow.

OR

6. Explain in detail about Map reduce partitioning and calculations.

SECTION – B

II. Answer any FOUR **4 x 6 = 24**

7. Write a short note on distributed systems.
8. Explain briefly the applications of big data.
9. Define Hive. Explain in detail about JOINS in HIVE.
10. Explain about Error handling in PIG.
11. Write a short note on analytical approaches and tools to analyze data.
12. Write a short note on materialized views.

c)Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	12	2	12
II	15	2	2	12	2	6
III	15	3	2	12	2	6

NOTE: From
Section-A any 3 questions can be answered (INTERNAL CHOICE).
Section-B any 4 questions can be answered. (EXTERNAL CHOICE)

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(Hrs.)
1	1	2	15
2	2	3,4	15
3	2	5	15

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

SEMESTER - III

BIG DATA ANALYTICS

PRACTICAL

Course Description

Programme:	**M.Sc. Data Science**	**Max. Hours: 60**
Course Code:	**P24/CDS/DSE/301/P**	**Hours per week: 4**
Course Type:	**DISCIPLINE SPECIFIC ELECTIVE**	**Max. Marks: 100**
No. of credits:	**2**	

Course Objectives

- To learn and develop programs applying the fundamental concepts of big data management and analytics.

Course Outcomes

On completion of the course the student will be able to:
CO1: E***xplain*** To setup and install Hadoop and implement file management tasks in Hadoop. (Cognitive level – 2)
CO2: ***Use*** Hive and Pig to perform DDL & DML operations on data. (Cognitive level – 3,4)

Practical Sessions

1. Perform some tasks by using web-based tools of the Hadoop system.
2. Implement the following file management tasks in Hadoop:
   a. Adding files and directories
   b. Creating file, retrieving file and deleting files
   c. Write a Map Reduce program for basic word count.
3. Installing and running Hive, practice some Hive commands.
   a. Using Hive; create, insert, update, alter, delete, and drop the tables
   b. Using Hive; query the data from the database tables.
   c. Using Hive; create views, use functions, create indexes for the database tables.
4. Installing and running Pig, practice some Pig commands.
   a. Write Pig Latin scripts using eval functions to analyze your data.
   b. Write Pig Latin scripts using math functions to analyze your data.
   c. Write Pig Latin scripts using string functions to analyze your data.
5. Write simple scripts to understand the using NoSQL in Hadoop systems.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

BIG DATA ANALYTICS

PRACTICAL MODEL PAPER

Course Code : P24/CDS/DSE/301/P

Max. Time: 2 Hrs.
Max Marks:50

Answer any two:

1. Using Hive perform CRUD operations on the student(rno,name,pno) table.
2. Write Pig Latin scripts using string functions to analyze employee data.
3. Write a Map Reduce program for basic word count.

Prepared by Name and Signature of the teaching faculty	Checked & Verified by Name and Signature of HoD	Approved by Name and Signature of Principal
Kavitha B **Teaching Faculty**	**Ms. D. Sowjenya** **Head of the Department**	**Dr.Uma Joseph** **Principal**

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

SEMESTER - III

BLOCKCHAIN TECHNOLOGY

THEORY

1. Course Description

Programme: M.Sc. Data Science
Course Code: P24/CDS/DSE/302
Course Type: DISCIPLINE SPECIFIC ELECTIVE
No. of credits: 3

Max. Hours: 45
Hours per week: 3
Max. Marks: 100

2. Course Objectives

- To understand the basic theory underlying blockchain technology and the range of problems that can be solvable.
- To learn various blockchain platforms.
- To learn the development of decentralized applications

3. Course Outcomes

On completion of the course the student will be able to:
CO1: ***Illustrate*** and ***explain*** essential concepts of blockchain and Bitcoin.
(Cognitive levels – 2)
CO2: ***Apply*** smart contracts for specific transactions.
(Cognitive level – 3,4)
CO3***: Choose*** and ***Design*** the decentralized application using Hyperledger fabric.
(Cognitive levels – 5,6)

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

4.Course Content

MODULE I: FUNDAMENTALS OF BLOCKCHAIN AND CRYPTOCURRENCY-BITCOIN (15 Hrs.)

Introduction, Origin of Blockchain- What is blockchain, The Bitcoin and the blockchain, Blockchain solution, Components of Blockchain, Block in a Blockchain, The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol.

Cryptocurrency- Bitcoin: Introduction, Bitcoin and the cryptocurrency, Cryptocurrency basics.

MODULE II: PUBLIC BLOCKCHAIN SYSTEMS (15 Hrs.)

Introduction, Public Blockchain, Popular Public Blockchains: The Bitcoin: Common Terminologies, Proof of Work (PoW) and Hash cash in Bitcoin, Block propagation and Relay, Transaction in the Bitcoin Network. Ethereum Blockchain: Introduction, Code is Law and Ethereum classic, Ethereum components, How Mining Works in Ethereum, Merkle Patricia Tree, Architecture of Ethereum, Workflow of Ethereum. Smart Contracts: Introduction, characteristics of smart contract, Types of smart contracts, smart contracts in Ethereum.

MODULE III: PRIVATE AND CONSORTIUM BLOCKCHAIN SYSTEM (15 Hrs.)

Introduction, Key characteristics of private blockchain, why we need private blockchain, private blockchain examples, Smart contract in private environment- Design limitations, The CAP Theorem, The BASE theory. Types of faults in a distributed environment, consensus for processes, Requirements of a consensus algorithm, RAFT consensus algorithm, BYZANTINE FAULT. Consortium Blockchain: Characteristics of consortium Blockchain, Need of consortium Blockchain, Hyperledger Platform, The Reference Architecture, Transaction flow, Certificate Authority, Membership service Provider, Consensus services (RAFT), chaincode structure, Life cycle chaincode, private data collection in identity.

5. References

1. Blockchain Technology-Chandramouli Subramanian, Asha A George, Abhilash KA and Meena Karthikeyan, 2020, Universities press(India) Private Ltd.
2. Hyperledger Fabric In-Depth, Ashwani Kumar,2020, BPB Publications.
3. Hyperledger Cookbook, Xun Wu, Chuanfeng Zhang and Andrew Zhang, Pckt Publishing
4. Blockchain Basics, Daniel Drescher, Apress Publication http://vlabs.iitb.ac.in/vlabs-dev/labs/blockchain/labs/index.php

6.Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global Development	Encompass various areas reflecting both current challenges and potential future advancements of scalability, interoperability, security etc.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 1 and 2	Applying public blockchains-Bitcoin and Ethereum for block creation and smart contracts.
EMP	Modules 3	Testing and evaluating networks on Hyperledger Fabric

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars
2.	Experimental	Quiz
3.	Problem solving	Identifying, formulating, and addressing challenges of interoperability of blockchains.

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 1 – Written	Written Exam
CO2	CIA 2 – Assignment	
CO3	CIA 2 – Lab	

b) Model Question Paper- End Semester Exam

BLOCKCHAIN TECHNOLOGY

MODEL QUESTION PAPER

THEORY

Course Code:P24/CDS/DSE/302 **Max Marks: 60**
Credits: 3 **Time: 2 ½ Hrs.**

SECTION – A

I: Answer the following **3 x 12 = 36**

1. Explain in detail about different Blockchain and Consensus Mechanisms.

OR

2. Describe in detail about Bitcoin and Cryptocurrency.

3. Explain in detail about architecture and workflow of Ethereum.

OR

4. Describe the importance of smart contracts in Ethereum.
5. Define Consensus algorithm. Explain in detail about the RAFT Consensus mechanism.

OR

6. Describe the chaincode structure and its life cycle..

II. Answer any Four: **4 x 6 = 24**

7. Discuss about blocks in a blockchain.
8. Write a short note on components of blockchain.
9. Explain in detail about Merkle Patricia Tree.
10. Write a short note on popular public blockchains.
11. Discuss CAP theorem.
12. Write a short note on the need of a private blockchain.

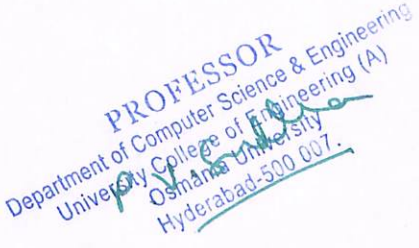
c)Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	12	2	12
II	15	2	2	12	2	6
III	15	3	2	12	2	6

NOTE: From
Section-A any 3 questions can be answered (INTERNAL CHOICE).
Section-B any 4 questions can be answered. (EXTERNAL CHOICE)

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(hrs)
1	1	2	15
2	2	3,4	15
3	2	5,6	15



SEMESTER III
BLOCKCHAIN TECHNOLOGY
PRACTICAL

1.Course Description

Programme: M.Sc. Data Science
Course Code: P24/CDS/DSE/302/P
Course Type: DSE
No. of credits: 2

Max. Hours: 60
Hours per week: 4
Max. Marks: 50

2.Course Objective

- To explore various Blockchain platforms for creating decentralized applications.

3.Course Outcomes

CO1: Exploring public blockchain- Ethereum and creation of smart contracts.
CO2: Applying chain code in Hyperledger fabric to perform transactions.

4. Practical Sessions

1 Create the following systems using Ethereum or Hyperledger Fabric:

1. Health care system.
2. Supply chain system.
3. E-Commerce.
4. Educational system.
5. Banking/Finance system

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

MODEL QUESTION PAPER

BLOCKCHAIN TECHNOLOGY
PRACTICAL

COURSE CODE: P24/CDS/DSE/302/P

Max.Marks: 50
Exam Duration: 2 Hrs

Answer any one of the following.

Create the following systems using Ethereum or Hyperledger Fabric:

1. Health care system.
2. Supply chain system.
3. E-Commerce.
4. Educational system.
5. Banking/Finance system.

Prepared by	Checked & Verified by	Approved by
Ms.Khalida Tabassum Teaching Faculty	Ms. D. Sowjenya Head of the Department	Dr.Uma Joseph Principal

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

SEMESTER - III

MACHINE LEARNING

THEORY

1. Course Description

Programme:	**M.Sc. Data Science**	**Max. Hours: 45**
Course Code:	**P24/CDS/DSC/301**	**Hours per week: 3**
Course Type:	**DISCIPLINE SPECIFIC CORE**	**Max. Marks: 100**
No. of credits:	**3**	

2. Course Objectives

- To understand the basic theory underlying machine learning and the range of problems that can be handled by machine learning.
- To learn various machine learning techniques.
- To learn evaluation metrics for performance analysis

3. Course Outcomes

On completion of the course the student will be able to:

CO1: ***Illustrate*** and ***explain*** essential libraries and different supervised algorithms (Cognitive levels – 2)

CO2: ***Apply*** pre-processing techniques and unsupervised algorithms on specified datasets. (Cognitive level – 3,4)

CO3*: Choose* and ***Design*** the model evaluation metrics on applied algorithm (Cognitive levels – 5,6)

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500007

4. Course Content

MODULE I: SUPERVISED LEARNING (15 Hrs.)

Introduction to Machine Learning, Need for Python, scikit-learn, Essential Libraries and Tools, First Application - Classifying Iris Species. Supervised Learning: Classification and Regression, Generalization, Overfitting, and Underfitting, Supervised Machine Learning Algorithms - Some Sample Datasets, k-Nearest Neighbors, Linear Models, Naive Bayes Classifiers, Decision Trees, Ensembles of Decision Trees, Support Vector Machines.

MODULE II: UNSUPERVISED LEARNING AND PREPROCESSING (15 Hrs.)

Unsupervised Learning: Types and Challenges. Preprocessing and Scaling - Different Kinds of Preprocessing, Applying Data Transformations, Scaling Training and Test Data the Same Way, Effect of Preprocessing on Supervised Learning. Dimensionality Reduction, Feature Extraction, and Manifold Learning - Principal Component Analysis, Non-Negative Matrix Factorization, Manifold Learning with t-SNE, Clustering, k-Means Clustering, Agglomerative Clustering, DBSCAN.

MODULE III: REPRESENTING DATA, MODEL EVALUATION AND ALGORITHM CHAINS (15 Hrs.)

Categorical Variables, Binning, Discretization, Linear Models, and Trees, Working with Text Data - Types of Data Represented as Strings, Sentiment Analysis of Movie Reviews, Representing Text Data as a Bag of Words.
Cross-Validation, Grid Search, Evaluation Metrics and Scoring, Parameter Selection with Preprocessing, Building Pipelines, Using Pipelines in Grid Searches, General Pipeline Interface, Grid-Searching Preprocessing Steps and Model Parameters, Grid-Searching Which Model to Use.

5. References

1. Introduction to Machine Learning with Python, by Andreas C. Müller & Sarah Guido, O'Reilly Media.
2. Machine Learning by Subramanian, Chandra Mouli, Amit Kumar Das, Saikant
3. Dutt, Pearson Publications, I edition, 2018.
4. Machine Learning by Tom Mitchell, McGraw Hill, 2013.
5. Machine Learning for Absolute Beginners, by Oliver Theobald, 2020.
6. Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 1st Edition , by Aurélien Géron , O'reilly Media.

6.Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global Development	Machine learning has the potential to address a wide range of global development needs by leveraging data-driven insights to informdecision-making and drive positive change across various sectors like agriculture, health, finance etc.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 1 and 2	Applying supervised or unsupervised algorithms on a specific dataset.
EMP	Modules 3	Testing and evaluating metrics of different models.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars
2.	Experimental	Quiz
3.	Problem solving	Identifying, formulating, and addressing challenges using ML techniques.

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 1 – Written	Written Exam
CO2	CIA 2 – Assignment	
CO3	CIA 2 – Lab	

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

b) Model Question Paper- End Semester Exam

c)

MACHINE LEARNING

MODEL QUESTION PAPER
THEORY

Course Code: P24/CDS/DSC/301 **Max Marks: 60**
Credits: 3 **Time: 2 ½ Hrs.**

I: Answer the following **3 x 12 = 36**

1. Define Supervised Learning Algorithm. Explain in detail about k nearest neighbours and naïve Bayes classifiers.

OR

2. Describe in detail about Decision Trees.

3. Define Clustering. Explain the following:
   i. k-Means Clustering.
   ii. Agglomerative Clustering.

OR

4. Explain in detail about Principal Component Analysis.
5. Discuss sentiment analysis of movie reviews.

OR

6. Describe the importance of Evaluation Metrics and Scoring.

II.. Answer any Four: **4 x 6 = 24**

7. Discuss about Overfitting and Underfitting.
8. Differentiate between classification and Regression.
9. Explain in detail about pre-processing and scaling.
10. Write a short note on DBSCAN.
11. Discuss binning and discretization.
12. Write a short note on building pipelines.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

d) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	12	2	12
II	15	2	2	12	2	6
III	15	3	2	12	2	6

NOTE: From
Section-A any 3 questions can be answered (INTERNAL CHOICE).
Section-B any 4 questions can be answered. (EXTERNAL CHOICE)

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(Hrs)
1	1	2	15
2	2	3,4	15
3	2	5,6	15

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500007

SEMESTER III

MACHINE LEARNING

PRACTICAL

1.Course Description

Programme: M.Sc. Data Science **Max. Hours: 60**
Course Code: P24/CDS/DSC/301/P **Hours per week: 4**
Course Type: DSC **Max. Marks: 50**
No. of credits: 2

2.Course Objective

- To explore various libraries and packages like NumPy, Matplotlib and Scikit-learn required for machine learning mechanisms.

3.Course Outcomes

CO1: Exploring Supervised and Un Supervised learning algorithms for data analysis.
CO2: Applying Scikit-learn to represent data and model evaluation.

4. Practical Sessions

1. Supervised Learning:
    a. k-Nearest Neighbors Classification and Analyzing
    b. Linear Regression.
    c. Building decision trees
2. Un Supervised Learning:
    a. Applying Data Transformations
    b. Transformation of data using Principal Component Analysis
3. Data Preprocessing:
    a. Applying k-Means Clustering
    b. Applying DBSCAN

4. Representing Data:
    a. Applying Binning on Linear models and Trees
    c. Sentiment analysis of movie reviews
    d. Representing data as a Bag of Words
5. Model Evaluation and Algorithm Chains:
    a. Implementation of Cross-Validation
    b. Implementation of Grid Search
    d. Using Pipelines in Grid Searches

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500007

MODEL QUESTION PAPER

MACHINE LEARNING
PRACTICAL

COURSE CODE: P24/CDS/DSC/301/P

Max.Marks: 50
Exam Duration: 2 Hrs.

Answer any one of the following.

1. k-Nearest Neighbors Classification and Analyzing using Supervised Learning.

2. Transformation of data using Principal Component Analysis using Un Supervised Learning.

3. Applying DBSCAN using Data preprocessing.

4. Represent the data by applying Linear Regression.

5. Implement Cross-Validation using Model Evaluation and Algorithm Chains.

Prepared by	Checked & Verified by	Approved by
Ms.Khalida Tabassum Teaching Faculty	Ms. D. Sowjenya Head of the Department	Dr.Uma Joseph Principal

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

SEMESTER -III

OBJECT ORIENTED DESIGN

PRACTICAL

1.Course Description

Programme: M.Sc. Data.Science
Course Code: P24/CDS/DSC/302/P
Course Type: DSC
No. of credits: 2

Max. Hours: 60
Hours per week: 4
Max. Marks: 50

2.Course Objective

- To understand & design the concepts of the Object-based view of Systems.
- To solve a software problem using UML models.

3.Course Outcomes

CO1: Understand the importance of systems analysis and design in solving problems.
CO2: Apply and develop a system using iterative and incremental process.

4. Practical Sessions

Rendering of UML diagrams for Case Studies:

1. Online Examination
2. Point of Sales
3. Banking System
4. ATM operations
5. Online Shopping
6. Transport App on mobile
7. Dish TV services
8. Airline System
9. College Management System.
10. Online Hospital Management

MODEL QUESTION PAPER

OBJECT ORIENTED DESIGN PRACTICAL

COURSE CODE: P24/CDS/DSC/302/P

Max.Marks: 50
Exam Duration: 2 Hrs.

Answer any one of the following.

1. Draw the following diagrams and explain their functionality:
   a) Use case diagram for College Management System.
   b) Activity diagram pertaining to your case study.

2. Draw the following diagrams and explain their functionality:
   a) Class diagram for Library management system.
   b) Timing diagram pertaining to your case study.

3. Draw the following diagrams and explain their functionality:
   a) Sequence diagram for money withdrawal operation using ATM.
   b) Use case diagram pertaining to your case study.

4. Draw the following diagrams and explain their functionality:
   a) State machine diagram for all transactions associated with ATMs.
   b) Communication diagram pertaining to your case study.

5. Draw the following diagrams and explain their functionality:
   a) Activity diagram for Online shopping
   b) Class diagram pertaining to your case study.

Prepared by	Checked & Verified by	Approved by
Ms. B. Jyothi P.G. Coordinator	Ms. D. Sowjenya Head of the Department	Dr. Uma Joseph Principal

PROFESSOR
Department of Computer Science & Engineering

DEPARTMENT OF COMPUTER SCIENCE
ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD

SEMESTER - III
OPTIMIZATION TECHNIQUES

1. Course Description

Programme: M.Sc. Data Science
Course Code: P24/CDS/DSC/302
Course Type: DSC
No. of credits: 5

Max. Hours: 45
Hours per week:3 hrs.
Max. Marks:100

2. Course Objectives:

At the end of this course students are expected to be able understand a wide variety of applications and problems that can be addressed using Operations Research techniques

3. Course Outcomes:

On completion of the course the student will be able to:

CO1: Apply operations research techniques like linear programming problem in industrial optimization problems

CO2: Use linear programming in the formulation of shortest route problem

CO3: Knowledge about network construction and to find critical path and total project duration.

4. Course Content:

MODULE I: LINEAR PROGRAMMING **(15 Hrs)**

Meaning and Scope of Operation Research - Formulation of a Linear Programming Problem - Solution of a Linear Programming Problem by Graphical Method. Solution of a Linear Programming Problem by Simplex method - Artificial variables techniques: Two Phase Method and Big-M method (Special Cases: Alternative Solutions, Unbounded Solutions, Non existing Feasible Solutions) – Degeneracy - Method to resolve Degeneracy.

MODULE- II: TRANSPORTATION MODELS AND ASSIGNMENT PROBLEM (15 Hrs)

Transportation problem: Formulation- Transportation problem as a special case of Linear Programming Problem - Initial Basic Feasible Solution by North -West Corner Rule, Matrix Minima and Vogel's Approximation Methods - Optimal solution through MODI Tableau for Balanced and Unbalanced Transportation problem - Degeneracy in Transportation Problem. Assignment problem: Formulation- Assignment problem as a special case of Transportation Problem and Linear Programming Problem - Optimal solution using Hungarian Method for Balanced and Unbalanced Problems - Traveling Salesman problem.

MODULE-III: NETWORKING AND PROJECT PLANNING **(15 Hrs)**

Network Analysis: Introduction - Critical Path Method and Project Evaluation Review Technique – Rules of network construction - Time calculations in networks - probability of completing the project within given time- project crashing - optimum cost and optimum duration

5. References:

1. S.D.Sharma (2012) : Operations Research; Theory,Methods and applications,15th Edition , Reprint, Kedarnath

2. Taha, H. A. (2019): Operations Research: An Introduction, 8th Edition, Prentice Hall of India.

3. P. K. Gupta and D. S. Hira, Operations Research, S. Chand & co., 2015.

4. R. Ravindran, D. T. Philips and J. J. Solberg, Operations Research: Principles and Practice, 2 nd ed., John Wiley & Sons, 2007.

6.Syllabus Focus

a) Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	Operations Research plays a significant role globally by providing valuable insights and decision making tools to optimize various business processes and operations.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill	Linear programming problem, Networks.	Operations Research involves developing skill in formulating mathematical models, getting familiar with optimization techniques, developing simulation models to analyze complex systems, Ability to evaluate alternative approaches and gain proficiency in project management methodologies.

PROVISIONAL
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	MCQ test	Experiential learning
2.	Assignment	Experiential learning

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA-1- Written Exam	Written Exam
CO2	CIA-1- Written Exam	
CO3	CIA-2 written test/Assignment	
CO4	CIA-2 MCQ test	

b) Model Question Paper- End Semester Exam

OPTIMIZATION TECHNIQUES

Course Code: P24/CDS/DSC/302 **Max. Marks: 60**
Credits : 5 **Time: 2 1/2Hrs.**

SECTION –A

I. Answer the following **3X12=36 Marks**

1. Old hens can be bought at Rs. 20 each and young ones at RS.30 each.The old hens lay 3 eggs per week and young ones lay 5 eggs per week ,each egg worth Rs 3 .A hen costs Rs.10 per week to feed. Vinod has only Rs.800 to spend for hens.How many of each kind should vinod buy to give a profit of more than Rs.60 per week, assuming that Vinod cannot house more than 20 hens . Solve the LPP graphically.

(OR)

2 . Solve the following LPP by simplex method.

$$Max\ Z = x_1 + 2x_2 + 3x_3 - x_4 \qquad s.t.c$$

$$x_1 + 2x_2 + 3x_3 = 15; 2x_1 + x_2 + 5x_3 = 20; x_1 + 2x_2 + x_3 + x_4 = 10; x_1, x_2, x_3, x_4 \geq 0$$

3.. What is Transportation Problem? Explain the stepwise procedure for finding the optimum solution of Transportation problem by Modi Method ?

(OR)

4. A company has FOUR machines on which to do 3 jobs. Each job can be assigned to one and only One machine. The cost of each job on each machine is given in the following table.

MACHINES

JOBS

	P	Q	R	S
A	18	24	28	32
B	8	13	17	19
C	10	15	19	22

What are the job assignments which will minimize the cost?

5. Draw the network diagram for the following project and compute the earliest and latest time for Each event and also critical path.

Activity	A	B	C	D	E	F	G	H	I
Predecessor Activity	-	-	A	B	C,D	C,D	E	F	G,H
Time(days)	5	4	6	2	1	7	8	4	3

(OR)

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

DEPARTMENT OF COMPUTER SCIENCE
ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD

6. A project consists of seven activities whose time estimates are listed in the table below.

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Optimistic	1	1	2	1	2	2	3
Most likely	1	4	2	1	5	5	6
Pessimistic	7	7	8	1	14	8	15

Draw the network and find the critical path.

SECTION –B

II. Answer any FOUR. **4x6=24 Marks**

9. Write the Characteristics of standard form of LPP
10. How do you resolve the degeneracy in LPP?
11 .Show that assignment problem is the special case of LPP?
12. Explain Vogel's approximation Method?
13. Explain the Rules in network construction?
14. Differentiate between CPM and PERT?

c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	**15**	CO-1	2	12	2	3
2	**15**	CO-2	2	12	2	3
3	15	CO-3	2	12	2	3

9. CO-PO Mapping

CO	PO	Cognitive Level	Class room sessions(hrs)
1	2	Apply/Understand	15
2	2	Remember/Apply	**15**
3	1	Analyze/Apply	15

Prepared by	Checked &Verified by	Approved by
G. Priyanka **Teaching Faculty**	**Dr. Yugandhar** **Head, Department of Statistics**	**Dr. Uma Joseph,** **Principal**

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

SEMESTER - III

SENTIMENT ANALYSIS

THEORY

1. Course Description

Programme: M.Sc. Data.Science
Course Code: P24/CDS/DSE/304
Course Type: DISCIPLINE SPECIFIC ELECTIVE
No. of credits: 3

Max. Hours: 45
Hours per week: 3
Max. Marks: 100

2. Course Objectives

- To introduce a computational study of people's opinions, sentiments, emotions, moods, and attitudes.

3. Course Outcomes

On completion of the course the student will be able to:

CO1: ***Illustrate*** and ***explain*** the underlying structure of the problem and the language constructs commonly used to express opinions, sentiments, and emotions. (Cognitive levels – 1,2)
CO2: ***Apply*** the core areas of sentiment Analysis. (Cognitive level – 3,4)
CO3*: Choose* and ***design*** the understand debate analysis, intention mining, and fake-opinion detection. (Cognitive levels – 5,6)

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

4. Course Content

MODULE I: INTRODUCTION TO SENTIMENT ANALYSIS **(15 Hrs)**

Introduction, Sentiment analysis applications, Sentiment analysis research, Sentiment analysis as mini-NLP, The Problem of Sentiment Analysis, Definition of opinion, Definition of opinion summary, different types of opinions, Document Sentiment Classification, Supervised sentiment classification, Unsupervised sentiment classification, Sentiment rating prediction.

MODULE II: SENTENCE SUBJECTIVITY AND SENTIMENT CLASSIFICATION (15 Hrs)

Sentence Subjectivity and Sentiment Classification, Subjectivity, Sentence Subjectivity Classification, Sentence Sentiment Classification, Aspect Sentiment Classification, Rules of Sentiment composition, Negation and Sentiment, Aspect and Entity Extraction, Frequency based aspect extraction, Exploring syntactic relations, Using supervised learning.

MODULE III: SENTIMENT LEXICON GENERATION **(15 Hrs)**

Sentiment Lexicon Generation, Dictionary based approach, Corpus based approach, Sentiment word embedding, Analysis of Comparative Opinions, Problem definition, identifying comparative sentences, Identifying the preferred entity set, Special types of comparison, Opinion Summarization and Search, Aspect based opinion summarization, enhancements to aspect-based summaries, Traditional summarization.

5. References

1. Sentiment Analysis: Mining Opinions, Sentiments, and Emotions, by Bing Liu, 2017.
2. Sentiment Analysis in Social Networks by Federico Pozzi, Elisabetta Fersini, Enza Messina, Bing Liu, 2016.
3. New Opportunities for Sentiment Analysis and Information Processing, Aakansha Sharaff, G. R. Sinha, Surbhi Bhatia, IGI Global, 2021, Springer.
4. Sentiment Analysis and Knowledge Discovery in Contemporary Business, Dharmendra Singh Rajput, Ramjeevan Singh Thakur, S. Muzamil Basha, IGI Global, 2018.

6.Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global Development	Sentiment analysis plays a crucial role in understanding and extracting sentiments (opinions) from textual data.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 1 and 2	Analysis on Real world data. Applying sentiment Analysis concepts
EMP	Modules 3	Sentiment analysis is a fascinating field that combines data science, natural language processing (NLP), and machine learning. Various job opportunities like Data Scientist, Social Media Analyst, Sales Data Scientist, NLP Engineer etc.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars, Presentations
2.	Experimental	Quiz, Group Discussion
3.	Problem solving	To analyse and study the sentiment analysis of various social media platforms.

PROFESSOR
Department of Computer Science
University College for Women
Osmania University
Hyderabad

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 1 – Written	Written Exam
CO2	CIA 2 – Assignment	
CO3	CIA 2 – Lab	

b) Model Question Paper- End Semester Exam

SENTIMENT ANALYSIS

MODEL QUESTION PAPER

THEORY

Course Code: P24/CDS/DSE/304 **Max Marks: 60**
Credits: 3 **Time: 2 ½ Hrs.**

I: Answer the following **3 x 12 = 36**

1. Explain in detail Sentiment Analysis Applications.

OR

2. Explain in detail different Types of Opinions.
3. Explain in detail Rules of Sentiment Composition.

OR

4. Explain in detail Entity Extraction and Resolution.
5. Explain in detail Corpus-Based Approach

OR

6. Explain in detail Special Types of Comparison in Analysis of Comparative Opinions.

II. Answer any Four: **4 x 6 = 24**

7. Briefly explain Supervised Sentiment Classification.
8. Discuss in detail Grouping Aspects into Categories.
9. Write short notes on Dictionary-Based Approach.
10. Write a short note on the Problem of Intention Mining.
11. Briefly explain Affect, Emotion, and Mood.
12. Discuss in detail Lexicon-Based Approach models.

c)Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	12	2	12
II	15	2	2	12	2	6
III	15	3	2	12	2	6

NOTE: From
Section-A any 3 questions can be answered (INTERNAL CHOICE).
Section-B any 4 questions can be answered. (EXTERNAL CHOICE)

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(Hrs)
1	1	2	15
2	1,2	3,4	15
3	2	5,6	15

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

SEMESTER III
SENTIMENT ANALYSIS

PRACTICAL

1.Course Description

Programme: M.Sc. Data.Science
Course Code: P24/CDS/DSE/304/P
Course Type: DSE
No. of credits: 2

Max. Hours: 60
Hours per week: 4
Max. Marks: 50

2.Course Objective

To Familiarize the learners with the concept of sentiment analysis and understand its significance networks.

3.Course Outcomes

CO1: Exploring the learner's concept of sentiment analysis and understand its significance.
CO2: Applying the concepts using the tools of sentiment analysis.
CO3: Enable the learners to develop skills required for analysing the effectiveness of sentiment analysis.

4. Practical Sessions

1. An appropriate mini project to analyse and study the sentiment analysis of various social media platforms.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

MODEL QUESTION PAPER

SENTIMENT ANALYSIS
PRACTICAL

COURSE CODE: P24/CDS/DSE/304/P

Max.Marks: 50
Exam Duration: 2 Hrs

Answer any one of the following.

1. Mini project work for the social media platforms.

Prepared by	Checked & Verified by	Approved by
B. Jyothi PG Coordinator	Ms. D. Sowjenya Head of the Department	Dr.Uma Joseph Principal

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University

SEMESTER -III

SOCIAL MEDIA ANALYTICS

THEORY

1. Course Description

Programme: M.Sc. Data.Science **Max. Hours: 45**
Course Code: P24/CDS/DSE/303 **Hours per week: 3**
Course Type: DISCIPLINE SPECIFIC ELECTIVE **Max. Marks: 100**
No. of credits: 3

2. Course Objectives

- To answer mission-critical questions and maximize the business value of social media data at every step of the process. And to offer thorough and practical coverage of all three phases: data identification, analysis, and knowledge interpretation.

3. Course Outcomes

On completion of the course the student will be able to:

CO1: ***Understand*** the concept of social media analytics and understand its significance. (Cognitive level – 1)
CO2: **Familiarize** the learners with the tools of social media analytics(Cognitive level – 4)
CO3***: Design*** & develop skills required for analysing the effectiveness of social media for business purposes (Cognitive levels – 6)

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007

4. Course Content

MODULE I: INTRODUCTION TO SOCIAL MEDIA ANALYTICS (SMA) (15 Hrs.)

Social media landscape, Need for SMA; SMA in Small organizations; SMA in large organizations; Application of SMA in different areas Network fundamentals and models: The social networks perspective - nodes, ties and influencers, social network and web data and methods. Graphs and Matrices- Basic measures for individuals and networks. Information visualization.

MODULE II: MAKING CONNECTIONS (15 Hrs.)

Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity. Web analytics tools: Clickstream analysis, A/B testing, online surveys, Web crawling and Indexing. Natural Language Processing Techniques for Micro-text Analysis.

MODULE III: FACEBOOK ANALYTICS & PROCESSING AND VISUALIZING DATA (15 Hrs.)

Introduction, parameters, demographics. Analysing page audience. Reach and Engagement analysis. Post- performance on FB. Social campaigns. Measuring and analysing social campaigns, defining goals and evaluating outcomes, Network Analysis.
(LinkedIn, Instagram, YouTube Twitter etc. Google analytics.)
Processing and Visualizing Data, Influence Maximization, Link Prediction, Collective Classification, Collecting and analyzing social media data; visualization and exploration

5. References

1. Matthew Ganis, Avinash Kohirkar, Social Media Analytics: Techniques and Insights for Extracting Business Value Out of Social Media, Pearson 2016.
2. Jim Sterne, Social Media Metrics: How to Measure and Optimize Your Marketing Investment, Wiley Latest edition.
3. Oliver Blanchard, Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization (Que Biz-Tech), Que Publishing Latest edition
4. Marshall Sponder, Social Media Analytics, McGraw Hill, Latest edition
5. Tracy L. Tuten, Michael R. Solomon, Social Media Marketing, Sage, Latest edition
6. Marshall Sponder, Gorah F. Khan, Digital Analytics for Marketing, Routledge, 2017, 1st Edition.
7. Gohar F. Khan, Creating Value with Social Media Analytics, CreateSpace Independent Publishing, 2018, 1st Edition.
8. Alex Gonsalves, Social Media Analytics Strategy, Apress 2017, 1st Edition

6.Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	**Relevance**
Global Development	Data science and analytics enable social media platforms to segment users based on their demographics, interests, and behaviours. This segmentation helps them deliver targeted, personalized advertisements, which are likely to resonate with users, improving the effectiveness of advertising campaigns.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	**Syllabus Content**	**Description of Activity**
SD	Modules 1 and 2	To gain concepts and approaches to mining social media data. Familiarize with the tools of social media analytics.
EMP	Modules 3	Social media specialists are in high demand, with the field growing faster than overall marketing positions. Key skills in demand include content strategy, digital project management, data analytics, brand marketing, SEO, website design, and e-commerce.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500007
P. V

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars
2.	Experimental	Quiz, Group Discussion
3.	Problem solving	Data Analysis & Exploring data.

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA- 40%	End Semester Examination-60%
CO1	CIA 1 – Written	Written Exam
CO2	CIA 2 – Assignment	
CO3	CIA 2 – Lab	

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

b) Model Question Paper- End Semester Exam

SOCIAL MEDIA ANALYTICS

MODEL QUESTION PAPER
THEORY

Course Code: P24/CDS/DSE/303
Credits: 3

Max Marks: 60
Time: 2 ½ Hrs.

I: Answer the following **3 x 12 = 36**

1. Explain in detail application of SMA in different areas of the network.

OR

2. What are the basic measures of individuals and networks of Graphs?
3. Explain in detail Web analytics tools.

OR

4. What are the Natural Language Processing Techniques for Micro-text Analysis?
5. Explain in detail defining goals and evaluating outcomes of social media.

OR

6. Explain in detail Processing and Visualizing Data of social media data.

II. Answer any Four: **4 x 6 = 24**

7. Briefly explain the social media landscape.
8. Write short notes on social networks perspective nodes.
9. Write short notes on A/B testing
10. Write a short note on Web crawling and Indexing.
11. Briefly explain demographics.
12. Discuss in detail data visualisation and exploration.

c)Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	12	2	12
II	15	2	2	12	2	6
III	15	3	2	12	2	6

NOTE: From
Section-A any 3 questions can be answered (INTERNAL CHOICE).
Section-B any 4 questions can be answered. (EXTERNAL CHOICE)

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions(Hrs.)
1	1	2	15
2	2	4	15
3	2	6	15

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University

SEMESTER III

SOCIAL MEDIA ANALYTICS

PRACTICAL

1.Course Description

Programme: M.Sc. Data.Science
Course Code: P24/CDS/DSE/303/P
Course Type: DISCIPLINE SPECIFIC ELECTIVE
No. of credits: 2

Max. Hours: 60
Hours per week: 4
Max. Marks: 50

2.Course Objective

To explore various tools to answer mission-critical questions and maximize the business value of social media data at every step of the process. And to offer thorough and practical coverage of all three phases: data identification, analysis, and knowledge interpretation.

3.Course Outcomes

CO1: Familiarize the learners with the concept of social media analytics and tools, understand its significance.
CO2: Enable the learners to develop skills required for analyzing the effectiveness of social media for business purposes.

4. Practical Sessions

1. An appropriate mini project to analyze and study the business value of various social media platforms.

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University
Hyderabad-500 007.

MODEL QUESTION PAPER

SOCIAL MEDIA ANALYTICS
PRACTICAL

COURSE CODE: P24/CDS/DSE/303/P

Max.Marks: 50
Exam Duration: 2 Hrs.

Answer the following:

1. An appropriate mini project to analyze and study the business value of various social media platforms.

.

Prepared by	Checked & Verified by	Approved by
Ms. B. Jyothi **P.G. Coordinator**	**Ms. D. Sowjenya** **Head of the Department**	**Dr. Uma Joseph** **Principal**

PROFESSOR
Department of Computer Science & Engineering
P.V.S.