LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT
PART-A

Name of Course Instructor: CH SAMBASIVARAO
Course Name & Code : BIGDATA ANALYTICS & 20CS19
L-T-P Structure : **3-0-0**   **Credits:** 3
Program/Sem/Sec : B.Tech/VI/A   **A.Y.:** 2022-23

PREREQUISITE: **Should have knowledge of one Programming Language (Java preferably), Practice of SQL (queries and sub queries), exposure to Linux Environment.**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Understanding the process of distributed data (Structured, Semi-Structured and Unstructured) that process the Terabytes of data using Hadoop Eco System Tools.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Identify Big Data and its Business Implications. (**Understand-L2**)
CO2	Process of distributed file system using Hadoop. (**Apply-L3**)
CO3	Illustrate the Map Reduce mechanism. (**Apply-L3**)
CO4	Develop Structured data processing tools. (**Apply-L3**)
CO5	Develop semi/ unstructured data processing tools. (**Apply– L3**)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	2	-	2	-	-	-	-	-	-	-	-	2	3	-	-
CO3	2	-	2	-	-	-	-	-	-	-	-	2	-	-	-
CO4	2	3	-	-	1	-	-	-	-	-	-	2	-	-	-
CO5	2	3	-	-	1	-	-	-	-	-	-	2	-	-	-
1 - Low **2 –**Medium **3 -** High														

TEXTBOOKS:

T1 Tom White" Hadoop: The Definitive Guide" Third Edit, O'reilyMedia,2012.
T2 Big Data and Analytics, 2ed Seema Acharya, Subhashini Chellappan, Wiley2015.

REFERENCE BOOKS:

R1 Michael Berthold, DavidJ.Hand,"IntelligentDataAnalysis", Springer,2007.
R2 Jay Liebowitz ,"Big Data and Business Analytics" Auerbach Publications ,CRCpress (2013).
R3 Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop",McGraw-Hill/Osborne Media(2013),Oracle press.
R4 AnandRajaramanandJefreyDavidUlman,"MiningofMassiveDatasets",Cambri dgeUniversityPress,2012

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Big data

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Big data, CEOs and Cos discussion	1	26-12-2022		TLM1	
2.	Types of Digital Data	1	27-12-2022		TLM1	
3.	Classification of Digital Data	1	28-12-2022		TLM1	
4.	Characteristics of Data	1	30-12-2022		TLM1	
5.	Evolution of Big Data	1	02-01-2023		TLM1	
6.	Definition of Big Data, Challenges with Big Data	1	03-01-2023		TLM1	
7.	What is Big Data? Other Characteristics of Data Which are not Definitional Traits of Big Data	1	04-01-2023		TLM1	
8.	Why Big Data? analyzing Data with Unix tools	1	06-01-2023		TLM1	
9.	Analyzing Data with Hadoop	1	09-01-2023		TLM1	
10.	Hadoop Streaming	1	10-01-2023		TLM1	
11.	Hadoop Echo System	1	11-01-2023		TLM1	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Hadoop Distributed File System

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	The Design of HDFS	1	12-01-2023		TLM1	
13.	HDFS Concepts	1	18-01-2023		TLM1	
14.	Command Line Interface	1	20-01-2023		TLM1	
15.	Hadoop file system interfaces	1	23-01-2023		TLM1	
16.	Dataflow, Data Ingestion with Sqoop and Hadoop archives,	1	24-01-2023		TLM1	
17.	Dataflow, Data Ingestion with Sqoop and Hadoop archives,	1	25-01-2023		TLM1	
18.	Hadoop I/O: Compression	1	27-01-2023		TLM1	
19.	Serialization	1	30-01-2023		TLM1	
20.	Avro and File-Based Data structures	1	31-01-2023		TLM1	
21.	Bigdata Applications	1	01-02-2023		TLM1	
22.	Bigdata Analytics Use cases	1	03-02-2023		TLM1	
23.	Bigdata Analytics Use cases	1	06-02-2023		TLM1	
24.	Bigdata Analytics Challenges	1	07-02-2023		TLM1	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Map Reduce Technique

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	How Map Reduce works?	1	08-02-2023		TLM1	
26.	Anatomy of a Map Reduce Job Run	1	10-02-2023		TLM1	
27.	Job Failures	1	13-02-2023		TLM1	
28.	Job Scheduling	1	14-02-2023		TLM1	
29.	Shuffle and Sort	1	15-02-2023		TLM1	
30.	Task Execution	1	17-02-2023		TLM1	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	Map Reduce Types and Formats	1	28-02-2023		TLM1	
32.	Map Reduce Features	1	01-03-2023		TLM1	
No. of classes required to complete UNIT-III: 08				**No. of classes taken:**		

UNIT-IV: Structured Data Processing Tools

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Hive: Installation	1	02-03-2023		TLM1	
34.	Running Hive	1	06-03-2023		TLM1	
35.	Hive QL	1	07-03-2023		TLM1	
36.	Tables, Querying Data	1	08-03-2023		TLM1	
37.	User Defined functions	1	10-03-2023		TLM1	
38.	Sqoop: Introduction	1	13-03-2023		TLM1	
39.	generate code	1	14-03-2023		TLM1	
40.	Database import	1	15-03-2023		TLM1	
41.	working with imported data	1	17-03-2023		TLM1	
42.	Importing large objects	1	20-03-2023		TLM1	
43.	performing an export	1	21-03-2023		TLM1	
44.	Applications	1	24-03-2023		TLM1	
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: Semi-structured and unstructured Data Processing Tools Pig

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Introduction to PIG	1	27-03-2023		TLM1	
46.	Execution Modes of Pig	1	28-03-2023		TLM1	
47.	Comparison of Pig with Databases	1	29-03-2023		TLM2	
48.	Grunt, Pig Latin	1	03-04-2023		TLM2	
49.	User Defined Functions	1	04-04-2023		TLM2	
50.	Data Processing operators	1	05-04-2023		TLM2	
51.	HBase: Basics	1	07-04-2023		TLM2	
52.	Concepts, Clients	1	11-04-2023		TLM2	
53.	Example	1	12-04-2023		TLM2	
54.	HBase Versus RDBMS	1	14-04-2023		TLM2	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

CONTENT BEYOND THE SYLLABUS:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	BDA Use case – I	1	17-04-2023		TLM2	
2.	BDA Use case – II	1	18-04-2023		TLM2	
3.	BDA Use case - III	1	19-04-2023		TLM2	

Teaching Learning Methods				
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)	
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)	
TLM3	Tutorial	**TLM6**	Group Discussion/Project	

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities withan understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and normsof the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with 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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the 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.
PO 12	**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 of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	SAMBASIVARAO CH	MR.G. VIJAYA SURESH	MRS.M EMALATHA	DR. B.SRINIVASARAO
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: CH.SAMBASIVARAO

Course Name & Code   : DATA ANALYTICS AND VISUALIZATION LAB & 20CS62

L-T-P Structure   : 0-0-3   **Credits:** 1.5

Program/Sem/Sec   : B.Tech /VI/C   **A.Y.:** 2022-23

PREREQUISITE: Should have knowledge of one Programming Language (Java preferably), Practice of SQL (queries and sub queries), exposure to Linux Environment

COURSE EDUCATIONAL OBJECTIVE(CE0):

The Objective of the course is to provide practical, foundation level training that enables immediate and effective participation in Big Data and other Analytics projects using Hadoop and Data Visualization using Tableau.

COURSE OUTCOMES (CO):

CO1: Demonstrate the installation of Big data analytic tools. **(Understand–L2)**

CO2: Apply data modeling techniques to large datasets. **(Apply–L3)**

CO3: Conduct exploratory data analysis using visualization. **(Understand–L2)**

CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

COURSE ARTICULATION MATRIX (Correlation between Cos, Pos & PSOs):

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	-	2	2	-	-	-	-	-	-	1	-	-	-
CO2	2	-	-	3	-	-	-	-	-	-	-	1	-	-	-
CO3	2	1	-	2	2	-	-	-	-	-	-	1	-	-	-
CO4	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-

Note: 1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High)

PART-B:

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	Refreshing Linux Commands and Installation of Hadoop	3	30-12-2023		
2.	Implementation of Run a basic Word Count Map Reduce program	3	06-01-2023		
3.	Implementation of Matrix Multiplication with Hadoop Map Reduce	3	13-01-2023		
4.	Implementation of Weather mining by taking weather dataset using Map Reduce	3	20-01-2023		
5.	Installation of Hive along with practice examples	3	27-01-2023		
6.	Installation of Sqoop along with Practice examples	3	03-02-2023		
7.	Downloading and installing Tableau Understanding about importing data, saving, opening, and sharing work books	3	10-02-2023		
8.	Data Preparation with Tableau	3	17-02-2023		
9.	Charts: Bar Charts, Legends, Filters ,and Hierarchies ,Step Charts, Line Charts	3	24-02-2023		
10.	Maps: Symbol Maps, Filled Maps, Density Maps, Maps with Pie Charts	3	03-03-2023		
11.	Interactive Dash boards	3	10-03-2023		
12.	Interactive Dash boards	3	17-03-2023		
13.	Interactive Dash boards	3	24-03-2023		
14.	Lab Internal Exam	3	31-03-2023		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 12	**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 of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. REHANA BEGUM

Course Name & Code : Compiler Design, 20CS18

L-T-P Structure : **3-0-0**   **Credits:** 03

Program/Sem/Sec : B.Tech-IT / VI SEM / A

A.Y. : 2022-23

PRE-REQUISITE: Programming language, and Automata theory and formal languages

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to understand and list the different stages in the process of compilation, identify different methods of lexical analysis, design top-down and bottom-up parsers, develop syntax directed translation schemes, and develop algorithms to generate code for a target machine..

COURSE OUTCOMES (COs): At the end of the course, students will be able to

CO1	Design the lexical analyzer using LEX tool. (Apply- L3)
CO2	Design a parser using top-down and bottom-up parser design methods. (Apply- L3)
CO3	Construct syntax-directed translator for semantic checking and intermediate code generation Using YACC tool (Apply –L3)
CO4	Demonstrate the machine dependent and machine independent code optimization techniques. (Understand-L2)
CO5	Understand the design issues of the code generator and run-time environment of the program. (Understand-L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2										2	2	1	
CO2	3	2										2		1	
CO3	3	2												2	3
CO4	3	2											2	2	2
CO5	1	2												2	2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

    1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXTBOOKS:

1. Alfred V.Aho, Jeffrey Ullman, Ravi sethi, "Compilers Principles, Techniques and Tools", Pearson Education, 2nd Edition, 2008.

REFERENCE BOOKS:
1. ParagH.Dave, HimanshuB.Dave ,"Compilers Principles and Practice" , Person Education, First Edition, 2012.

2. Andrew W.appel ,"Modern compiler implementation in C" ,Cambridge, Revised Edition, 2010.
3. http://nptel.ac.in/courses/106108052/(Video lectures for Compiler design)

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Compiler &v Lexical Analysis

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Language Processing System	1	27/12/22		TLM1	CO1	
2.	Compiler Vs Interpreter	1	29/12/22		TLM1	CO1	
3.	The Phases of Compiler	1	30/12/22		TLM1	CO1	
4.	The Phases of Compiler	1	3/1/23		TLM1	CO1	
5.	Compiler Construction Tools	1	4/1/23		TLM1	CO1	
6.	Boot Strapping Concept	1	5/1/23		TLM2	CO1	
7.	The Role of Lexical Analyzer	1	6/1/23		TLM2	CO1	
8.	Input Buffering	1	9/1/23		TLM2	CO1	
9.	Input Buffering	1	10/1/23		TLM2	CO1	
10.	Specification of Tokens	1	11/1/23		TLM2	CO1	
11.	Recognition of Tokens	1	12/1/23		TLM1	CO1	
12.	LEX Tools	1	13/1/23		TLM1	CO1	
13.	Examples on LEX Tool	1	17/1/23		TLM1	CO1	
No. of classes required to complete UNIT-I		13	No. of classes taken:				

UNIT-II: Syntax Analyzer & TOP Down Parsing

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	The Role of parser	1	18/1/23		TLM1	CO2	
2.	Writing a Grammar	1	19/1/23		TLM1	CO2	
3.	Elimination of left recursion	1	20/1/23		TLM2	CO2	
4.	Left factoring	1	24/1/23		TLM1	CO2	

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
5.	Recursive decent parsing	1	25/1/23		**TLM1**	CO2	
6.	Predictive Parsing	1	25/1/23		**TLM1**	CO2	
7.	Pre-processing steps required for predictive parsing	1	27/1/23		**TLM2**	CO2	
8.	LL(1) Grammar	1	31/1/23		**TLM1**	CO2	
9.	Examples on LL(1) Parser	1	1/2/23		**TLM1**	CO2	
10.	Error recovery in predictive parsing temple	1	2/2/23		**TLM1**	CO2	
11.	Backtracking	1	3/2/23		**TLM1**	CO2	
No. of classes required to complete UNIT-2		11	No. of classes taken:				

UNIT – III: Bottom-Up parsing

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Handle pruning	1	7/2/23		**TLM1**	CO3	
2.	Shift reduce Parsing	1	8/2/23		**TLM1**	CO3	
3.	Operator precedence Parsing	1	10/2/23		**TLM1**	CO3	
4.	SLR parser	1	14/2/23		**TLM1**	CO3	
5.	Examples on SLR parser	1	15/2/23		**TLM2**	CO3	
6.	CLR parser	1	28/2/23		**TLM1**	CO3	
7.	Examples on CLR parser	1	1/3/23		**TLM1**	CO3	
8.	LALR parser	1	2/3/23		**TLM1**	CO3	
9.	Examples on LALR Parser	1	3/3/23		**TLM2**	CO3	
10.	Handling Ambiguous Grammar	1	7/3/23		**TLM2**	CO3	
11.	Error recovery in LR parser	1	10/3/23		**TLM2**	CO3	
12.	YACC-Automatic parser Generator	1	14/3/23		**TLM2**	CO3	
No. of classes required to complete UNIT-3		12	No. of classes taken:				

UNIT-IV: Syntax Directed Translation & Intermediate Code Generation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Syntax directed definitions	1	15/3/23		TLM1	CO4	
2.	Evaluation order of SDD's	1	16/3/23		TLM1	CO4	
3.	Application of SDD	1	17/3/23		TLM1	CO4	
4.	Syntax directed Translation schemes	1	21/3/23		TLM1	CO4	
5.	Syntax directed Translation schemes	1	24/3/23		TLM1	CO4	
6.	Syntax Tree	1	28/3/23		TLM1	CO4	
7.	Polish Notation	1	29/3/23		TLM1	CO4	
8.	Three Address Code	1	31/3/23		TLM1	CO4	
9.	Static single assignment	2	04/4/23		TLM1	CO4	
10.	Translation of expressions and control flow statements-Boolean expressions	2	06/4/23		TLM1	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Code Optimization & Code Generation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Basic blocks and flow graphs	1	11/04/23		TLM1	CO5	
2.	Principle Sources of optimization	2	12/04/23		TLM1	CO5	
3.	Loop Optimization	2	13/04/23		TLM1	CO5	
4.	Design issues & Object code forms	1	18/04/23		TLM1	CO5	
5.	Optimization of Basic Blocks	1	19/04/23		TLM1	CO5	
6.	DAG Representation of basic blocks	1	19/04/23		TLM1	CO5	
7.	Code Generation using DAG	1	20/04/23		TLM1	CO5	
8.	A simple Code Generator	1	20/04/23		TLM1	CO5	
9.	Peephole Optimization	1	21/04/23		TLM1	CO5	
10.	Register Allocation and assignment	1	21/04/23		TLM1	CO5	
No. of classes required to complete UNIT-5		12	No. of classes taken:				

TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/SWAYAM/MOOCS)
TLM3	Tutorial	TLM6	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with 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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engine**ring 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
PO 12	**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 of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help ofdifferent currentengineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs. Rehana Begum	Dr. D Veeraiah	Dr. K.Lavanya	Dr. B.Srinivasarao
Signature				

![Lakireddy Bali Reddy College of Engineering header]

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs M.Hema Latha
Course Name & Code   : Data Science & 20IT04
L-T-P Structure   : 3-0-0   **Credits:** 3
Program/Sem/Sec   : B.Tech/VI/B   **A.Y.:** 2022-23

PREREQUISITE   : Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs) :

COURSE OUTCOMES (COs)   : At the end of the course, student will be able to

CO1	Understand basic introduction concepts of Data science **(L2-Understand)**
CO2	Explore how to describe data **(L2-Understand)**
CO3	Apply mathematical concepts to prepare data tables **(L3-Apply)**
CO4	Identify relations and groups in data science **(L2-Understand)**
CO5	Analyze machine learning models **(L3-Apply)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2		
CO2		2												2	
CO3		2	3											2	
CO4	2													2	
CO5		2	2											2	
	1 - Low				**2 –**Medium					**3 -** High					

TEXTBOOKS:

T1 A Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, 2nd Edition, Glenn J. Myatt, Wiley, 2014.

T2 Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education services, 2015.

REFERENCE BOOKS:

R1 Python Data Science Handbook,1st Edition, Jake VanderPlas, O'Reilly, 2017.

PART-B - COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION TO DATA SCIENCE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Outcomes and Introduction to Data Science Course	1	26/12/22		TLM1	
2.	Introduction to Data Science	1	27/12/22		TLM1	
3.	Introduction to Data Science, Data Analysis Life Cycle Overview.	1	28/12/22		TLM2	
4.	Introduction to Data Science, Data Analysis Life Cycle Overview.	1	29/12/22		TLM2	
5.	Data analysis Discovery, Framing Problem, Developing Initial Hypothesis	1	02/01/23		TLM1	
6.	Sources of Data, Process for Making Sense of Data, Data Preparation, Performing ETLT, Data Conditioning, Survey and Visualize,	1	03/01/23		TLM1	
7.	Common tools for Data Preparation Phase, Data Exploration and Variable Selection	1	04/01/23		TLM1	
8.	Common tools for the Model Planning and Building Phase, Communicate Results, Operationalize	1	05/01/23		TLM1	
9.	Revision of UNIT-2 & Assignment-II	1	09/01/23		TLM1	
No. of classes required to complete UNIT-I: 9				**No. of classes taken:**		

UNIT-II: DESCRIBING DATA

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Course Outcomes and Introduction to Describing Data	1	10/01/23		TLM1	
11.	Observations and Variables	1	11/01/23		TLM1	
12.	Types of Variables	1	18/01/23		TLM1	
13.	Central Tendency	1	19/01/23		TLM2	
14.	Distribution of the Data	1	23/01/23		TLM2	
15.	Confidence Intervals	1	24/01/23		TLM2	
16.	Hypothesis Tests	1	25/01/23		TLM2	
17.	Student t-test	1	30/01/23		TLM1	
18.	Student t-test	1	31/01/23		TLM1	
19.	Revision of UNIT-2 & Assignment-II	1	01/02/23		TLM1	
No. of classes required to complete UNIT-II : 10				**No. of classes taken:**		

UNIT-III: PREPARING DATA TABLES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	Course Outcomes and Introduction to Preparing Data Tables	1	02/02/23		TLM1	

21.	Cleaning the Data	1	06/02/23		TLM1	
22.	Removing Observations and Variables	1	07/02/23		TLM1	
23.	Generating Consistent Scales across Variables	1	08/02/23		TLM2	
24.	Generating Consistent Scales across Variables	1	09/02/23		TLM2	
25.	New Frequency Distribution	1	13/02/23		TLM1	
26.	Revision For MID1	1	14/02/23			
27.	Revision For MID1	1	15/02/23			
28.	Revision For MID1	1	16/02/23			
29.	Converting Continuous Data to Categories	1	27/02/23		TLM1	
30.	Combining Variables	1	28/02/23		TLM1	
31.	Generating Groups	1	27/03/23		TLM1	
32.	Preparing Unstructured Data	1	01/03/23		TLM2	
33.	Revision of UNIT-3 & Assignment-III	1	02/03/23			
No. of classes required to complete UNIT-III: 14				**No. of classes taken:**		

UNIT-IV: UNDERSTANDING RELATIONSHIPS & IDENTIFYING AND UNDERSTANDING GROUPS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Course Outcomes and Introduction to Understanding Relationships & Identifying and Understanding Groups	1	06/03/23		TLM1	
35.	Visualizing Relationships between Variables	1	07/03/23		TLM2	
36.	Visualizing Relationships between Variables	1	09/03/23		TLM2	
37.	Visualizing Relationships between Variables	1	13/03/23		TLM2	
38.	Calculating Metrics about Relationships	1	14/03/23		TLM2	
39.	Calculating Metrics about Relationships	1	15/03/23		TLM2	
40.	Calculating Metrics about Relationships	1	16/03/23		TLM2	
41.	Clustering, K-means	1	20/03/23		TLM2	
42.	Association Rules	1	21/03/23		TLM2	
43.	Apriori Algorithm	1	23/03/23		TLM2	
44.	Applications of Association Rules	1	27/03/23		TLM1	
45.	Applications of Association Rules	1	28/03/23		TLM1	
46.	**Revision of UNIT-3 & Assignment-III**	1	29/03/23			
No. of classes required to complete UNIT-IV: 13				**No. of classes taken:**		

UNIT-V: BUILDING MODELS FROM DATA

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Course Outcomes and Introduction to building models from data	1	03/04/23		TLM1	
48.	Linear Regression	1	04/04/23		TLM2	
49.	Logistic Regression	1	05/04/23		TLM2	
50.	Bayes Theorem	1	06/04/23		TLM2	
51.	Naïve Bayes Classifier	1	10/04/23		TLM2	
52.	k-Nearest Neighbours	1	11/04/23		TLM2	
53.	Learning Decision Trees from Data	1	12/04/23		TLM2	
54.	Revision of UNIT-5 & Assignment-V	1	13/04/23			
55.	Content Beyond: AWS Academy Data Analytics	1	17/04/23		TLM2	
56.	AWS Academy Data Analytics	1	18/04/23		TLM2	

No. of classes required to complete UNIT-V: 10   **No. of classes taken:**

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge :** Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics,natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and Design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research Methods including design of experiments, analysis and interpretation of data, and synthesis of theinformation to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activitieswith an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant tothe professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering Solutions in societal and environmental contexts, and demonstrate the knowledge of, and need forsustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in Diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the Engineering community and with 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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member andleader in a team, to manage projects and in multidisciplinary environments.
PO 12	**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 of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs M.Hema Latha	Dr.K.Lavanya	Dr.K.Lavanya	Dr.B,Srinivasa Rao
Signature				

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.K.Lavanya
Course Name & Code : Data Science & 20IT04
L-T-P Structure :3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech/VI/B **A.Y.:** 2022-23

PREREQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Understand basic introduction concepts of Data science **(L2-Understand)**
CO2	Explore how to describe data **(L2-Understand)**
CO3	Apply mathematical concepts to prepare data tables **(L3-Apply)**
CO4	Identify relations and groups in data science **(L2-Understand)**
CO5	Analyze machine learning models **(L3-Apply)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2		
CO2		2												2	
CO3		2	3											2	
CO4	2													2	
CO5		2	2											2	
	1 - Low			**2 –Medium**				**3 - High**							

TEXTBOOKS:

T1 A Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, 2nd Edition, Glenn J. Myatt, Wiley, 2014.

T2 Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education services, 2015.

REFERENCE BOOKS:

R1 Python Data Science Handbook,1st Edition, Jake VanderPlas, O'Reilly, 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION TO DATA SCIENCE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Outcomes and Introduction to Data Science Course	1	26/12/22		TLM2	
2.	Introduction to Data Science	1	29/12/22		TLM2	
3.	Introduction to Data Science, Data Analysis Life Cycle Overview.	1	30/12/22		TLM2	
4.	Introduction to Data Science, Data Analysis Life Cycle Overview.	1	02/01/23		TLM2	
5.	Data analysis Discovery, Framing Problem, Developing Initial Hypothesis	1	04/01/23		TLM2	
6.	Sources of Data, Process for Making Sense of Data, Data Preparation, Performing ETLT, Data Conditioning, Survey and Visualize,	1	05/01/23		TLM2	
7.	Common tools for Data Preparation Phase, Data Exploration and Variable Selection	1	06/01/23		TLM2	
8.	Common tools for the Model Planning and Building Phase, Communicate Results, Operationalize	1	09/01/23		TLM2	
9.	Revision of UNIT-2 & Assignment-II	1	11/01/23		TLM2,3	
No. of classes required to complete UNIT-I:				**No. of classes taken:**		

UNIT-II: DESCRIBING DATA

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Course Outcomes and Introduction to Describing Data	1	18/01/23		TLM2	
11.	Observations and Variables	1	19/01/23		TLM2	
12.	Types of Variables	1	20/01/23		TLM2	
13.	Central Tendency	1	23/01/23		TLM2	
14.	Distribution of the Data	1	25/01/23		TLM2	
15.	Confidence Intervals	1	27/01/23		TLM2	
16.	Hypothesis Tests	1	30/01/23		TLM2	
17.	Student t-test	1	01/02/23		TLM2	
18.	Student t-test	1	02/02/23		TLM2	
19.	Revision of UNIT-2 & Assignment-II	1	03/02/23		TLM2,3	
No. of classes required to complete UNIT-II:				**No. of classes taken:**		

(20-02-2023 TO 25-02-2023) I-mid exams

UNIT-III: PREPARING DATA TABLES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	Course Outcomes and Introduction to Preparing Data Tables	1 1	06/02/23		TLM2	
21.	Cleaning the Data	1	08/02/23		TLM2	
22.	Removing Observations and Variables	1	09/02/23		TLM2	
23.	Generating Consistent Scales across Variables	1	10/02/23		TLM2	
24.	Generating Consistent Scales across Variables	1	13/02/23		TLM2	
25.	New Frequency Distribution	1	15/02/23		TLM2	
26.	New Frequency Distribution	1	16/02/23		TLM2	
27.	Converting Continuous Data to Categories	1	17/02/23		TLM2	
28.	Combining Variables	1	27/02/23		TLM2	
29.	Generating Groups	1	01/03/23		TLM2	
30.	Preparing Unstructured Data	1	02/03/23		TLM2	
31.	Revision of UNIT-3 & Assignment-III	1	03/03/23		TLM2,3	
No. of classes required to complete UNIT-III:				**No. of classes taken:**		

UNIT-IV: UNDERSTANDING RELATIONSHIPS & IDENTIFYING AND UNDERSTANDING GROUPS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Course Outcomes and Introduction to Understanding Relationships & Identifying and Understanding Groups	1	06/03/23		TLM2	
33.	Visualizing Relationships between Variables	1	09/03/23		TLM2	
34.	Visualizing Relationships between Variables	1	10/03/23		TLM2	
35.	Visualizing Relationships between Variables	1	13/03/23		TLM2	
36.	Calculating Metrics about Relationships	1	15/03/23		TLM2	
37.	Calculating Metrics about Relationships	1	16/03/23		TLM2	
38.	Calculating Metrics about Relationships	1	17/03/23		TLM2	
39.	Clustering, K-means	1	20/03/23		TLM2	
40.	Association Rules	1	23/03/23		TLM2	
41.	Apriori Algorithm	1	24/03/23		TLM2	
42.	Applications of Association Rules	1	27/03/23		TLM2	
43.	Applications of Association Rules	1	29/03/23		TLM2	
44.	**Revision of UNIT-3 & Assignment-III**	1	31/03/23		TLM2,3	
No. of classes required to complete UNIT-IV:				**No. of classes taken:**		

UNIT-V: BUILDING MODELS FROM DATA

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Course Outcomes and Introduction to building models	1	03/04/23		TLM2	

	from data					
46.	Linear Regression	1	06/04/23		TLM2	
47.	Logistic Regression	1	10/04/23		TLM2	
48.	Bayes Theorem	1	12/04/23		TLM2	
49.	Naïve Bayes Classifier	1	13/04/23		TLM2	
50.	k-Nearest Neighbours	1	17/04/23		TLM2	
51.	Learning Decision Trees from Data	1	19/04/23		TLM2	
52.	Revision of UNIT-5 & Assignment-V	1	20/04/23		TLM2,3	
53.	Content Beyond: AWS Academy Data Analytics	1	21/04/23		TLM2	
54.	AWS Academy Data Analytics	1	21/04/23		TLM2	
No. of classes required to complete UNIT-V:				**No. of classes taken:**		

Teaching Learning Methods				
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)	
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)	
TLM3	Tutorial	**TLM6**	Group Discussion/Project	

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge :** Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics,natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and Design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research Methods including design of experiments, analysis and interpretation of data, and synthesis of theinformation to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activitieswith an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant tothe professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering Solutions in societal and environmental contexts, and demonstrate the knowledge of, and need forsustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in Diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the Engineering community and with 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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member andleader in a team, to manage projects and in multidisciplinary environments.
PO 12	**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 of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr.K.Lavanya**	**Dr.K.Lavanya**	**Dr.K.Lavanya**	**Dr.B,Srinivasa Rao**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B. REDDY NAGAR, MYLAVARAM – 521230. A.P. INDIA
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http://www.lbrce.ac.in, Phone: 08659 – 222933, Fax: 08659 – 222931 Extn:109
DEPARTMENT OF INFORMATION TECHNOLOGY

PROGRAM   : B.Tech., VI-Sem., IT – R20 Regulation
ACADEMIC YEAR   : 2022-23
COURSE NAME & CODE : Information Security Lab(20CS61)
L-T-P STRUCTURE   : 0-0-2
COURSE CREDITS   : 1
COURSE INSTRUCTOR   : Dr.AVN Reddy/A.Sarvani

Course Educational Objective: The objective of this lab is learn the various symmetric and public key encryption algorithm along with transposition and substitution techniques.

Course Outcomes (CO): At the end of this course, the student will be able to:

CO1:	Demonstrate the security concepts, type of attacks and network security algorithms. (Understand - L2)
CO2:	Apply symmetric and asymmetric cryptography technique to encrypt and decrypt text. (Apply - L3)
CO3:	Apply network-based tools for network analysis.(Apply - L3)
CO 4:	Improve individual / teamwork skills, communication & report writing skills with ethical values.

COURSE ARTICULATION MATRIX (Correlation between Cos & POs, PSOs):

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	1	-	-	-	-	-	-	-	-	-		2	
CO2	2	2	1	-	-	-	-	-	-	-	-	-		2	
CO3	2	1	-	2	2	-	-	-	-	-	-	-		2	
CO4	-	-	-	-	-	-	-	2	1	-	-	-		2	

1- Slight(Low), 2 - Moderate(Medium), 3 - Substantial (High).

COURSE DELIVERY PLAN (LESSON PLAN): Section-A,B

S.NO	Date	List Of Programmes	Signature
1	A: 02.01.2023 B: 05.01.2023	Implement any two Substitution Techniques.	
2	A: 23.01.2023 B: 19.01.2023	Implement any two Transposition Techniques	
3	A: 06.02.2023 B: 09.02.2023	Implement any two Symmetric algorithms.	
4	A: 20.02.2023 B: 23.02.2023	Implement any two Private -Key based algorithms.	
5	A: 06.03.2023 B: 09.03.2023	Explore any four network diagnosis tools.	
6	A: 13.03.2023 B: 16.03.2023	Study about Wireshark packet sniffer tool in promiscuous and non-promiscuous mode.	
7	A: 20.03.2023 B: 23.03.2023	Download and install nmap. Use it with different options to scan open ports, do a ping scan, tcp port scan, udp port scan.	
8	A: 03.03.2023 B: 06.03.2023	Iptables in linux.	
9	A: 10.03.2023 B: 13.03.2023	Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w).	

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work		26.12.2022	
I Phase of Instructions	26.12.2022	18.02.2022	8W
I Mid Examinations	**20.02.2023**	**25.02.2023**	1W
II Phase of Instructions	27.02.2023	22.04.2023	8W
II Mid Examinations	**24.04.2023**	**29.04.2023**	1W
Preparation and Practicals	01.05.2023	06.05.2023	1 W
Semester End Examinations	08.05.2023	20.05.2023	2 W

Dr.AVN Reddy,A.Sarvani	Dr.B.Manaswini	G.Rajenedra	Dr.B.Srinivasa Rao
Course Instructor	**Coordinator**	**Module Coordinator**	**Head of the Department**

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DEPARTMENT OF INFORMATION TECHNOLOY

COURSE HANDOUT

PART-A

Name of Course Instructor : A.Sarvani
Course Name & Code : Information Security (20CS17)
L-T-P Structure : 3-0-0　　　　　　　　　　　　　**Credits**: 3
Program/Sem/Sec : B.Tech., IT., VI-Sem. A Secion,　　　**A.Y** : 2022-23

PRE-REQUISITE: Principles of Computer networks, Data transfer mechanisms in Internet. Security aspects in Internet and Data communication networks and storage media

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course elevates the security aspects and provides the knowledge to understand the basic concept of Cryptography and Network Security principles. It antilight's different types of cipher mechanisms and various symmetric and asymmetric algorithms. Also provides the knowledge on digital signatures, different threats, viruses, intruders and firewalls.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Summarize encryption algorithms to achieve data confidentiality. (Understand-L2)
CO 2	Apply Secure hash functions for attaining data integrity. (Apply-L3)
CO 3	Illustrate the email security mechanisms to achieve authentication. (Understand- L2)
CO 4	Demonstrate the techniques of web security. (Understand-L2)
CO 5	Examine the threats and remedial measures for system security. (Apply-L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-		2	
CO2	3	2	-	-	-	-	-	-	-	-	-	-		2	
CO3	3	2	-	-	-	-	-	-	-	-	-	-		2	
CO4	2	3	-	-	-	-	-	-	-	-	-	-		2	
CO5	2	2	-	-	-	-	-	-	-	-	-	-		2	

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
　　1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS:
　T1　William Stallings, Network Security Essentials (Applications and Standards), Pearson Education.

REFERENCE BOOKS:

R1	Stallings, Cryptography and Network Security, PHI/Pearson, Third edition
R2	Whitman, Principles of Information Security, Thomson
R3	Robert Bragg, Mark Rhodes, Network Security: The complete reference, TMH
R4	Buchmann, Springer Introduction to Cryptography

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction: Security Services	1	26.12.2022		TLM1	
2.	Security Mechanisms	1	27.12.2022		TLM1	
3.	A Model for internetwork security	1	29.12.2022		TLM1	
4.	Internet standards and RFCs	1	30.12.2022		TLM1	
5.	Conventional encryption principals	1	02.01.2023		TLM1	
6.	Conventional encryption algorithm(DES, triple DES)	2	03.01.2023 05.01.2023		TLM1	
7.	Cipher block modes of operation (CBC,CFB)	2	06.01.2023 09.01.2023		TLM1	
8.	Location of encryption devices	1	10.01.2023		TLM1	
9.	Key distribution	1	12.01.2023		TLM1	
10.	Approaches to message authentication	1	13.01.2023		TLM1	
11.	Secure hash function and HMAC	1	17.01.2023		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: PUBLIC -KEY CRYPTOGRAPHY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Public Key Cryptography principles	1	19.01.2023		TLM1	
2.	Public key cryptography algorithms	1	20.01.2023		TLM1	
3.	Digital Signature	2	23.01.2023 24.01.2023		TLM1	
4.	Digital certificates	2	27.01.2023 30.01.2023		TLM1	
5.	Certificate authority and key management	2	31.01.2023 02.02.2023		TLM1	
6.	Kerberos	2	03.02.2023 06.02.2023		TLM1	
7.	X.509	1	07.02.2023		TLM1	
8.	Directory authentication service	1	09.02.2023		TLM1	
No. of classes required to complete UNIT-II: 12				No. of classes taken:		
Mid-I: 20.2.2023 to 25.02.2023						

UNIT-III: EMAIL PRIVACY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Pretty good privacy(PGP)	1	10.02.2023		TLM1	
2.	S/MIME	1	13.02.2023		TLM1	
3.	IP Security overview	1	14.02.2023		TLM1	
4.	IP Security architecture	2	16.02.2023 17.02.2023		TLM1	
5.	Authentication header	1	27.02.2023		TLM1	
6.	Encapsulating security payload	1	28.02.2023		TLM1	
7.	Combining Security associations	1	02.03.3023		TLM1	
No. of classes required to complete UNIT-III: 08				No. of classes taken:		

UNIT-IV : WEB SECURITY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Web Security Requirements	2	03.03.3023 06.03.3023		TLM1	
2.	Secure Socket layer(SSL)	2	07.03.3023 09.03.3023		TLM1	
3.	Transport layer security(TLS)	2	10.03.3023 13.03.3023		TLM1	
4.	Secure Electronic Transaction(SET)	3	14.03.3023 16.03.3023 17.03.3023		TLM1	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : INTRUDERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Intruders	2	20.03.3023 21.03.3023		TLM1	
2.	Viruses	1	23.03.3023		TLM1	
3.	Related threats	1	24.03.3023		TLM1	
4.	Firewall	1	27.03.3023		TLM1	
5.	Design Principles	1	28.03.3023		TLM1	
6.	Trusted Systems	1	31.03.3023		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		
Mid-II: 24.04.2023 to 29.04.2023						

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I , Unit-II , Unit-III)	A1=5
Assignment-II (Unit-III , Unit-IV , Unit-V)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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PO 12	**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 of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Course Instructor	Course Coordinator	Module Coordinator	HOD
A.Sarvani	Dr.B.Manaswini	G.Rajendra	Dr.B.Srinivasa Rao

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT
PART-A

Name of Course Instructor : Dr. K.VenuGopal

Course Name & Code   : Server-Side Scripting Lab , 20CS63

L-T-P Structure   : 0-0-3   Credits: 1.5
Program/Sem/Sec   : B.Tech-IT / VI SEM / A/B
Academic Year   : 2022-23

PREREQUISITE   : JAVA Programming, Web Technology

Course Educational Objective:

Students will learn the importance of client-server architecture in the web application development and able to develop dynamic data driven (server-side) web applications by using advanced technologies (AJAX, PHP)

Course Outcomes (CO): At the end of this course, the student will be able to:

CO1 : Understand the differences between server-side and client-side script, develop simple server-server-side web applications. **(Understand - L2)**

CO2 : Identify the importance of AJAX, PHP programming constructs to design server-side web applications. **(Remember - Ll)**

C03 : Develop Dynamic Data Driven (Server-side) Web Applications by using AJAX, PHP. **(Apply- L3)**

CO4 : Improve individual / teamwork skills, communication & report writing skills with ethical values.

COURSE ARTICULATION MATRIX (Correlation of Cos & POs, PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	-	-	2	-	3	-	-	-	-	-	-	1	-	1	3
C02	-	-	2	-	3	-	-	-	-	-	-	1	-	3	-
C03	-	-	2	-	3	-	-	-	-	-	-	1	-	3	-
C04	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

*Note: Enter Correlation Levels 1 or 2 or 3.
If there is no correlation, put '-' 1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

PART-B
COURSE DELIVERY PLAN (LESSON PLAN): Section-A&B

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	MOD--1a Intro to Web Servers & Server Side Scripting	3	28-12-2022			TLM4	CO1	
2	MOD--1b:Front End Form Valid Java Script	3	11-01-2023			TLM4	CO1	
3	MOD--2 :Ajax XMLHTTP Request	3	25-01-2023			TLM4	CO1	
4	MOD--3: Ajax -Server Communication	3	08-02-2023			TLM4	CO1	
5	MOD--4 : PHP Form handling ,require and include methods	3	15-02-2023			TLM4	CO1	
6	MOD--5 : PHP Session Management	3	1-03-2023			TLM4	CO1	
7	MOD--6: PHP File Handling	3	15-03-2023			TLM4	CO2	
8	MOD--7 : PHP mail, PHP-Ajax	3	22-03-2023			TLM4	CO2	
9	MOD--8: PHP MYSQL- CRUD-I	3	29-03-2023			TLM4	CO3	
10	MOD--9: PHP MYSQL- CRUD -II	3	05-04-2023			TLM4	CO3	
11	MOD--10: PHP Image handling- PHP -JSON	3	12-04-2023			TLM4	CO3	
11	**Programs Beyond Syllabus, Revision, Pending Etc**	3	19-04-2023			TLM4	CO3	
12	**Lab Internal Examination**	3	03-05-2023					

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Day-to-Day Work	A1 = 5
Record & Observation	B1 = 5
Internal Exam	C1 = 5
Cumulative Internal Examination (CIE): (A1+B1+C1)	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

	Course Instructor	Course Coordinator	MOD-Coordinator	Head of the Department
Signature				
Name of the Faculty	Dr. K.VenuGopal	Dr. K Venu Gopal	Dr.S.Naganjaneyulu	Dr. B.Srinivasa Rao