



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.

<http://cse.lbrce.ac.in>, cse.lbrce@gmail.com, Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART A

Name of Course Instructor	: M. Sri Bala	
Course Name & Code	: Artificial Intelligence- 17CI23	
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech., CSE., VII-Sem., Sections- A	A.Y : 2020-21

PRE-REQUISITE : : Knowledge of Algorithms

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course is used to provide the description of agents and various types of agents and how they used to solve various AI problems. This gives a clear view of analyzing AI problems, types of problems techniques of solving problems. It gives a clear view of knowledge, representation of knowledge, types of logic and its algorithms. It provides a better understanding of uncertainty and certainty, its factors various theories of uncertainty and appropriate examples. It provides a clear view of state space in search, game playing procedures, expert systems and advanced concepts like swarm intelligent systems.

COURSE OUTCOMES (COs): After the completion of this course, the student will be able to:
CO1: Understand about AI techniques and different ways to implement them and deals about the techniques and set of rules to find solutions in problem solving.

CO2: Implement and understand about various searching strategies, presenting various searching algorithms in searching techniques and also deals about problem solving techniques in search trees.

CO3: Understand about knowledge, represent different issues in knowledge, and present various ways to represent it, implement predicate and propositional knowledge and present logic resolution and unification techniques.

CO4: Present different types of knowledge and reasoning techniques, understand about logic programming and PROLOG, and implement indexing and matching techniques.

CO5: Present uncertainty in knowledge and various techniques to solve it. Present efficient techniques to remove uncertainty in knowledge domain.



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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	3	3	2	-	-	-	-	-	-	-	-	1	2	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	1	1	-	-
CO3	1	3	2	1	-	-	-	-	-	-	-	1	1	-	-
CO4	2	3	2	1	-	-	-	-	-	-	-	1	1	-	-
CO5	2	3	2	-	-	-	-	-	-	-	-	1	1	-	-

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. Iain Rich, Kevin Knight and Shivashankar B.Nair, —Artificial Intelligence, TMH, Third edition, 2009. (UNITs I, II, III & V).

2. Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, Second edition, 2003. (UNIT IV).

3. N. P. Padhy, —Artificial Intelligence and Intelligent System, Oxford University Press, Second edition, 2005. (UNIT V).

REFERENCES: 1. Rajendra Akerkar, —Introduction to Artificial Intelligence, PHI, 2005. 2. Patrick Henry Winston, —Artificial Intelligence, Pearson Education Inc., Third edition, 2001.

4. Eugene Charniak and Drew Mc Dermott, —Introduction to Artificial Intelligence", Addison Wesley, ISE Reprint, 1998.

5. Nils J.Nilsson, —Artificial Intelligence - A New Synthesis", Harcourt Asia Pvt.Ltd.,Morgan Kaufmann, 1988.

6. www.nptel.ac.in

7. <https://www.britannica.com/technology/artificial-intelligence>

8. [https://www.tutorialspoint.com / Artificial Intelligence / AI – Overview](https://www.tutorialspoint.com/Artificial-Intelligence/AI-Overview)

PART – B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: Introduction of Artificial Intelligence

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 of AI	1	28-11-2021		TLM1	
2.	History of AI	1	29-11-2021		TLM1	



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3.	Intelligent agents	1	01-10-2021		TLM1
4.	Structure of agents and its functions	1	05-10-2021		TLM1/ TLM2
5.	Problem spaces and search	1	06-10-2021		TLM1/ TLM2
6.	Heuristic Search Techniques	1	07-10-2021		TLM1/ TLM2
7.	Best-first search	1	09-10-2021		TLM1/ TLM2
8.	Problem reduction	1	12-10-2021		TLM1/ TLM2
9.	Constraint satisfaction	1	13-10-2021		TLM3
10.	AO* Algorithm	1	14-10-2021		
11.	Tutorial	1	16-10-2021		
No. of classes required to complete UNIT-I: 11			No. of classes taken:		

UNIT-II : Knowledge Representation

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.	Introduction to Knowledge Representation	1	19-10-2021		TLM1	
13.	Approaches and issues in knowledge representation	1	20-10-2021		TLM1	
14.	Knowledge - Based Agent	1	21-10-2021		TLM1/ TLM2	
15.	Propositional Logic	1	23-10-2021		TLM1	
16.	Predicate logic	1	26-10-2021		TLM1/ TLM2	
17.	Unification	1	27-10-2021		TLM1/ TLM2	
18.	Resolution	1	28-10-2021		TLM1/ TLM2	
19.	Weak slot – filler structure	1	30-10-2021		TLM1/ TLM2	
20.	TUTORIAL-2	1	02-11-2021			



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No. of classes required to complete UNIT-II: 10	No. of classes taken:
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I MID EXAMINATIONS FROM 08-11-2021 TO 15-11-2021.

UNIT-III : Reasoning under uncertainty

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction of Reasoning under Uncertainty	1	03-11-2021		TLM1	
22.	Logics of non-monotonic reasoning	1	04-11-2021		TLM1/ TLM2	
23.	Implementation- Basic probability notation	1	06-11-2021		TLM1/ TLM2	
24.	Bayes rule	1	09-11-2021		TLM1/ TLM2	
25.	Certainty factors and rule based systems	1	10-11-2021		TLM1/ TLM2	
26.		1	11-11-2021		TLM3	
27.	Bayesian networks	1	13-11-2021			
28.	Dempster Shafer Theory	1	16-11-2021			
29.	Fuzzy Logic	1	17-11-2021			
30.	TUTORIAL-3	1	18-11-2021			
No. of classes required to complete UNIT-III: 7			No. of classes taken:			

UNIT-IV : Planning and Learning

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.	Planning with state space search	1	20-11-2021		TLM1	
32.	conditional planning- Multi-Agent planning	1	23-11-2021		TLM1/ TLM2	
33.	Forms of learning inductive learning	1	24-11-2021		TLM1/ TLM2	



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	Reinforcement Learning					
34.	learning decision trees	1	25-11-2021		TLM1/ TLM2	
35.	Neural Net learning and Genetic learning	1	27-11-2021		TLM1/ TLM2	
No. of classes required to complete UNIT-IV: 9				No. of classes taken:		

UNIT-V : Advanced Topics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
36.	Game Playing: Minimax search procedure Adding alpha-beta cutoffs.	1	30-11-2021		TLM1	
37.	Expert System: Representation Expert System shells - Knowledge Acquisition	1	01-12-2021		TLM1/ TLM2	
38.	Robotics: Hardware Robotic Perception – Planning - Application domains.	1	02-12-2021		TLM1/ TLM2	
39.	Swarm Intelligent Systems – Ant Colony System	1	04-12-2021		TLM1/ TLM2	
No. of classes required to complete UNIT-V: 7				No. of classes taken:		
II MID EXAMINATIONS FROM 04-12-2021 TO 10-07-2021						

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
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Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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 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



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	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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to analyze, design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes/ methodologies/ practices employed in design, validation, testing and maintenance of software products.

Course Instructor

(M. Sri Bala)

Course Coordinator

(M. Sri Bala)

Module Coordinator

(Dr.Ch.V.Narayana)

HOD

(Dr. D. Veeraiah)



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COURSE HANDOUT

PART-A

Name of Course Instructor : G.V.Suresh
Course Name & Code : BIG DATA ANALYTICS (17CI18)
L-T-P Structure : 2-2-0 Credits: 3
Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – A A.Y : 2021- 2022

PRE-REQUISITE: Knowledge of JAVA Programming Language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course aims to provide students with the knowledge of current challenges, methodologies and technologies in processing big data. Emphasis will be placed on the students understanding of the rationales behind the technologies and the student’s ability to analyze big data using professional software packages like Hadoop and R.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Identify Big Data and its Business Implications.
CO2	Access and Process Data on Distributed File System.
CO3	Manage Job Execution in Hadoop Environment.
CO4	Develop Big Data Solutions using Hadoop Eco System.
CO5	Apply Machine Learning Techniques using R.

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	3	1	-	1	-	-	-	-	-	-	-	-	3	-
CO2	2	3	1	-	2	-	-	-	-	-	-	-	1	3	-
CO3	2	2	3	-	2	-	-	-	-	-	-	-	2	3	-
CO4	2	3	3	-	2	-	-	-	-	-	-	-	2	3	-
CO5	3	3	3	-	2	-	-	-	-	-	-	-	2	3	-

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** Data Science and Big Data Analytics – Discovering, Analyzing, Visualizing and presenting data – EMC Education Services, EMC2, Wiley Publications, 2015.



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T2 Tom White —Hadoop: The Definitive Guide| Third Edit on, O'reily Media, 2012.

T3 Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015

REFERENCE BOOKS:

R1 Michael Berthold, David J. Hand, "Intelligent Data Analysis|, Springer, 2007.

R2 Jay Liebowitz, —Big Data and Business Analytics| Auerbach Publications, CRC press (2013).

R3 Anand Rajaraman and Jeffrey David Ulman, —Mining of Massive Datasets|, Cambridge University Press, 2012.

R4 Arvind Sathi, —Big Data Analytics: Disruptive Technologies for Changing the Gamel, MC Press, 2012, 2001.

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
40.	Evolution of Big data, Best Practices for Big data Analytics	1	28-09-2021		TLM2	
41.	Big data characteristics, The Promotion of the Value of Big Data	1	01-10-2021		TLM2	
42.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	02-10-2021		TLM2	
43.	stages of analytical evolution, State of the Practice in Analytics, The Data Scientist	1	04-10-2021		TLM2	
44.	Big Data Analytics in Industry Verticals	1	05-10-2021		TLM2	
45.	Data Analytics Lifecycle	1	08-10-2021		TLM2	
46.	Data Analytics Lifecycle	1	09-10-2021		TLM2	
47.	Basic Data Analytic Methods Using R	3	19-10-2021		TLM2	
48.	Big Data Use Cases- Characteristics of Big Data Applications	2	22-10-2021		TLM2	
49.	Assignment - 1	1	23-10-2021		TLM6	
No. of classes required to complete UNIT-I		13		No. of classes taken:		

UNIT-II: Technologies and 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
50.	Analytics for Unstructured Data - MapReduce and Hadoop	1	08-09-2020		TLM2/ TLM4/ TLM5	



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51.	The design of HDFS, HDFS concepts	1	25-10-2021		TLM2/ TLM4/ TLM5	
52.	Command line interface to HDFS	1	26-10-2021		TLM2/ TLM4/ TLM5	
53.	Hadoop File system Interfaces, Java Interface to Hadoop	1	29-10-2021		TLM2/ TLM4/ TLM5	
54.	Anatomy of a file read, Anatomy of a file write, Replica placement and Coherency Model	1	30-10-2021		TLM2/ TLM4/ TLM5	
55.	Parallel copying with distcp, keeping an HDFS cluster balanced	1	30-10-2021		TLM2/ TLM4/ TLM5	
56.	Advantages of Hadoop and HDFS	1	01-11-2021		TLM2/ TLM4/ TLM5	
57.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	02-11-2021		TLM2/ TLM4/ TLM5	
58.	Assignment - 2	1	05-11-2021		TLM6	
No. of classes required to complete UNIT-II		9		No. of classes taken:		

UNIT-III: Anatomy of a Map Reduce Job Run

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
59.	Anatomy of a Map Reduce Job Run	1	06-11-2021		TLM2/ TLM4/ TLM5	
60.	Failures, Job Scheduling	1	15-11-2021		TLM2/ TLM4/ TLM5	
61.	Shuffle and Sort	1	16-11-2021		TLM2/ TLM4/ TLM5	
62.	Task Execution	1	19-11-2021		TLM2/ TLM4/ TLM5	
63.	Map Reduce Types and Formats	1	20-11-2021		TLM2/ TLM4/ TLM5	
64.	Map Reduce Features	1	22-11-2021		TLM2/ TLM4/ TLM5	
65.	Map Reduce Features	1	23-11-2021		TLM2/ TLM4/ TLM5	
66.	Assignment - 3	1	26-11-2021		TLM6	



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No. of classes required to complete UNIT-III	08	No. of classes taken:
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UNIT-IV: HADOOP ECO-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
67.	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	27-11-2021		TLM2/ TLM4/ TLM5	
68.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	03-12-2021		TLM2/ TLM4/ TLM5	
69.	Pig: Introduction to PIG, Execution Modes of Pig	1	04-12-2021		TLM2/ TLM4/ TLM5	
70.	Comparison of Pig with Databases, Grunt, Pig Latin,	1	06-12-2021		TLM2/ TLM4/ TLM5	
71.	User Defined Functions, Data Processing operators	1	07-12-2021		TLM2/ TLM4/ TLM5	
72.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	03-12-2021		TLM2/ TLM4/ TLM5	
73.	Querying Data and User Defined Functions	1	04-12-2021		TLM2/ TLM4/ TLM5	
74.	Hbase: HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	06-12-2021		TLM2/ TLM4/ TLM5	
75.	Big SQL: Introduction	1	07-12-2021		TLM2/ TLM4/ TLM5	
76.	Assignment - 4	1	10-12-2021		TLM6	
No. of classes required to complete UNIT-IV		07		No. of classes taken:		

UNIT-V: DATA ANALYTICS WITH R

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
77.	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	1	11-12-2021		TLM2	
78.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	13-12-2021		TLM2	



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79.	Data Visualization Techniques	1	14-12-2021		TLM2	
80.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	17-12-2021		TLM2	
81.	Collaborative Filtering, Big Data Analytics with BigR	1	18-12-2021		TLM2	
82.	Data models for managing big data, Real-time streaming data analytics	1	20-12-2021		TLM2	
83.	Scalable analytics on large data sets	1	21-12-2021		TLM2	
84.	Systems architecture for big data management	1	24-12-2021		TLM2	
85.	Main memory data management techniques	1	25-12-2021		TLM2	
86.	Assignment - 5	1	27-12-2021		TLM6	
87.	Review	1	28-12-2021 31-12-2021		TLM2	
No. of classes required to complete UNIT-V		10		No. of classes taken:		

Contents 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
88.						

Teaching Learning Methods

TLM1	Chalk and Talk	TLM4	Problem Solving	TLM7	Seminars or GD
TLM2	PPT	TLM5	Programming	TLM8	Lab Demo
TLM3	Tutorial	TLM6	Assignment or Quiz	TLM9	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17-08-2020	03-10-2020	6W
I Mid Examinations	28-09-2020	03-10-2020	1W
II Phase of Instructions	05-10-2020	21-11-2020	6W
II Mid Examinations	16-11-2020	21-11-2020	1W
Preparation and Practicals	23-11-2020	28-11-2020	1W



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Semester End Examinations	30-11-2020	14-12-2020	2W
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PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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



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	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	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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Course Instructor	Course Coordinator	Module Coordinator	HOD
G.V.SURESH	G.V.SURESH	DR. D.VEERAI AH	DR. D.VEERAI AH



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COURSE HANDOUT
PART-A

Name of Course Instructor : G V Suresh
Course Name & Code : BIG DATA WITH HADOOP LAB (17CI68)
L-T-P Structure : 0-0-2 Credits: 1
Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – A A.Y: 2021 - 2022

PRE-REQUISITE: JAVA PROGRAMMING & R

COURSE OBJECTIVE: This course provides practical, foundation level training that enables immediate and effective participation in Big Data and other Analytics projects using Hadoop and R.

COURSE OUTCOMES (COs)

At the end of the course, the student will be able to:

CO1	Preparing for data summarization, query, and analysis.
CO2	Applying data modelling techniques to large data sets
CO3	Creating applications for Big Data analytics

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	3	3	2	3	-	-	-	-	-	-	-	2	3	-
CO2	3	2	2	2	3	-	-	-	-	-	-	-	2	2	-
CO3	3	3	3	2	3	1	-	-	-	-	-	-	2	3	-

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):

S.No.	Programs to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
89.	Installation of R, along with Practice examples in R.	2	29-09-2021		TLM2/ TLM4	
90.	Installation of R, along with Practice examples in R.	2	06-10-2021		TLM2/ TLM4	
91.	Installation of R, along with	2	27-10-2021		TLM2/	



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	Practice examples in R.				TLM4
92.	Downloading and installing Hadoop; Understanding different Hadoop modes. Startup scripts, Configuration files.	2	03-11-2021		TLM2/ TLM4
93.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2	17-11-2021		TLM2/ TLM4
94.	Implementation of Matrix Multiplication with Hadoop Map Reduce	2	24-11-2021		TLM2/ TLM4
95.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2	01-12-2021		TLM2/ TLM4
96.	Implementation of K-means clustering using map reduce	2	07-12-2021		TLM2/ TLM4
97.	Installation of Hive along with practice examples	2	14-12-2021		TLM2/ TLM4
98.	Installation of Hive along with practice examples	2	21-12-2021		TLM2/ TLM4
99.	Installation of HBase, Installing thrift along with Practice examples	2	28-12-2021		TLM2/ TLM4

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

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



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	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.
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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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Course Instructor	Course Coordinator	Module Coordinator	HOD
G V Suresh	Dr. Y.V.Bhaskar Reddy	DR. D.Veeraiah	DR. D.Veeraiah



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COURSE HANDOUT

PART-A

Name of Course Instructor: B SIVARAMAKRISHNA

Course Name & Code : INTERNET OF THINGS LAB & 17CI69

L-T-P Structure : 0-0-2 Credits: 1

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-A A.Y. : 2021-22

PRE-REQUISITE: Python Programming, Computer Networks.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to give a comprehensive view of the "Internet of Things" (Applications/ Potentials/ Challenges). To analyze enabling technologies to make it happen (Embedded Devices and communication protocols) and to conduct Hands on activities (Guidelines on how to operate "things" in the "Internet of Things").

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

CO1	Understand the programming environment of IOT.
CO2	Develop IOT applications using sensors.
CO3	Develop IOT applications using web/mobile services.
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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	1	-	1	3	-	-	-	-	-	-	1	3	-	-
CO2	2	2	3	1	3	-	2	-	-	-	-	1	3	-	-
CO3	2	2	3	1	3	-	2	-	-	-	-	1	3	-	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
	1 - Low			2 -Medium				3 - High							



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REFERENCES:

- R1 wwwusers.di.uniroma1.it/~spenza/files/labIoT2015/Lab-IoT-1.pdf
- R2 www.mobileeducationkit.net/labmanuals/LAB-Manual-mbed.docx



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PA
RT
-B

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Introduction to Raspberry Pi & Cycle-1	2	5/10/21		DM5
2.	Installation of NOOBs in Raspberry Pi	2	26/10/21		DM5
3.	Cycle-2	2	2/11/21		DM5
4.	Cycle-3	2	16/11/21		DM5
5.	Cycle-4	2	23/11/21		DM5
6.	Cycle-5	2	30/11/21		DM5
7.	Cycle-6	2	7/12/21		DM5
8.	Cycle-7	2	14/12/21		DM5
9.	Cycle-8	2	21/12/21		DM5
10.	Internal Lab Exam	2	28/12/21		DM4

Delivery Methods			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning



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PA
RT
-C

GRAMME 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.
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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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: 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 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):



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PSO 1	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. B. Siva Rama Krishna	Mr. B. Siva Rama Krishna	Dr. D. V. Subbaiah	Dr. D. Veeraiah
Signature				



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COURSE HANDOUT

PART-A

Name of Course Instructor: B SIVARAMAKRISHNA

Course Name & Code : INTERNET OF THINGS & 17CI19

L-T-P Structure : 2-2-0

Credits: 3

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-A

A.Y.: 2021-22

PREREQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to explore the interconnection and integration of the physical world and the cyber space. Understand the design concepts in setting up IOT Devices. Study about the setup, configuration, and installation of equipment for IOT.

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

CO1	Understand Device-processor communication models & protocols.
CO2	Understand the application areas of IOT.
CO3	Visualize the effect of internet on Mobile Devices, Cloud & Sensor Networks.
CO4	Acquire programming experience with Raspberry Pi kit to interface various devices.
CO5	Implement Programming models for IoT Cloud Environment.

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	1	-	-	-	-	-	-	-	-	1	-	-	-
CO2	3	1	1	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	1	-	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
	1 - Low			2 -Medium						3 - High					

TEXTBOOKS:

T1 ArshdeepBahga and Vijay Madiseti, –**Internet** of Things - A Hands-on Approach, Universities Press, 2015, ISBN: 9788173719547.

T2 James C Sheusi, –**Android** Application Development for Java Programmers, Cengage Learning, 2013.

REFERENCE BOOKS:



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- R1 Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press).
- R2 Adrian McEwen, **–Designing the Internet of Things**||, Wiley Publishers, 2013, ISBN: 978-1-118-43062-0.
- R3 Daniel Kellmerein, **–The Silent Intelligence: The Internet of Things**||, 2013, ISBN: 0989973700.
- R4 https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
- R5 <https://nptel.ac.in/courses/106/105/106105166/>

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION TO INTERNET OF THINGS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
100	Introduction to IoT	1	28/09/2021		TLM1	
101	Definition and Characteristics of IoT	1	29/09/2021		TLM1	
102	Physical Design of IoT Part-1	1	30/09/2021		TLM2	
103	Physical Design of IoT Part-2	1	05/10/2021		TLM2	
104	Logical Design of IoT Part-1	1	06/10/2021		TLM1	
105	Logical Design of IoT Part-2	1	07/10/2021		TLM2	
106	IoT Enabled Technologies	1	09/10/2021		TLM2	
107	IoT Levels	1	19/10/2021		TLM1	
108	IoT Deployment Templates	1	20/10/2021		TLM2	
No. of classes required to complete UNIT-I: 09				No. of classes taken:		

UNIT-II: DOMAIN SPECIFIC IOTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
109	Introduction to Domain Specific IoTS	1	21/10/2021		TLM1	
110	Home Automation	1	26/10/2021		TLM2	
111	Smart Cities	1	28/10/2021		TLM2	
112	Environment	1	30/10/2021		TLM1	
113	Energy	1	02/11/2021		TLM2	
114	Retail & Logistics	1	03/11/2021		TLM2	
115	Agriculture	1	06/11/2021		TLM1	
116	Industry	1	06/11/2021		TLM1	



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			1		
117	Health & Lifestyle	1	06/11/2021		TLM2
No. of classes required to complete UNIT-II: 07				No. of classes taken:	

UNIT-III: IOT AND M2M, IOT SYSTEM MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
118	Introduction to M2M	1	16/11/2021		TLM2	
119	Difference between IoT and M2M	1	17/11/2021		TLM1	
120	Traditional Networking and SDN	1	18/11/2021		TLM2	
121	NFV for IoT	1	20/11/2021		TLM1	
122	Need for IoT Systems Management	1	23/11/2021		TLM2	
123	Simple Network management Protocol (SNMP)	1	24/11/2021		TLM2	
124	NETCONF, YANG	1	25/11/2021		TLM4	
125	YANG-NETCONF	1	27/11/2021		TLM4	
126	NETOPEER	1	30/11/2021		TLM4	
No. of classes required to complete UNIT-III: 09				No. of classes taken:		

UNIT-IV: IOT PHYSICAL DEVICES & ENDPOINTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
127	What is an IoT Device?	1	01/12/2021		TLM2	
128	Raspberry Pi and its Configuration	1	02/12/2021		TLM4	
129	Linux on Raspberry Pi	1	04/12/2021		TLM4	
130	Raspberry Pi Interfaces	1	07/12/2021		TLM1	
131	Programming Pi with Python Part-1	1	08/12/2021		TLM4	
132	Programming Pi with Python Part-2	1	09/12/2021		TLM4	
133	Other IoT Devices	1	11/12/2021		TLM2	
No. of classes required to complete UNIT-IV: 07				No. of classes taken:		

UNIT-V: IOT PHYSICAL SERVERS AND CLOUD OFFERINGS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
134.	Introduction to Cloud Storage	1	14/12/2021		TLM1	
135.	Cloud Storage Models &	1	15/12/2021		TLM2	



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	Communication APIs		1		
136.	WAMP - AutoBahn for IoT	1	16/12/202 1		TLM2
137.	Commands for Installing AutoBahn	1	18/12/202 1		TLM2
138.	Xively Cloud for IoT	1	21/12/202 1		TLM1
139.	Python Web Application Framework - Django	1	22/12/202 1		TLM4
140.	Example Programs on Django	1	23/12/202 1		TLM4
141.	Designing a RESTful Web API	1	23/12/202 1		TLM2
No. of classes required to complete UNIT-V: 08				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 (Unit-I)	A1=5
Assignment-II (Unit-II)	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 = 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)	Q=10
Cumulative Internal Examination (CIE): A+B+M+Q	40
Semester End Examination (SEE)	60



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Total Marks = CIE + SEE

100



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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 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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: 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 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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.



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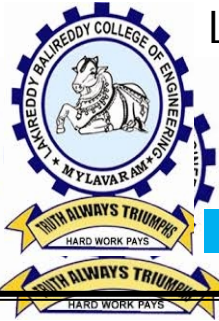
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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. B. Siva Rama Krishna	Mr. B. Siva Rama Krishna	Dr. D. V. Subbaiah	Dr. D. Veeraiah
Signature				



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COURSE HANDOUT

PART-A

Name of Course Instructor : B.USHA RANI
 Course Name & Code : Information Retrieval Systems &17CS92
 L-T-P Structure : 3-0-0 Credits : 3
 Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sec-A A.Y : 2021-22

PRE-REQUISITE: Fundamentals of database concepts, data structures & data warehouse.

COURSE EDUCATIONAL OBJECTIVES (CEOs):The main objective of this course is to present the basic concepts in information retrieval and the significance of various indexing and searching techniques for informatin retrieval.

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

CO 1	Identify the basic concepts of Information retrieval system.
CO 2	Evaluate the taxonomy of different information retrieval models.
CO 3	Demonstrate and evaluate automatic indexing, document & term clustering techniques.
CO 4	Demonstrate and evaluate various searching techniques.
CO5	Evaluate text processing techniques and operations in information retrieval system.

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

COs	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-

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



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TEXT BOOKS:

- T1 Kowalski, Gerald, Mark T Maybury, –**Information** Storage & Retrieval Systems: Theory and **Implementation**||, Kluwer Academic Press, 2nd edition, 2002.

REFERENCE BOOKS:

- R1 Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
- R2 <https://epdf.tips/queue/information-storage-and-retrieval-systems-theory-and-implementationthe-informat.html> Robert Korthagen, John Wiley & Sons, –**Information** Storage & **Retrieval**||.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction & Information Retrieval System Capabilities

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
142.	UNIT - I: Introduction: Definition, Objectives	1	30-09-2021		TLM2	
143.	Functional Overview Item Normalization	1	01-10-2021		TLM2	
144.	Selective dissemination AFB	1	04-10-2021		TLM2	
145.	Relationship to DBMS, Digital libraries and Data Warehouses	1	07-10-2021		TLM2	
146.	Information Retrieval System Capabilities: Search	1	08-10-2021 11-10-2021		TLM2	



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	capabilities					
147.	Information Retrieval System Capabilities: Browse, Miscellaneous Capabilities	1	18-10-2021		TLM2	
No. of classes required to complete UNIT-I:07				No. of classes taken:		

UNIT-II: Data Structures & Cataloguing and Indexing

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, Stemming Algorithms	1	21-10-2021		TLM2	
2.	Inverted file structures	1	22-10-2021		TLM2	
3.	N-gram data structure,	1	25-10-2021		TLM2	
4.	PAT data structure	1	28-10-2021		TLM2	
5.	Signature file structure, Hypertext data structure	1	29-10-2021		TLM2	
6.	Cataloguing and Indexing Objectives, Indexing Process	1	01-11-2021		TLM2	
7.	Automatic Indexing, Information Extraction.	1	05-11-2021		TLM2	
No. of classes required to complete UNIT-II:07				No. of classes taken:		



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I MID EXAMINATIONS FROM 08-11-2021 TO 13-11-2021

UNIT-III: Automatic Indexing, Document and Term Clustering

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.	Automatic Indexing: Classes of automatic indexing	1	15-11-2021		TLM2	
2.	Statistical indexing, Natural language	1	18-11-2021		TLM2	
3.	Concept indexing, Hypertext linkages.	1	19-11-2021		TLM2	
4.	Document and Term Clustering: Introduction, Thesaurus generation	1	22-11-2021		TLM2	
5.	Item clustering	1	25-11-2021		TLM2	
6.	Hierarchy of clusters	1	26-11-2021		TLM2	
No. of classes required to complete UNIT-III:06				No. of classes taken:		

UNIT-IV :User Search Techniques & Information Visualization

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.	Search statements and binding, Similarity measures and ranking	1	29-11-2021		TLM2	
2.	Relevance feedback, Selective dissemination of information	1	02-12-2021		TLM2	



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	search				
3.	weighted searches of Boolean systems	1	03-12-2021		TLM2
4.	Searching the Internet and hypertext	1	06-12-2021		TLM2
5.	Information Visualization, Introduction, Cognition and perception	1	09-12-2021		TLM2
6.	Information visualization technologies.	1	10-12-2021		TLM2
No. of classes required to complete UNIT-IV:06				No. of classes taken:	

UNIT-V: Text Search Algorithms & Information System Evaluation

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.	Text Search Algorithms Introduction, Software text search algorithms	1	13-12-2021		TLM2	
2.	Hardware text search systems.	1	16-12-2021		TLM2	
3.	Information System Evaluation: Introduction,	1	17-12-2021		TLM2	
4.	Measures used in system evaluation,	1	20-12-2021		TLM2	
5.	Measurement example – TREC results	1	23-12-2021		TLM2	



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6.	Revision	1	24-12-2021		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		
II MID EXAMINATIONS 03-01-2022 TO 08-01-2022						

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)	A1=5
Assignment-II (Unit-II)	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



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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 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	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 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



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context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms. 2. Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students. 3. Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.
PSO 2	Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course
Instructor

Course Coordinator

Module Coordinator

HOD



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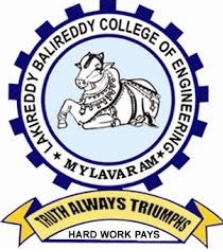
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COURSE HANDOUT

PART-A

Name of Course Instructor Mr.CH. Srinivasa Rao

Course Name & Code : INFORMATION SECURITY (17CI20)

L-T-P Structure : 2-2-0

Credits: 3

Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – A

A.Y : 2021 - 2022

PRE-REQUISITE : Knowledge of Communication Networks.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

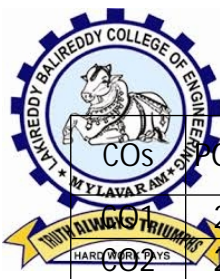
This course elevates the security aspects and provides the knowledge to understand the basic concept of Cryptography and Network Security principles. It ant light's different types of cipher mechanisms and various symmetric and asymmetric algorithms. Also provides the knowledge on digital signatures, different threats, viruses, intruders and firewalls.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Evaluate the use of encryption algorithm for achieving data confidentiality.
CO2	Apply Secure hash functions for attaining data integrity.
CO3	Analyze the security mechanisms for achieving authentication.
CO4	Analyze the protocols for achieving availability, access control to resources and protocols for non-repudiation.
CO5	Explore the threats and remedial measures for system security.

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



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CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	2	-	-	-	-	-	1	1	-	-
CO2	2	3	2	-	-	2	-	-	-	-	-	1	1	-	-
CO3	2	3	2	-	-	2	-	-	-	-	-	1	1	-	-
CO4	2	1	2	-	-	2	-	-	-	-	-	1	1	-	-
CO5	2	2	1	-	-	1	-	-	-	-	-	1	1	-	-

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

1- Low 2 –Medium 3 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
148.	Introduction to IS, Security Attacks	1	30/09/2021	30/09/2021	TLM2	
149.	Security Services, Mechanisms	1	01/10/2021	01/10/2021	TLM2	
150.	Integrity, Authentication Confidentiality & Non-Repudiation	1	04/10/2021	04/10/2021	TLM2	
151.	Substitution Techniques, Transposition Techniques	1	07/10/2021	07/10/2021	TLM2	
152.	Block Cipher, Block Cipher & Fiestal Structure	1	08/10/2021	08/10/2021	TLM2	
153.	DES Algorithm	1	09/10/2021	09/10/2021	TLM2	
154.	AES Algorithm	1	11/10/2021	11/10/2021	TLM2	
155.	Cipher Block Modes of Operations	1	18/10/2021	18/10/2021	TLM2	
156.	Traffic Analysis & Placement of encryption	1	21/10/2021	21/10/2021	TLM2	
157.	Key Distribution	1	22/10/2021	22/10/2021	TLM2	
158.	Assignment-1				TLM3	



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No. of classes required to complete UNIT-I	10		No. of classes taken:
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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
159.	Approaches of Message Authentication, Hash & MAC functions	1	23/10/2021	23/10/2021	TLM1	
160.	HMAC Algorithm	1	25/10/2021	25/10/2021	TLM1	
161.	Public-Key Encryption Algorithm- RSA	1	28/10/2021	28/10/2021	TLM1	
162.	Diffie –Hellman Key Exchange Algorithm	1	29/10/2021	29/10/2021	TLM1	
163.	SHA-512	1	30/10/2021	30/10/2021	TLM1	
164.	Digital Signatures	1	01/11/2021	01/11/2021	TLM1	
165.	Public Key Infrastructure, Digital Certificates	1	05/11/2021	05/11/2021	TLM1	
166.	Certificate Authority, Key Management	1	06/11/2021	06/11/2021	TLM1	
167.	Kerberos, X.509 Directory Authentication Service	1	15/11/2021	15/11/2021	TLM1	
168.	Assignment-2				TLM3	
sNo. of classes required to complete UNIT-II		09			No. of classes taken:	

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
169.	Email privacy, Pretty Good Privacy (PGP)	1	18/11/2021	18/11/2021	TLM1	
170.	PGP Key Management	1	19/11/2021	19/11/2021	TLM1	
171.	MIME and S/ MIME	1	20/11/2021	20/11/2021	TLM1	
172.	IP Security Overview, IP Security Architecture,	1	22/11/2021	22/11/2021	TLM1	
173.	Authentication Header Encapsulating Security Payload,	1	25/11/2021	25/11/2021	TLM1	



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174.	Tunnel and Transport Modes	1	26/11/2021	26/11/2021	TLM1	
175.	Combining Security Associations, Key Exchange	1	27/11/2021	27/11/2021	TLM1	
176.	Cryptographic Suites	1	29/11/2021	29/11/2021	TLM1	
177.	Unit Overview and Discussion	1	02/12/2021	02/12/2021	TLM1	
178.	Assignment - 3				TLM3	
No. of classes required to complete UNIT-III		09			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
179.	Web Security Requirements	1	03/12/2021	03/12/2021	TLM1	
180.	Secure Socket Layer (SSL) Architecture, Protocols	1	04/12/2021	04/12/2021	TLM1	
181.	SSL Handshake Protocol	1	06/12/2021	06/12/2021	TLM1	
182.	Transport Layer Security	1	09/12/2021	09/12/2021	TLM1	
183.	Transport Layer Security Approaches	1	10/12/2021	10/12/2021	TLM1	
184.	Secure Electronic Transaction (SET)	1	13/12/2021	13/12/2021	TLM1	
185.	Payment Processing	1	16/12/2021	16/12/2021	TLM1	
186.	HTTPs. HTTP vs HTTPs	1	17/12/2021	17/12/2021	TLM1	
187.	Unit Overview and Discussion	1	18/12/2021	18/12/2021	TLM1	
188.	Assignment - 4				TLM3	
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
189.	Intruders	1	20/12/2021	20/12/2021	TLM1	



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190.	Viruses and Related Threats	1	23/12/2021	23/12/2021	TLM1	
191.	Firewall Design principles	1	24/12/2021	24/12/2021	TLM1	
192.	Trusted System	1	27/12/2021	27/12/2021	TLM1	
193.	Introduction to Database Security and authorization	1	30/12/2021	30/12/2021	TLM1	
194.	Database authorization	1	31/12/2021	31/12/2021	TLM1	
195.	Unit Overview and Discussion	1	01/01/2022	01/01/2022	TLM1	
196.	Assignment-5				TLM3	
No. of classes required to complete UNIT-V		07			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/Assignment	TLM6	Group Discussion/Project

PART C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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



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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

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 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, demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO 9	Individual and teamwork: 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, 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



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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Programming Paradigms: The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	Data Engineering: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	Software Engineering: To inculcate an ability to analyze, design and implement database applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr.CH. SRINIVASA RAO	Mr.CH. SRINIVASA RAO	Dr. D.V.SUBHAI AH	Dr. D. VEERAI AH



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COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. P. Bhagath

Course Name & Code : Pattern Recognition (17CI26)

L-T-P Structure : 3-0-0

Credits: 3

Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – A

A.Y : 2020 - 2021

Pre-Requisite: Basic knowledge of probability & statistics

Course Educational Objectives (CEOs):

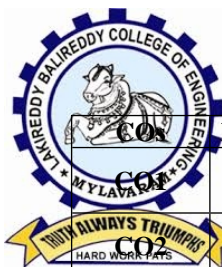
The main objective of this course is that the concept of a pattern and the fundamentals of pattern recognition and its relevance to classical and modern problems and to be able to identify where, when and how pattern recognition can be applied.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Understand the principles of pattern recognition to classify objects through probabilistic models and their estimations.
CO2	Analyze density functions to estimate the decision boundaries
CO3	Understand the parameter estimations for Bayes theorem
CO4	Apply unsupervised techniques to estimate the clusters based on similarity
CO5	Understand the concept of hidden markov models in real-time applications

Course Articulation Matrix (Correlation between COs, POs & PSOs):



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PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO3	2	2	3	1	-	-	-	-	-	-	-	-	-	3
CO4	2	3	3	1	-	-	-	-	-	-	-	-	-	3
CO5	2	2	3	1	-	-	-	-	-	-	-	-	-	3

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

1- Low

2 –Medium

3 High

TEXT BOOKS:

- T1** Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition.
- T2** Pattern Recognition, an Introduction, V Susheela Devi, M Narsimha Murthy, University Press.

REFERENCE BOOKS:

- R1** R.C Gonzalez and R.E. Woods, —Digital Image Processing, Addison Wesley, 1992.
- R2** Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004.
- R3** Fundamentals of speech Recognition, Lawrence Rabiner, Biing – Hwang Juang Pearson education.
- R4** Pattern Recognition, Sergios Theodoridis, Konstantinos Koutroumbas, Academic Press, Elsevier, 4ed.

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Pattern Recognition

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
197.	Introduction to Pattern Recognition	1	28-09-2021		TLM2	
198.	Machine perception	1	29-09-2021		TLM2	
199.	pattern recognition example, pattern recognition systems	1	30-09-2021		TLM2	
200.	Design cycle, learning and adaptation	1	04-10-2021		TLM2	
201.	Bayesian Decision Theory	1	05-10-2021		TLM2	
202.	continuous features – two categories classifications	1	06-10-2021		TLM2	
203.	minimum error-rate classification-zero-one loss function, classifiers	1	07-10-2021		TLM2	



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204.	Problems with Bayes classifier	1	08-10-2021		TLM2	
205.	Discriminant functions, and decision surface	1	09-10-2021		TLM2	
No. of classes required to complete UNIT-I		09		No. of classes taken:		

UNIT-II: Density Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
206.	Normal density	1	11-10-2021		TLM1	
207.	Univariate and multivariate density	1	20-10-2021		TLM1	
208.	discriminant functions for the normal Density different cases	2	21-10-2021, 22-10-2021		TLM1	
209.	Example problems	1	23-10-2021		TLM1	
210.	Bayes decision theory - discrete features	1	25-10-2021		TLM1	
211.	Example problems	1	26-10-2021		TLM1	
212.	Compound Bayesian decision theory and context	1	28-10-2021		TLM1	
213.	Example problems	1	29-10-2021		TLM1	
No. of classes required to complete UNIT-II		09		No. of classes taken:		

UNIT-III: Bayesian parameter estimation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
214.	Parameter Estimation under Normal density function	1	01-11-2021		TLM1	
215.	What is maximum likelihood estimation	1	02-11-2021		TLM1	
216.	Maximum likelihood estimation	1	04-11-2021		TLM1	
217.	Example problems	1	05-11-2021		TLM1	
218.	Bayes likelihood estimation	1	08-11-2021		TLM1	
219.	Bayes parameter estimation	1	09-11-2021		TLM1	
220.	Bayes parameter estimation – Gaussian distribution	1	11-11-2021		TLM1	
221.	Example problems	1	12-11-2021		TLM1	
No. of classes required to complete UNIT-III		08		No. of classes taken:		



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UNIT-IV: Unsupervised learning and clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
222.	Unsupervised Learning	1	15-11-2021		TLM1	
223.	Mixture densities and identifiability	1	16-11-2021		TLM1	
224.	Maximum likelihood estimates	1	18-11-2021		TLM1	
225.	Application to normal mixtures	1	19-11-2021		TLM1	
226.	K-means clustering	1	22-11-2021		TLM1	
227.	Data description and clustering	1	23-11-2021		TLM1	
228.	Similarity measures	1	25-11-2021		TLM1	
229.	Criteria function for clustering	1	26-11-2021		TLM1	
230.	Example Problems	1	29-11-2021		TLM1	
No. of classes required to complete UNIT-IV		09				16-10-2020

UNIT-V: Hidden Markov models

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
231.	Hidden Markov Model	1	28-11-2021		TLM1	
232.	Discrete-time Markov process	1	30-11-2021		TLM1	
233.	Extensions to hidden Markov models	1	02-12-2021		TLM1	
234.	Three basic problems of HMMs & types of HMMs	1	03-12-2021		TLM1	
235.	Three basic problems of HMMs & types of HMMs	1	06-12-2021		TLM1	
236.	Continuous observation densities multiple mixtures per state	1	07-12-2021		TLM1	
237.	Continuous observation densities multiple mixtures per state	1	09-12-2021		TLM1	
238.	speech recognition applications	1	10-12-2021		TLM1	
No. of classes required to complete UNIT-V		08			No. of classes taken:	

Teaching Learning Methods

TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)



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TLM3	Tutorial	TLM6	Group Discussion/Project
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PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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



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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.

<http://cse.lbrce.ac.in>, cse.lbrce@gmail.com, Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

	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	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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr P. Bhagath	Dr P. Bhagath	Dr Ch V Narayana	Dr. D. VEERAI AH



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Y. VIJAY BHASKAR REDDY

Course Name & Code : BIG DATA ANALYTICS (17CI18)

L-T-P Structure : 2-2-0

Credits : 3

Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – B

A.Y : 2021 - 2022

PRE-REQUISITE: Knowledge of JAVA Programming Language.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course aims to provide students with the knowledge of current challenges, methodologies and technologies in processing big data. Emphasis will be placed on the students understanding of the rationales behind the technologies and the student's ability to analyze big data using professional software packages like Hadoop and R.

COURSE OUTCOMES (COs):

At the end of the course, students can

CO1	Identify Big Data and its Business Implications.
CO2	Access and Process Data on Distributed File System.
CO3	Manage Job Execution in Hadoop Environment.
CO4	Develop Big Data Solutions using Hadoop Eco System.
CO5	Apply Machine Learning Techniques using R.

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

Note:

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

Enter

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

1- Low

2 –Medium

3 High

TEXT BOOKS:

T1 Data Science and Big Data Analytics – Discovering, Analyzing, Visualizing and presenting data – EMC Education Services, EMC2, Wiley Publications, 2015.

T2 Tom White —Hadoop: The Definitive Guide| Third Edit on, O'reily Media, 2012.

T3 Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

- R1** Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- R2** Jay Liebowitz, —Big Data and Business Analytics| Auerbach Publications, CRC press (2013).
- R3** AnandRajaraman and Jeffrey David Ulman, —Mining of Massive Datasets|, Cambridge University Press,2012.
- R4** ArvindSathi, —BigDataAnalytics: Disruptive Technologies for Changing the Game|, MC Press, 2012, 2001.

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.	Evolution of Big data, Best Practices for Big data Analytics	1	27-09-2021		TEAMS	
2.	Big data characteristics, The Promotion of the Value of Big Data	1	28-09-2021		TEAMS	
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	01-10-2021		TEAMS	
4.	stages of analytical evolution, State of the Practice in Analytics	1	04-10-2021		TEAMS	
5.	The Data Scientist	1	05-10-2021		TEAMS	
6.	Big Data Analytics in Industry Verticals	1	08-10-2021		TEAMS	
7.	Data Analytics Lifecycle	1	09-10-2021		TEAMS	
8.	Data Analytics Lifecycle	1	11-10-2021		TEAMS	
9.	Data Analytics Lifecycle	1	18-10-2021		BB	
10.	Basic Data Analytic Methods Using R	1	22-10-2021		BB	
11.	Basic Data Analytic Methods Using R	1	23-10-2021		BB	
12.	Big Data Use Cases- Characteristics of Big Data Applications	1	25-10-2021		BB	
13.	Big Data Use Cases- Characteristics of Big Data Applications	1	26-10-2021		BB	
14.	Assignment – 1	1	29-10-2021		BB	
No. of classes required to complete UNIT-I		14				

UNIT-II: TECHNOLOGIES AND 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
15.	Analytics for Unstructured Data	1	30-10-2021		BB	

16.	MapReduce and Hadoop	1	01-11-2021		BB
17.	The design of HDFS	1	02-11-2021		BB
18.	HDFS concepts	1	05-11-2021		BB
19.	Command line interface to HDFS	1	06-11-2021		BB
20.	Hadoop File system Interfaces	1	08-11-2021		BB
21.	Java Interface to Hadoop	1	09-11-2021		BB
22.	Anatomy of a file read, Anatomy of a file write	1	12-11-2021		BB
23.	Replica placement and Coherency Model	1	13-11-2021		BB
24.	Parallel copying with distcp	1	15-11-2021		BB
25.	keeping an HDFS cluster balanced	1	16-11-2021		BB
26.	Advantages of Hadoop and HDFS	1	19-11-2021		BB
27.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	20-11-2021		BB
28.	Assignment - 2	1	22-11-2021		
No. of classes required to complete UNIT-II		14			

UNIT-III: ANATOMY OF A MAP REDUCE JOB RUN

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Anatomy of a Map Reduce Job Run	1	23-11-2021		BB	
30.	Anatomy of a Map Reduce Job Run	1	26-11-2021		BB	
31.	Failures, Job Scheduling	1	27-11-2021		BB	
32.	Failures, Job Scheduling	1	29-11-2021		BB	
33.	Shuffle and Sort	1	30-11-2021		BB	
34.	Task Execution	1	03-12-2021		BB	
35.	Map Reduce Types and Formats	1	04-12-2021		BB	
36.	Map Reduce Features	1	04-12-2021		BB	
37.	Assignment - 3		04-12-2021			
No. of classes required to complete UNIT-III		08				

UNIT-IV: HADOOP ECO-SYSTEM

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
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		Required	Completion	Completion	Methods	Weekly
38.	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	06-12-2021		BB	
39.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	07-12-2021		BB	
40.	Pig: Introduction to PIG, Execution Modes of Pig Comparison of Pig with Databases, Grunt, Pig Latin.	1	10-12-2021		BB	
41.	User Defined Functions, Data Processing operators	1	11-12-2021		BB	
42.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	13-12-2021		BB	
43.	Querying Data and User Defined Functions	1	14-12-2021		BB	
44.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	17-12-2021		BB	
45.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	18-12-2021		BB	
46.	Big SQL: Introduction	1	20-12-2021		BB	
47.	Assignment - 4		20-12-2021			
No. of classes required to complete UNIT-IV		09				

UNIT-V: DATA ANALYTICS WITH R

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	1	21-12-2021			
49.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	24-12-2021			
50.	Data Visualization Techniques	1	27-12-2021			
51.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	28-12-2021			
52.	Collaborative Filtering, Big Data Analytics with BigR, Data models for managing big	1	29-12-2021			

	data, Real-time streaming data analytics					
53.	Scalable analytics on large data sets, Systems architecture for big data management	1		31-12-2021		
54.	Main memory data management techniques	1		01-01-2022		
55.	Assignment - 5			20-12-2021		
56.	Review					
No. of classes required to complete UNIT-V		07		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 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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
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	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	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 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	Programming Paradigms: The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	Data Engineering: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	Software Engineering: To inculcate an ability to analyze, design and implement database applications.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	DR. D. VEERAAH



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. Y.VIJAY BHASKAR REDDY

Course Name & Code : BIG DATA ANALYTICS LAB & 17CI68

L-T-P Structure : 0-0-2 Credits: 1

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-B A.Y. : 2020-21

PRE-REQUISITE: JAVA PROGRAMMING & R

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides practical, foundation level training that enables immediate and effective participation in Big Data and other Analytics projects using Hadoop and R.

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

CO1	Preparing for data summarization, query, and analysis.
CO2	Applying data modelling techniques to large data sets.
CO3	Creating applications for Big Data analytics
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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	3	3	2	3	-	-	-	-	-	-	-	2	3	-
CO2	3	2	2	2	3	-	-	-	-	-	-	-	2	2	-
CO3	3	3	3	2	3	1	-	-	-	-	-	-	2	3	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
	1 - Low			2 -Medium				3 - High							

PART-B

SCHEDULE:

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Downloading and installing Hadoop; Understanding different Hadoop modes. Startup scripts, Configuration files.	2	30-09-21		DM5
2.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2	07-10-21		DM5
3.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2	21-10-21		DM5
4.	Implementation of Matrix Multiplication with Hadoop Map Reduce	2	28-10-21		DM5
5.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2	18-11-21		DM5
6.	Implementation of K-means clustering using map reduce	2	25-11-21		DM5
7.	Installation of Hive along with practice examples	2	02-12-21		DM5
8.	Installation of Hive along with practice examples	2	09-12-21		DM5
9.	Installation of HBase, Installing thrift along with Practice examples	2	16-12-21		DM5
10.	Installation of R, along with Practice examples in R.	2	23-12-21		DM5
11.	Installation of R, along with Practice examples in R.	2	23-12-21		DM5
12.	Internal Lab Exam	2	30-12-21		DM4

Delivery Methods			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Head of the Faculty	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D. Veeraiah	Dr. D. Veeraiah

Signature				
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PART-C

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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: 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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate ability to Analyze, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes/methodologies /practices employed in design, validation, testing, and maintenance of software products.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D. Veeraiah
Signature				



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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B. NARASIMHA RAO
Course Name & Code : **BASIC CIVIL ENGINEERING&17CE80**
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sections- A&B- A.Y: 2021-22

PRE-REQUISITE:Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):This course deals with the importance of building planning, properties and applications of various building materials, soil classification and different types of foundations, important aspects of surveying, levelling operations and identify the terminology in roadway and railway networks, principles of water resources and environmental engineering

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

CO 1	Recognize the importance of building planning for construction
CO 2	Identify appropriate building materials for construction purposes
CO 3	Distinguish the different types of soils and foundations required for specific usage
CO 4	Evaluate the basics of surveying and levelling operations for field application and categorize the important elements of roadway and railway networks
CO 5	Discriminate the importance of quantity and quality aspects of water in the society and priorities for sanitation management.

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	1	-	-	-	2	-	2	1	3
CO2	-	-	-	2	-	2	1	-	-	-	2	-	2	1	3
CO3	-	1	1	2	-	2	1	-	-	-	2	-	2	1	3
CO4	-	1	1	2	-	2	1	-	-	-	2	-	2	1	3
CO5	-	1	1	2	2	2	1	-	-	-	2	-	2	1	3

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 1. M.S Palanichamy "Basic Civil Engineering", Tata McGraw Hill Publishing 2000.

REFERENCE BOOKS:

- R1** 1. S S Bhavikatti "Basic Civil Engineering", New age International Publications, 2010
- R2** C P Kaushik & S S Bhavikatti "Basic Civil Engineering ", New age International Publications 2010.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Building Planning**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
57.	Building Planning-Role of a Civil Engineer	1	29-09-2021		TLM2	
58.	Inter connection among specializations in Civil Engineering	1	01-10-2021		TLM2	
59.	Elements of a Building, Basic Requirements of a Building	1	06-10-2021		TLM2	
60.	Planning- Hot and dry climates	1	08-10-2021		TLM2	
61.	Hot and wet climates, Cold climatic conditions	1	09-10-2021		TLM2	
62.	Aspect and Prospect, Roominess- Grouping, Privacy, circulation	1	16-10-2021		TLM2	
63.	Orientation, Economy, Role of Bye-laws	1	22-10-2021		TLM2	
No. of classes required to complete UNIT-I:07				No. of classes taken:		

UNIT-II: Building Materials

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.	Building Materials - Classification	1	23-10-2021		TLM2	
2.	Rocks, Bricks Classification, Composition, Properties, Commercial forms, Uses	1	27-10-2021		TLM2	
3.	Timber, Ply wood Classification, Composition, Properties, Commercial forms	1	29-10-2021		TLM2	
4.	Glass, Bitumen Classification, Composition, Properties, Commercial forms,	1	30-10-2021		TLM2	
5.	Aluminium, Cement Classification, Composition, Properties, Commercial forms,	1	03-11-2021		TLM2	
6.	Steel, Concrete Classification, Composition, Properties, Commercial forms, Uses	1	05-11-2021		TLM2	
7.	Mortar Classification, Composition, Properties, Commercial forms, Uses	1	06-11-2021		TLM2	

No. of classes required to complete UNIT-II:07	No. of classes taken:
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UNIT-III:SOIL CLASSIFICATION AND FOUNDATION

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.	Types of soils, soil classification	1	17-11-2021		TLM2	
2.	Engineering properties	1	19-11-2021		TLM2	
3.	Bearing Capacity of soil, purpose and methods of improving bearing capacity	1	20-11-2021		TLM2	
4.	Foundations – Requirements, Loads, Types	1	24-11-2021		TLM2	
5.	for special structures-water tanks-	1	26-11-2021		TLM2	
6.	for special structures- silos, chimneys- transmission line towers- cooling towers, telecommunication towers	1	27-11-2021		TLM2	
No. of classes required to complete UNIT-III:06				No. of classes taken:		

UNIT-IV : SURVEYING, LEVELLING & HIGHWAY NETWORK

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.	Objective of surveying– Principles, applications and uses of - chain surveying	1	01-12-2021		TLM2	
2.	theodolite, levelling, contour maps, Planimeter, EDM concept	1	03-12-2021		TLM2	
3.	linear distance and area measurement	1	04-12-2021		TLM2	
4.	Total station- GIS-Concept and applications in civil engineering.	1	08-12-2021		TLM2	
5.	Indian highways- Basic terminology- Classification of roads - PIEV theory - Traffic signs - IRC Code provisions	1	10-12-2021		TLM2	
6.	Indian railways –Permanent way and components of railway track	1	11-12-2021		TLM2	
7.	Gauges – Rails -Sleepers – Ballast.	1	15-12-2021		TLM2	
No. of classes required to complete UNIT-IV:07				No. of classes taken:		

UNIT-V : WATER RESOURCES AND ENVIRONMENTAL ENGINEERING

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.	Objectives of water supply system-Sources of water	1	17-12-2021		TLM2	

	supply-Hydrologic cycle				
2.	Rainfall measurement - Purpose of dams, reservoirs, intakes, infiltration galleries	1	18-12-2021		TLM2
3.	Water demands –Water quality parameters and their impacts - Principles of water treatment	1	22-12-2021		TLM2
4.	Objectives and methods of water distribution systems – Sewage generation in a society –	1	24-12-2021		TLM2
5.	Wastewater characteristics and their impacts	1	29-12-2021		TLM2
6.	Water quality standards for – drinking purpose,	1	31-12-2021		TLM2
7.	irrigation, -making and curing of concrete	1	01-01-2022		TLM2
No. of classes required to complete UNIT-V:07				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 Regulations):

Evaluation Task	Marks
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Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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 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	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 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	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
(B.Narasimha Rao)

Course Coordinator
(B.Narasimha Rao)

Module Coordinator
(B.Narasimha Rao)

HOD
(Dr. D.Veeraiah)



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. MANASWINI

Course Name & Code : INTERNET OF THINGS LAB & 17CI69

L-T-P Structure : 0-0-2 Credits: 1

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-B A.Y. : 2021-22

PRE-REQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to give a comprehensive view of the “Internet of Things” (Applications/ Potentials/ Challenges). To analyze enabling technologies to make it happen (Embedded Devices and communication protocols) and to conduct Hands on activities (Guidelines on how to operate “things” in the “Internet of Things”).

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

CO1	Understand the programming environment of IOT.
CO2	Develop IOT applications using sensors.
CO3	Develop IOT applications using web/mobile services.
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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	1	-	1	3	-	-	-	-	-	-	1	3	-	-
CO2	2	2	3	1	3	-	2	-	-	-	-	1	3	-	-
CO3	2	2	3	1	3	-	2	-	-	-	-	1	3	-	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
	1 - Low			2 -Medium				3 - High							

REFERENCES:

- R1 wwwusers.di.uniroma1.it/~spenza/files/labIoT2015/Lab-IoT-1.pdf
- R2 www.mobileeducationkit.net/labmanuals/LAB-Manual-mbed.docx

PART-B

SCHEDULE:

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Introduction to Raspberry Pi & Cycle-1	2			DM5
2.	Cycle-2	2			DM5
3.	Cycle-3	2			DM5
4.	Cycle-3	2			DM5
5.	Cycle-4	2			DM5
6.	Cycle-4	2			DM5
7.	Cycle-5	2			DM5
8.	Cycle-6	2			DM5
9.	Cycle-7	2			DM5
10.	Cycle-8	2			DM5
11.	Cycle-8	2			DM5
12.	Internal Lab Exam	2			DM4

Delivery Methods			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr.B.Manaswini	Mr. B. Siva Rama Krishna	Dr. D. V. Subbaiah	Dr. D. Veeraiah
Signature				

PROGRAMME OUTCOMES (POs):

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	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 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	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr.B.Manaswini	Mr. B. Siva Rama Krishna	Dr. D. V. Subbaiah	Dr. D. Veeraiah
Signature				



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. MANASWINI

Course Name & Code : INTERNET OF THINGS & 17CI19

L-T-P Structure : 2-2-0

Credits: 3

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-B

A.Y.: 2021-22

PREREQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to explore the interconnection and integration of the physical world and the cyber space. Understand the design concepts in setting up IOT Devices. Study about the setup, configuration, and installation of equipment for IOT.

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

CO1	Understand Device-processor communication models & protocols.
CO2	Understand the application areas of IOT.
CO3	Visualize the effect of internet on Mobile Devices, Cloud & Sensor Networks.
CO4	Acquire programming experience with Raspberry Pi kit to interface various devices.
CO5	Implement Programming models for IoT Cloud Environment.

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	1	-	-	-	-	-	-	-	-	1	-	-	-
CO2	3	1	1	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	1	-	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
			1 - Low			2 -Medium			3 - High						

TEXTBOOKS:

- T1** ArshdeepBahga and Vijay Madiseti, –Internet of Things - A Hands-on Approach, Universities Press, 2015, ISBN: 9788173719547.
- T2** James C Sheusi, –Android Application Development for Java Programmers, Cengage Learning, 2013.

REFERENCE BOOKS:

- R1** Pethuru Raj and Anupama C. Raman,"The Internet of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press).
- R2** Adrian McEwen, –Designing the Internet of Things||, Wiley Publishers, 2013, ISBN: 978-1-118-43062-0.
- R3** Daniel Kellmerit, –The Silent Intelligence: The Internet of Things||, 2013, ISBN: 0989973700.
- R4** https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: INTRODUCTION TO INTERNET OF THINGS**

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 IoT	1	28/09/2021			
2.	Definition and Characteristics of IoT	1	29/09/2021			
3.	Physical Design of IoT Part-1	1	30/09/2021			
4.	Physical Design of IoT Part-2	1	05/10/2021			
5.	Logical Design of IoT Part-1	1	06/10/2021			
6.	Logical Design of IoT Part-2	1	07/10/2021			
7.	IoT Enabled Technologies	1	09/10/2021			
8.	IoT Levels	1	19/10/2021			
9.	IoT Deployment Templates	1	20/10/2021			
No. of classes required to complete UNIT-I: 09				No. of classes taken:		

UNIT-II: DOMAIN SPECIFIC IOTs

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.	Introduction to Domain Specific IoTs	1	21/10/2021			
11.	Home Automation	1	26/10/2021			
12.	Smart Cities	1	28/10/2021			
13.	Environment	1	30/10/2021			
14.	Energy	1	02/11/2021			
15.	Retail & Logistics	1	03/11/2021			
16.	Agriculture	1	06/11/2021			
17.	Industry	1	06/11/2021			
18.	Health & Lifestyle	1	06/11/2021			
No. of classes required to complete UNIT-II: 07				No. of classes taken:		

UNIT-III: IOT AND M2M, IOT SYSTEM MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Introduction to M2M	1	16/11/2021			
20.	Difference between IoT and M2M	1	17/11/2021			
21.	Traditional Networking and SDN	1	18/11/2021			
22.	NFV for IoT	1	20/11/2021			
23.	Need for IoT Systems Management	1	23/11/2021			
24.	Simple Network management Protocol (SNMP)	1	24/11/2021			
25.	NETCONF, YANG	1	25/11/2021			
26.	YANG-NETCONF	1	27/11/2021			
27.	NETOPEER	1	30/11/2021			
No. of classes required to complete UNIT-III: 09				No. of classes taken:		

UNIT-IV: IOT PHYSICAL DEVICES & ENDPOINTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	What is an IoT Device?	1	01/12/2021			
29.	Raspberry Pi and its Configuration	1	02/12/2021			
30.	Linux on Raspberry Pi	1	04/12/2021			
31.	Raspberry Pi Interfaces	1	07/12/2021			
32.	Programming Pi with Python Part-1	1	08/12/2021			

33.	Programming Pi with Python Part-2	1	09/12/2021			
34.	Other IoT Devices	1	11/12/2021			
No. of classes required to complete UNIT-IV: 07				No. of classes taken:		

UNIT-V: IOT PHYSICAL SERVERS AND CLOUD OFFERINGS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Introduction to Cloud Storage	1	14/12/2021			
36.	Cloud Storage Models & Communication APIs	1	15/12/2021			
37.	WAMP - AutoBahn for IoT	1	16/12/2021			
38.	Commands for Installing AutoBahn	1	18/12/2021			
39.	Xively Cloud for IoT	1	21/12/2021			
40.	Python Web Application Framework - Django	1	22/12/2021			
41.	Example Programs on Django	1	23/12/2021			
42.	Designing a RESTful Web API	1	01/01/2022			
No. of classes required to complete UNIT-V: 08				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 (Unit-I)	A1=5
Assignment-II (Unit-II)	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 = 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)	Q=10
Cumulative Internal Examination (CIE): A+B+M+Q	40
Semester End Examination (SEE)	60
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 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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. B. Manaswini	Mr. B. Siva Rama Krishna	Dr. D. V. Subbaiah	Dr. D. Veeraiah
Signature				



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B.USHA RANI
Course Name & Code : Information Retrieval Systems &17CS92
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sec-B A.Y : 2021-22

PRE-REQUISITE: Fundamentals of database concepts, data structures & data warehouse.

COURSE EDUCATIONAL OBJECTIVES (CEOs):The main objective of this course is to present the basic concepts in information retrieval and the significance of various indexing and searching techniques for information retrieval.

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

CO 1	Identify the basic concepts of Information retrieval system.
CO 2	Evaluate the taxonomy of different information retrieval models.
CO 3	Demonstrate and evaluate automatic indexing, document & term clustering techniques.
CO 4	Demonstrate and evaluate various searching techniques.
CO5	Evaluate text processing techniques and operations in information retrieval system.

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

COs	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-

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 Kowalski, Gerald, Mark T Maybury, –Information Storage & Retrieval Systems: Theory and Implementation||, Kluwer Academic Press, 2nd edition, 2002.

REFERENCE BOOKS:

R1 Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

R2 <https://epdf.tips/queue/information-storage-and-retrieval-systems-theory-and-implementationthe-informat.html> Robert Korthagen, John Wiley & Sons, –Information Storage & Retrieval||.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Introduction & Information Retrieval System Capabilities**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
64.	UNIT - I: Introduction: Definition, Objectives	1	29-09-2021		TLM2	
65.	Functional Overview Item Normalization	1	01-10-2021		TLM2	
66.	Selective dissemination AFB	1	06-10-2021		TLM2	
67.	Relationship to DBMS, Digital libraries and Data Warehouses	1	08-10-2021		TLM2	
68.	Information Retrieval System Capabilities: Search capabilities	1	09-10-2021 20-10-2021		TLM2	
69.	Information Retrieval System Capabilities: Browse, Miscellaneous Capabilities	1	22-10-2021		TLM2	
No. of classes required to complete UNIT-I:07				No. of classes taken:		

UNIT-II: Data Structures & Cataloguing and Indexing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Introduction, Stemming Algorithms	1	23-10-2021		TLM2	
9.	Inverted file structures	1	27-10-2021		TLM2	
10.	N-gram data structure,	1	29-10-2021		TLM2	
11.	PAT data structure	1	30-10-2021		TLM2	
12.	Signature file structure, Hypertext data structure	1	03-11-2021		TLM2	
13.	Cataloguing and Indexing Objectives, Indexing Process	1	05-11-2021		TLM2	
14.	Automatic Indexing, Information Extraction.	1	06-11-2021		TLM2	
No. of classes required to complete UNIT-II:07				No. of classes taken:		
I MID EXAMINATIONS FROM 08-11-2021 TO 13-11-2021						

UNIT-III: Automatic Indexing, Document and Term Clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
7.	Automatic Indexing: Classes of automatic indexing	1	17-11-2021		TLM2	
8.	Statistical indexing, Natural language	1	19-11-2021		TLM2	
9.	Concept indexing, Hypertext linkages.	1	20-11-2021		TLM2	
10.	Document and Term Clustering: Introduction, Thesaurus generation	1	24-11-2021		TLM2	
11.	Item clustering	1	26-11-2021		TLM2	

12.	Hierarchy of clusters	1	27-11-2021		TLM2	
No. of classes required to complete UNIT-III:06				No. of classes taken:		

UNIT-IV :User Search Techniques & Information Visualization

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Search statements and binding, Similarity measures and ranking	1	01-12-2021		TLM2	
9.	Relevance feedback, Selective dissemination of information search	1	03-12-2021		TLM2	
10.	weighted searches of Boolean systems	1	04-12-2021		TLM2	
11.	Searching the Internet and hypertext	1	08-12-2021		TLM2	
12.	Information Visualization, Introduction, Cognition and perception	1	10-12-2021		TLM2	
13.	Information visualization technologies.	1	11-12-2021		TLM2	
No. of classes required to complete UNIT-IV:06				No. of classes taken:		

UNIT-V:Text Search Algorithms & Information System Evaluation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Text Search Algorithms Introduction, Software text search algorithms	1	15-12-2021		TLM2	
9.	Hardware text search systems.	1	17-12-2021		TLM2	
10.	Information System Evaluation: Introduction,	1	18-12-2021		TLM2	

11.	Measures used in system evaluation,	1	22-12-2021		TLM2	
12.	Measurement example – TREC results	1	24-12-2021		TLM2	
13.	Revision	1	29-12-2021		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		
II MID EXAMINATIONS 03-01-2022 TO 08-01-2022						

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)	A1=5
Assignment-II (Unit-II)	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

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 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	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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms. 2. Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students. 3. Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.
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PSO 2	Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course
Instructor

Course Coordinator

Module Coordinator

HOD



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B.USHA RANI
Course Name & Code : Information Retrieval Systems &17CS92
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sec-B A.Y : 2021-22

PRE-REQUISITE: Fundamentals of database concepts, data structures & data warehouse.

COURSE EDUCATIONAL OBJECTIVES (CEOs):The main objective of this course is to present the basic concepts in information retrieval and the significance of various indexing and searching techniques for information retrieval.

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

CO 1	Identify the basic concepts of Information retrieval system.
CO 2	Evaluate the taxonomy of different information retrieval models.
CO 3	Demonstrate and evaluate automatic indexing, document & term clustering techniques.
CO 4	Demonstrate and evaluate various searching techniques.
CO5	Evaluate text processing techniques and operations in information retrieval system.

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

COs	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-

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 Kowalski, Gerald, Mark T Maybury, –Information Storage & Retrieval Systems: Theory and Implementation||, Kluwer Academic Press, 2nd edition, 2002.

REFERENCE BOOKS:

R1 Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

R2 <https://epdf.tips/queue/information-storage-and-retrieval-systems-theory-and-implementationthe-informat.html> Robert Korthagen, John Wiley & Sons, –Information Storage & Retrieval||.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Introduction & Information Retrieval System Capabilities**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
70.	UNIT - I: Introduction: Definition, Objectives	1	29-09-2021		TLM2	
71.	Functional Overview Item Normalization	1	01-10-2021		TLM2	
72.	Selective dissemination AFB	1	06-10-2021		TLM2	
73.	Relationship to DBMS, Digital libraries and Data Warehouses	1	08-10-2021		TLM2	
74.	Information Retrieval System Capabilities: Search capabilities	1	09-10-2021 20-10-2021		TLM2	
75.	Information Retrieval System Capabilities: Browse, Miscellaneous Capabilities	1	22-10-2021		TLM2	
No. of classes required to complete UNIT-I:07				No. of classes taken:		

UNIT-II: Data Structures & Cataloguing and Indexing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Introduction, Stemming Algorithms	1	23-10-2021		TLM2	
16.	Inverted file structures	1	27-10-2021		TLM2	
17.	N-gram data structure,	1	29-10-2021		TLM2	
18.	PAT data structure	1	30-10-2021		TLM2	
19.	Signature file structure, Hypertext data structure	1	03-11-2021		TLM2	
20.	Cataloguing and Indexing Objectives, Indexing Process	1	05-11-2021		TLM2	
21.	Automatic Indexing, Information Extraction.	1	06-11-2021		TLM2	
No. of classes required to complete UNIT-II:07				No. of classes taken:		
I MID EXAMINATIONS FROM 08-11-2021 TO 13-11-2021						

UNIT-III: Automatic Indexing, Document and Term Clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Automatic Indexing: Classes of automatic indexing	1	17-11-2021		TLM2	
14.	Statistical indexing, Natural language	1	19-11-2021		TLM2	
15.	Concept indexing, Hypertext linkages.	1	20-11-2021		TLM2	
16.	Document and Term Clustering: Introduction, Thesaurus generation	1	24-11-2021		TLM2	
17.	Item clustering	1	26-11-2021		TLM2	

18.	Hierarchy of clusters	1	27-11-2021		TLM2	
No. of classes required to complete UNIT-III:06			No. of classes taken:			

UNIT-IV :User Search Techniques & Information Visualization

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Search statements and binding, Similarity measures and ranking	1	01-12-2021		TLM2	
15.	Relevance feedback, Selective dissemination of information search	1	03-12-2021		TLM2	
16.	weighted searches of Boolean systems	1	04-12-2021		TLM2	
17.	Searching the Internet and hypertext	1	08-12-2021		TLM2	
18.	Information Visualization, Introduction, Cognition and perception	1	10-12-2021		TLM2	
19.	Information visualization technologies.	1	11-12-2021		TLM2	
No. of classes required to complete UNIT-IV:06			No. of classes taken:			

UNIT-V:Text Search Algorithms & Information System Evaluation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Text Search Algorithms Introduction, Software text search algorithms	1	15-12-2021		TLM2	
15.	Hardware text search systems.	1	17-12-2021		TLM2	
16.	Information System Evaluation: Introduction,	1	18-12-2021		TLM2	

17.	Measures used in system evaluation,	1	22-12-2021		TLM2	
18.	Measurement example – TREC results	1	24-12-2021		TLM2	
19.	Revision	1	29-12-2021		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		
II MID EXAMINATIONS 03-01-2022 TO 08-01-2022						

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)	A1=5
Assignment-II (Unit-II)	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

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 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	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 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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms. 2. Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students. 3. Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.
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PSO 2	Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course
Instructor

Course Coordinator

Module Coordinator

HOD



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor Mr.CH. Srinivasa Rao

Course Name & Code : INFORMATION SECURITY (17CI20)

L-T-P Structure : 2-2-0

Credits : 3

Program/Sem/Sec : B.Tech., CSE, VII-Sem., Section – B

A.Y : 2021 - 2022

PRE-REQUISITE : Knowledge of Communication Networks.

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 also highlights 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

CO1	Evaluate the use of encryption algorithm for achieving data confidentiality.
CO2	Apply Secure hash functions for attaining data integrity.
CO3	Analyze the security mechanisms for achieving authentication.
CO4	Analyze the protocols for achieving availability, access control to resources and protocols for non-repudiation.
CO5	Explore the threats and remedial measures for system security.

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	3	2	-	-	1	-	-	-	-	-	1	1	-	-
CO2	2	3	2	-	-	1	-	-	-	-	-	1	1	-	-
CO3	2	3	2	-	-	2	-	-	-	-	-	1	1	-	-
CO4	2	1	2	-	-	2	-	-	-	-	-	1	1	-	-
CO5	2	2	1	-	-	1	-	-	-	-	-	1	1	-	-

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

1- Low

2 –Medium

3 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 to IS, Security Attacks	1	29/09/2021	29/09/2021	TLM2	
2.	Security Services, Mechanisms	1	30/09/2021	30/09/2021	TLM2	
3.	Integrity, Authentication Confidentiality & Non-Repudiation	1	04/10/2021	04/10/2021	TLM2	
4.	Substitution Techniques, Transposition Techniques	1	07/10/2021	07/10/2021	TLM2	
5.	Block Cipher, Block Cipher & Fiestal Structure	1	09/10/2021	09/10/2021	TLM2	
6.	DES Algorithm	1	11/10/2021	11/10/2021	TLM2	
7.	AES Algorithm	1	18/10/2021	18/10/2021	TLM2	
8.	Cipher Block Modes of Operations	1	20/10/2021	20/10/2021	TLM2	
9.	Traffic Analysis & Placement of encryption	1	21/10/2021	21/10/2021	TLM2	
10.	Key Distribution	1	23/10/2021	23/10/2021	TLM2	
11.	Assignment-1				TLM3	
No. of classes required to complete UNIT-I		10		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
12.	Approaches of Message Authentication, Hash & MAC functions	1	25/10/2021	25/10/2021	TLM1	
13.	HMAC Algorithm	1	28/10/2021	28/10/2021	TLM1	
14.	Public-Key Encryption Algorithm- RSA	1	30/10/2021	30/10/2021	TLM1	
15.	Diffie –Hellman Key Exchange Algorithm	1	01/11/2021	01/11/2021	TLM1	

16.	SHA-512	1	03/11/2021	03/11/2021	TLM1	
17.	Digital Signatures	1	04/11/2021	04/11/2021	TLM1	
18.	Public Key Infrastructure, Digital Certificates	1	06/11/2021	06/11/2021	TLM1	
19.	Certificate Authority, Key Management	1	15/11/2021	15/11/2021	TLM1	
20.	Kerberos, X.509 Directory Authentication Service	1	17/11/2021	17/11/2021	TLM1	
21.	Assignment-2				TLM3	
sNo. of classes required to complete UNIT-II		09		No. of classes taken:		

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
22.	Email privacy, Pretty Good Privacy (PGP)	1	18/11/2021	18/11/2021	TLM1	
23.	PGP Key Management	1	20/11/2021	20/11/2021	TLM1	
24.	MIME and S/ MIME	1	22/11/2021	22/11/2021	TLM1	
25.	IP Security Overview, IP Security Architecture,	1	24/11/2021	24/11/2021	TLM1	
26.	Authentication Header Encapsulating Security Payload,	1	25/11/2021	25/11/2021	TLM1	
27.	Tunnel and Transport Modes	1	27/11/2021	27/11/2021	TLM1	
28.	Combining Security Associations, Key Exchange	1	29/11/2021	29/11/2021	TLM1	
29.	Cryptographic Suites	1	01/12/2021	01/12/2021	TLM1	
30.	Unit Overview and Discussion	1	02/12/2021	02/12/2021	TLM1	
31.	Assignment - 3				TLM3	
No. of classes required to complete UNIT-III		09		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
32.	Web Security Requirements	1	04/12/2021	04/12/2021	TLM1	
33.	Secure Socket Layer (SSL) Architecture, Protocols	1	06/12/2021	06/12/2021	TLM1	
34.	SSL Handshake Protocol	1	08/12/2021	08/12/2021	TLM1	

35.	Transport Layer Security	1	09/12/2021	09/12/2021	TLM1	
36.	Transport Layer Security Approaches	1	11/12/2021	11/12/2021	TLM1	
37.	Secure Electronic Transaction (SET)	1	13/12/2021	13/12/2021	TLM1	
38.	Payment Processing	1	15/12/2021	15/12/2021	TLM1	
39.	HTTPs. HTTP vs HTTPs	1	16/12/2021	16/12/2021	TLM1	
40.	Unit Overview and Discussion	1	18/12/2021	18/12/2021	TLM1	
41.	Assignment - 4				TLM3	
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
42.	Intruders	1	20/12/2021	20/12/2021	TLM1	
43.	Viruses and Related Threats	1	22/12/2021	22/12/2021	TLM1	
44.	Firewall Design principles	1	23/12/2021	23/12/2021	TLM1	
45.	Trusted System	1	27/12/2021	27/12/2021	TLM1	
46.	Introduction to Database Security and authorization	1	29/12/2021	29/12/2021	TLM1	
47.	Database authorization	1	30/12/2021	30/12/2021	TLM1	
48.	Unit Overview and Discussion	1	01/01/2022	01/01/2022	TLM1	
49.	Assignment-5				TLM3	
No. of classes required to complete UNIT-V		07		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/Assignment	TLM6	Group Discussion/Project

PART C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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 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, demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO 9	Individual and teamwork: 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, 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	Programming Paradigms: The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	Data Engineering: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	Software Engineering: To inculcate an ability to analyze, design and implement database applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr.CH. SRINIVASA RAO	Mr.CH. SRINIVASA RAO	Dr. D.V.SUBHAI AH	Dr. D. VEERAI AH



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

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor :Dr.P. Bhagath

Course Name & Code : Pattern Recognition (17CI26)

L-T-P Structure : 3-0-0

Credits: 3

Program/Sem/Sec :B.Tech., CSE, VII-Sem., Section – B

A.Y : 2020 - 2021

Pre-Requisite: Basic knowledge of probability & statistics

Course Educational Objectives (CEOs):

The main objective of this course is that the concept of a pattern and the fundamentals of pattern recognition and its relevance to classical and modern problems and to be able to identify where, when and how pattern recognition can be applied.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Understand the principles of pattern recognition to classify objects through probabilistic models and their estimations.
CO2	Analyze density functions to estimate the decision boundaries
CO3	Understand the parameter estimations for Bayes theorem
CO4	Apply unsupervised techniques to estimate the clusters based on similarity
CO5	Understand the concept of hidden markov models in real-time applications

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	3	2	1	-	-	-	-	-	-	-	-	-	3	
CO2	3	2	2	1	-	-	-	-	-	-	-	-	-	3	
CO3	2	2	3	1	-	-	-	-	-	-	-	-	-	3	
CO4	2	3	3	1	-	-	-	-	-	-	-	-	-	3	
CO5	2	2	3	1	-	-	-	-	-	-	-	-	-	3	

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

1- Low

2 -Medium

3 High

TEXT BOOKS:

- T1** Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition.
- T2** Pattern Recognition, an Introduction, V Susheela Devi, M Narsimha Murthy, University Press.

REFERENCE BOOKS:

- R1** R.C Gonzalez and R.E. Woods, —Digital Image Processing, Addison Wesley, 1992.
- R2** Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004.
- R3** Fundamentals of speech Recognition, Lawrence Rabiner, Biing – Hwang Juang Pearson education.
- R4** Pattern Recognition, Sergios Theodoridis, Konstantinos Koutroumbas, Academic Press, Elsevier, 4ed.

COURSE DELIVERY PLAN (LESSON PLAN):**UNIT-I: Introduction to Pattern Recognition**

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 Pattern Recognition	1	28-09-2021		TLM2	
2.	Machine perception	1	29-09-2021		TLM2	
3.	pattern recognition example, pattern recognition systems	1	30-09-2021		TLM2	
4.	Design cycle, learning and adaptation	1	01-10-2021		TLM2	
5.	Bayesian Decision Theory	1	05-10-2021		TLM2	
6.	continuous features – two categories classifications	1	06-10-2021		TLM2	
7.	minimum error-rate classification-zero-one loss function, classifiers	1	07-10-2021		TLM2	
8.	Problems with Bayes classifier	1	08-10-2021		TLM2	
9.	Discriminant functions, and decision surface	1	18-10-2021		TLM2	
No. of classes required to complete UNIT-I		09		No. of classes taken:		

UNIT-II: Density Functions

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.	Normal density	1	19-10-2021		TLM1	
11.	Univariate and multivariate density	1	20-10-2021		TLM1	
12.	discriminant functions for the normal Density different cases	2	21-10-2021, 22-10-2021		TLM1	
13.	Example problems	1	26-10-2021		TLM1	

14.	Bayes decision theory - discrete features	1	27-10-2021		TLM1	
15.	Example problems	1	28-10-2021		TLM1	
16.	Compound Bayesian decision theory and context	1	29-10-2021		TLM1	
17.	Example problems	1	02-11-2021		TLM1	
No. of classes required to complete UNIT-II		09		No. of classes taken:		

UNIT-III: Bayesian parameter estimation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Parameter Estimation under Normal density function	1	03-11-2021		TLM1	
19.	What is maximum likelihood estimation	1	04-11-2021		TLM1	
20.	Maximum likelihood estimation	1	05-11-2021		TLM1	
21.	Example problems	1	09-11-2021		TLM1	
22.	Bayes likelihood estimation	1	10-11-2021		TLM1	
23.	Bayes parameter estimation	1	11-11-2021		TLM1	
24.	Bayes parameter estimation – Gaussian distribution	1	12-11-2021		TLM1	
25.	Example problems	1	16-11-2021		TLM1	
No. of classes required to complete UNIT-III		08		No. of classes taken:		

UNIT-IV: Unsupervised learning and clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Unsupervised Learning	1	17-11-2021		TLM1	
27.	Mixture densities and identifiability	1	18-11-2021		TLM1	
28.	Maximum likelihood estimates	1	19-11-2021		TLM1	
29.	Application to normal mixtures	1	19-11-2021		TLM1	
30.	K-means clustering	1	23-11-2021		TLM1	
31.	Data description and clustering	1	24-11-2021		TLM1	
32.	Similarity measures	1	25-11-2021		TLM1	
33.	Criteria function for clustering	1	26-11-2021		TLM1	
34.	Example Problems	1	30-11-2021		TLM1	
No. of classes required to complete UNIT-IV		09		16-10-2020		

UNIT-V: Hidden Markov models

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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35.	Hidden Markov Model	1	01-12-2021		TLM1
36.	Discrete-time Markov process	1	02-12-2021		TLM1
37.	Extensions to hidden Markov models	1	03-12-2021		TLM1
38.	Three basic problems of HMMs&types of HMMs	1	07-12-2021		TLM1
39.	Three basic problems of HMMs&types of HMMs	1	08-12-2021		TLM1
40.	Continuous observation densitiesmultiple mixtures perstate	1	09-12-2021		TLM1
41.	Continuous observation densitiesmultiple mixtures perstate	1	10-12-2021		TLM1
42.	speech recognition applications	1	13-12-2021		TLM1
No. of classes required to complete UNIT-V		08		No. of classes taken:	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	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

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.
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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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Course Instructor	Course Coordinator	Module Coordinator	HOD
DrP. Bhagath	Dr P. Bhagath	DrCh V Narayana	Dr. D.VEERAI AH