LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
Accredited by NAAC & NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh
Department of Computer Science & Engineering

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 : 2020 - 2021

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.
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 Jefrey David Ulman, —Mining of Massive Datasets‖, Cambridge University Press,2012.

R4 ArvindSathi, —BigDataAnalytics: Disruptive Technologies for Changing the Game‖, 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
1.	Evolution of Big data, Best Practices for Big data Analytics	1	03-11-2020		**TLM2**	
2.	Big data characteristics, The Promotion of the Value of Big Data	1	03-11-2020		**TLM2**	
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	05-11-2020		**TLM2**	
4.	stages of analytical evolution, State of the Practice in Analytics, The Data Scientist	1	06-11-2020		**TLM2**	
5.	Big Data Analytics in Industry Verticals	1	10-11-2020		**TLM2**	
6.	Data Analytics Lifecycle	1	10-11-2020		**TLM2**	
7.	Data Analytics Lifecycle	1	17-11-2020		**TLM2**	
8.	Basic Data Analytic Methods Using R	1	17-11-2020		**TLM2**	
9.	Big Data Use Cases-Characteristics of Big Data Applications	1	19-11-2020		**TLM2**	
10.	Assignment - 1	1	20-11-2020		**TLM6**	
No. of classes required to complete UNIT-I		8		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
11.	Analytics for Unstructured Data - MapReduce and Hadoop	1	24-11-2020		**TLM2/ TLM4/ TLM5**	
12.	The design of HDFS, HDFS concepts	1	24-11-2020		**TLM2/ TLM4/ TLM5**	
13.	Command line interface to HDFS	1	26-11-2020		**TLM2/ TLM4/ TLM5**	
14.	Hadoop File system Interfaces, Java Interface to Hadoop	1	27-11-2020		**TLM2/ TLM4/ TLM5**	
15.	Anatomy of a file read, Anatomy of a file write, Replica placement	1	01-12-2020		**TLM2/ TLM4/**	

	and Coherency Model				**TLM5**	
16.	Parallel copying with distcp, keeping an HDFS cluster balanced	1	01-12-2020		**TLM2/ TLM4/ TLM5**	
17.	Advantages of Hadoop and HDFS	1	03-12-2020		**TLM2/ TLM4/ TLM5**	
18.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	04-12-2020		**TLM2/ TLM4/ TLM5**	
19.	Assignment - 2	1	08-12-2020		**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
20.	Anatomy of a Map Reduce Job Run	1	08-12-2020		**TLM2/ TLM4/ TLM5**	
21.	Failures, Job Scheduling	1	10-12-2020		**TLM2/ TLM4/ TLM5**	
22.	Shuffle and Sort	1	11-12-2020		**TLM2/ TLM4/ TLM5**	
23.	Task Execution	1	15-12-2020		**TLM2/ TLM4/ TLM5**	
24.	Map Reduce Types and Formats	1	15-12-2020		**TLM2/ TLM4/ TLM5**	
25.	Map Reduce Features	1	17-12-2020		**TLM2/ TLM4/ TLM5**	
26.	Map Reduce Features	1	18-12-2020		**TLM2/ TLM4/ TLM5**	
27.	Assignment - 3	1	22-12-2020		**TLM6**	
No. of classes required to complete UNIT-III		08		No. of classes taken:		

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
28.	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	22-12-2020		**TLM2/ TLM4/ TLM5**	
29.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	24-12-2020		**TLM2/ TLM4/ TLM5**	
30.	**Pig:** Introduction to PIG, Execution Modes of Pig	1	29-12-2020		**TLM2/ TLM4/ TLM5**	
31.	Comparison of Pig with Databases, Grunt, Pig Latin.	1	29-12-2020		**TLM2/ TLM4/ TLM5**	
32.	User Defined Functions, Data Processing operators	1	31-12-2020		**TLM2/ TLM4/**	

					TLM5	
33.	**Hive:** Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	05-01-2021		**TLM2/ TLM4/ TLM5**	
34.	Querying Data and User Defined Functions	1	05-01-2021		**TLM2/ TLM4/ TLM5**	
35.	HBase: HBase Concepts, Clients, Example, HBase vs RDBMS	1	07-01-2021		**TLM2/ TLM4/ TLM5**	
36.	**Big SQL:** Introduction	1	08-01-2021		**TLM2/ TLM4/ TLM5**	
37.	Assignment - 4	1	12-01-2021		**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
38.	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	1	12-01-2021		**TLM2**	
39.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	19-01-2021 19-01-2021		**TLM2**	
40.	Data Visualization Techniques	1	21-01-2021 22-01-2021		**TLM2**	
41.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	28-01-2021 02-02-2021		**TLM2**	
42.	Collaborative Filtering, Big Data Analytics with BigR	1	04-02-2021 05-02-2021		**TLM2**	
43.	Data models for managing big data, Real-time streaming data analytics	1	09-02-2021 09-02-2021		**TLM2**	
44.	Scalable analytics on large data sets	1	11-02-2021		**TLM2**	
45.	Systems architecture for big data management	1	12-02-2021		**TLM2**	
46.	Main memory data management techniques	1	16-02-2021		**TLM2**	
47.	Assignment - 5	1	16-02-2021		**TLM6**	
48.	Review	1	17-02-2021		**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
49.						

50.						
51.						
52.						
53.						

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

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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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.VEERAIAH	DR. D.VEERAIAH

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B. Siva Rama Krishna
Course Name & Code : **INTERNET OF THINGS&17CI19**
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE.,VII-Sem., Sections- A A.Y: 2020-21

Pre-requisites: Python programming.

Course Educational Objective (CEO): 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): After the completion of this course, the 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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	1	-	-	1	-	-	-	-	-	-	-	-	3	1	-
CO 2	-	2	3	1	-	1	-	-	-	-	-	-	3	-	1
CO 3	1	-		2	-	-	-	-	-	-	-	-	-	3	1
CO 4	1	-	2	-	2	-	-	-	-	-	-	-	-	3	1
CO 5	1	-	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).

BOS APPROVED TEXT BOOKS:

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

BOS APPROVED REFERENCE:

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:Buchman, Springer Introduction to Cryptography.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	03/11/2020		**TLM2**	CO1	T1	
2.	Definition and Characteristics of IoT	1	05/11/2020		**TLM2**	CO1	T1	
3.	Physical Design of IoT	2	07/11/2020		**TLM2**	CO1	T1	
4.	Logical Design of IoT	2	10/11/2020		**TLM2**	CO1	T1	
5.	IoT Enabled Technologies	2	12/11/2020		**TLM2**	CO1	T1	
6.	IoT Levels	1	17/11/2020		**TLM2**	CO1	T1	
7.	Deployment Templates	1	19/11/2020		**TLM2**	CO1	T1	
8.	**Assignment Test-1**	1	21/11/2020		**TLM6**	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II:

S.No.	Topics to be covered	No. Of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	Introduction	1	24/11/2020		**TLM2**	CO2	T1	
10.	Home Automation	1	26/11/2020		**TLM2**	CO2	T1	
11.	Cities	1	28/11/2020		**TLM2**	CO2	T1	
12.	Environment,Energy	1	1/12/2020		**TLM2**	CO2	T1	
13.	Retail, Logistics	1	3/12/2020		**TLM2**	CO2	T1	
14.	Agriculture	1	5/12/2020		**TLM2**	CO2	T1	
15.	Industry	1	8/12/2020		**TLM2**	CO2	T1	
16.	Health & Lifestyle	1	10/12/2020		**TLM2**	CO2	T1	
17.	**Assignment Test-2**	1	12/12/2020		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		09			No. of classes taken:			

UNIT-III:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
18.	Introduction	1	15/12/2020		**TLM2**	CO3	T1	
19.	M2M, Difference between IoT and M2M	1	17/12/2020		**TLM2**	CO3	T1	

20.	SDN and NFV for IoT	1	19/12/2020		**TLM2**	CO3	T1	
21.	Need for IoT Systems Management	1	22/12/2020		**TLM2**	CO3	T1	
22.	SNMP, NETCONF, YANG, YANG-NETCONF, NETOPEER	1	2/01/2021		**TLM2**	CO3	T1	
23.	**Assignment Test-3**	1	2/01/2021		**TLM6**	CO3	T1	
No. of classes required to complete UNIT-III		6			No. of classes taken:			

UNIT-IV:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
24.	What is an IoT Device, Exemplary Device: Raspberry Pi	1	5/01/2021		**TLM2**	CO4	T1	
25.	About the Board, Linux on Raspberry Pi	1	7/01/2021		**TLM2**	CO4	T1	
26.	Raspberry Pi Interfaces (Serial, SPI, and I2C)	1	9/01/2021		**TLM2**	CO4	T1	
27.	Programming Raspberry Pi with Python, Other IoTDevices	1	12/01/2021		**TLM2**	CO4	T1	
28.	**Assignment Test-4**	1	12/01/2021		**TLM6**	CO4	T1	
No. of classes required to complete UNIT-IV		5			No. of classes taken:			

UNIT-V:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly

29.	Introduction to Cloud Storage Models & Communication APIs	1	19/01/2021		**TLM1**	CO5	T1	
30.	WAMP - AutoBahn for IoT	1	21/01/2021		**TLM1**	CO5	T1	
31.	Xively Cloud for IoT	1	23/01/2021		**TLM1**	CO5	T1	
32.	Python Web Application Framework – Django	1	29/01/2021		**TLM1**	CO5	T1	
33.	Designing a RESTful Web API	1	30/01/2021		**TLM1**	CO5	T1	
34.	**Assignment Test-5**	1	30/01/2021		**TLM6**	CO5	T1	
No. of classes required to complete UNIT-V		7			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
35.	Aurduino introduction	1	2/02/2021		**TLM1**		T1	
36.	Aurduino board and pins	1	4/02/2021		**TLM1**		T1	
37.	ESP8266 programming	1	06/02/2021		**TLM1**			
38.	ESP32 programming	1	11/02/2021		**TLM1**			

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

PART-C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz-1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz-2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D(>95%=5, 90-95%=4,85-90%=3,80-85%=2,75-80%=1)		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations	**1,2,3,4,5**	**E=60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyzecomplexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems anddesign 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.
4. **Conduct investigations of complex problems**: Use research-based knowledge and researchmethods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engine**ering 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.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in indep and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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 Analyse, 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.

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**

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 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 : 2020 - 2021

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):

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.	Security Attacks - Interruption, Interception	1	02-11-2020			
2.	Modification and Fabrication Passive and Active Attacks	1	04-11-2020			
3.	Security Services - Confidentiality, Authentication, Integrity	1	05-11-2020			
4.	Non-repudiation, Access Control and Availability Security Mechanisms	1	07-11-2020			
5.	Substitution, Transposition Techniques	1	09-11-2020			
6.	A Model for Internetwork security, Access Security Model	1	11-11-2020			
7.	Conventional Encryption Principles	1	12-11-2020			
8.	Conventional Encryption Algorithms –DES		16-11-2020			
9.	Conventional Encryption Algorithms -AES	1	18-11-2020			
10.	Conventional Encryption Algorithms – Triple DES and AES	1	19-11-2020			
11.	Cipher Block Modes of Operations CBC and CFB	1	21-11-2020			
12.	Stream Ciphers and RC4	1	23-11-2020			
13.	Location of Encryption Devices	1	25-11-2020			
14.	Key Distribution	1	26-11-2020			
15.	Unit Overview and Discussion, Assignment 1	1	28-11-2020			
No. of classes required to complete UNIT-I		15		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
16.	Approaches of Message Authentication	1	30-11-2020			
17.	Secure Hash Functions (SHA-1)	1	02-12-2020			
18.	SHA-512	1	03-12-2020			
19.	HMAC Algorithm	1	05-12-2020			
20.	Public Key Cryptography principles	1	07-12-2020			
21.	Public-Key Encryption Algorithm- RSA	1	09-12-2020			
22.	Diffie –Hellman Key Exchange Algorithm	1	10-12-2020			
23.	Digital Signatures	1	12-12-2020			
24.	Public Key Infrastructure, Digital Certificates	1	14-12-2020			
25.	Certificate Authority, Key Management	1	16-12-2020			
26.	Kerberos, X.509 Directory Authentication Service	1	17-12-2020			
27.	Unit Overview and Discussion, Assignment-2	1	19-12-2020			
No. of classes required to complete UNIT-II		12		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
28.	Email privacy, Pretty Good Privacy (PGP)	1	28-12-2020			
29.	PGP Key Management	1	30-12-2020			
30.	MIME and S/ MIME	1	31-12-2020			
31.	IP Security Overview, IP Security Architecture,	1	02-01-2021			
32.	Authentication Header Encapsulating Security Payload,	1	04-01-2021			
33.	Tunnel and Transport Modes	1	06-01-2021			
34.	Combining Security Associations, Key Exchange	1	07-01-2021			
35.	Cryptographic Suites	1	09-01-2021			
36.	Unit Overview and Discussion	1	11-01-2021			
37.	Assignment - 3	1	18-01-2021			
No. of classes required to complete UNIT-III		10		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
38.	Web Security Requirements	1	20-01-2021			
39.	Secure Socket Layer (SSL) Architecture, Protocols	1	21-01-2021			
40.	SSL Handshake Protocol	1	23-01-2021			
41.	Transport Layer Security	1	25-01-2021			
42.	Transport Layer Security Approaches	1	27-01-2021			
43.	Secure Electronic Transaction (SET)	1	28-01-2021			
44.	Payment Processing	1	30-01-2021			
45.	HTTPs. HTTP vs HTTPs	1	01-02-2021			
46.	Unit Overview and Discussion	1	03-02-2021			
47.	Assignment - 4	1	04-02-2021			
No. of classes required to complete UNIT-IV		10		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
48.	Intruders	1	06-02-2021			
49.	Viruses and Related Threats	1	08-02-2021			
50.	Firewall Design principles	1	10-02-2021			
51.	Trusted System	1	11-02-2021			
52.	Introduction to Database Security and authorization	1	13-02-2021			
53.	Database authorization	1	15-02-2021			
54.	Unit Overview and Discussion	1	17-02-2021			
55.	Assignment - 5	1	18-02-2021			
56.	Review	1	20-02-2021			
No. of classes required to complete UNIT-V		09		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 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	**Ethic**s: 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:** 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	Course Coordinator	Module Coordinator	HOD
Mr.CH. SRINIVASA RAO	**Dr. M. SITHA RAM**	**DR. D. JAGAN MOHAN REDDY**	**DR. D. VEERAIAH**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., VII-Sem., CSE

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Artificial Intelligence (AI) - 17CI23

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Mr.N V NAIK

COURSE COORDINATOR: Mr.N V NAIK

PRE-REQUISITE: Knowledge of Algorithms and *Probability and Statistics.*

COURSE OBJECTIVE: 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 and 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, a clear view of state space in search, game playing procedures, expert systems, and advanced concepts like swarm intelligent systems.

COURSE OUTCOMES (COs)

CO1: Analyse the design specifications for the structure of agents and distinguish among heuristic techniques.

CO2: Identify approaches and issues in knowledge representation and formulate propositional and predicate logic.

CO3: Formulate the logic of non-monotonic reasoning and apply the techniques in uncertainty domain.

CO4: Analyse the planning and learning techniques in state space search.

CO5: Formulate the design specification of game playing techniques, analyze expert systems, robotics, and swarm intelligence systems.

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- Lightly(33%) **2 -** Moderately(66%), **3 -** Strongly (100%).

BOS APPROVED TEXT BOOKS:

T1 1. Elaine Rich, Kevin Knight and ShivashankarB.Nair, ―Artificial Intelligence‖, TMH, Third edition, 2009. (UNITs I, II, III & V).
T2 2. Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, Second edition, 2003. (UNIT IV).
T3 3. N. P. Padhy, ―Artificial Intelligence and Intelligent System‖, Oxford University Press, Secondedition, 2005. (UNIT V).

BOS APPROVED REFERENCE BOOKS:

R1 RajendraAkerkar, ―Introduction to Artificial Intelligence‖, PHI, 2005.
R2 2. Patrick Henry Winston, ―Artificial Intelligence‖, Pearson Education Inc., Third edition,2001.
R3 3. Eugene Charniak and Drew Mc Dermott, ―Introduction to Artificial Intelligence", Addison Wesley, ISE Reprint, 1998.
R4 4. Nils J.Nilsson, ―Artificial Intelligence - A New Synthesis", Harcourt Asia Pvt.Ltd.,Morgan Kaufmann, 1988.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Introduction to Artificial Intelligence

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	History of AI	2	02/11/2020 03/11/2020		**TLM2**	CO1	T1	
2.	Intelligent agents	2	03/11/2020 05/11/2020		**TLM2**	CO1	T1	
3.	Structure of agents and its functions	1	09/11/2020		**TLM2**	CO1	T1	
4.	Problem spaces and search	2	10/11/2020 10/11/2020		**TLM2**	CO1	T1	
5.	Heuristic Search techniques	3	12/11/2020 16/11/2020 17/11/2020		**TLM2**	CO1	T1	
6.	Problem reduction	1	17/11/2020		**TLM2**	CO1	T1	
7.	Constraint satisfaction	1	23/11/2020		**TLM2**	CO1	R1	
8.	Means Ends Analysis	1	26/11/2020		**TLM2**	CO1	T1	
No. of classes required to complete UNIT-I		13			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	Approaches and issues in knowledge representation	2	30/11/2020 01/12/2020		**TLM2**	CO2	T1	
10.	Knowledge - Based Agent	1	01/12/2020		**TLM2**	CO2	T1	
11.	Propositional Logic	1	03/12/2020		**TLM2**	CO2	T1	
12.	Predicate logic	2	07/12/2020 08/12/2020		**TLM2**	CO2	T1	
13.	Unification	1	08/12/2020		**TLM2**	CO2	T1	
14.	Resolution	2	10/12/2020 14/12/2020		**TLM2**	CO2	T1	
15.	Weak slot – filler structure	2	15/12/2020 15/12/2020		**TLM2**	CO2	T1	
16.	Strong slot - filler structure	2	17/12/2020 21/12/2020		**TLM2**	CO2	T1	
No. of classes required to complete UNIT-II		13			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Logics of non-monotonic reasoning	2	22/12/2020 22/12/2020		**TLM2**	CO3	T1	
18.	Implementation-Basic probability notation	2	24/12/2020 5/01/2021		**TLM2**	CO3	T1	
19.	Bayes rule, Certainty factors and rule-based systems	2	5/01/2021 7/01/2021		**TLM2**	CO3	T1	
20.	Bayesian networks, Dempster – Shafer Theory	2	11/01/2021 12/01/2021		**TLM2**	CO3	T1	
21.	Fuzzy Logic	1	12/01/2021		**TLM2**	CO3	T1	
No. of classes required to complete UNIT-III		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
22.	Planning with state space search	2	18/01/2021 19/01/2021		**TLM2**	CO4	T2	
23.	Multi-Agent planning	1	19/01/2021		**TLM2**	CO4	T2	
24.	Forms of learning	2	21/01/2021 25/1/2021		**TLM2**	CO4	T2	
25.	inductive learning	2	28/01/2021 1/02/2021		**TLM2**	CO4	T2	
26.	Reinforcement Learning, learning decision trees	1	04/02/2021		**TLM2**	CO4	T2	
27.	Neural Net learning and Genetic learning	1	08/02/2021		**TLM2**	CO4	T2	
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
28.	Minimax search procedure	1	09/02/2021		**TLM2**	CO5	T1	
29.	Adding alpha-beta cutoffs.	1	09/02/2021		**TLM2**	CO5	T1	
30.	Representation - Expert System shells	1	11/02/2021		**TLM2**	CO5	T3	
31.	Knowledge Acquisition	1	15/02/2021		**TLM2**	CO5	T1	
32.	Hardware - Robotic Perception	1	16/02/2021		**TLM2**	CO5	T1	
33.	Robotic applications	1	16/02/2021		**TLM2**	CO5	T3	
34.	Application and Working of Ant Colony System.	1	18/02/2021		**TLM2**	CO5	T3	
No. of classes required to complete UNIT-V		07			No. of classes taken:			

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

EVALUATION PROCESS:

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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.
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.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing 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.
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.

PROGRAM SPECIFIC OUTCOMES

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Jagan Mohan Reddy
Course Name & Code : Pattern Recognition & 17CI26
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: Basic knowledge of probability &statistics, data mining.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The main objective of this course is that the concept of a pattern and the basic 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

CO 1	Analyse classification problems probabilistically and estimate classifier performance
CO 2	Understand the concepts of Bayesian decision theory
CO 3	Apply Maximum-likelihood parameter estimation in relatively complex probabilistic models
CO 4	Apply unsupervised learning algorithms to data objects & Analyze clustering algorithms
CO5	Apply 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	-	-	-	-	-	-	-	1	-	3	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	3	-
CO3	2	2	3	1	-	-	-	-	-	-	-	1	-	3	-
CO4	2	3	3	1	-	-	-	-	-	-	-	1	-	3	-
CO5	2	2	3	1	-	-	-	-	-	-	-	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	Pattern Classification, Book by David G. Stork, Peter E. Hart, and Richard O. Duda
T2	Pattern Recognition, Konstantinos Koutroumbas, Sergios Theodoridis

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
1.	Introduction to PR	1	02-11-2020		TLM2	
2.	Machine perception, pattern recognition example	1	04-11-2020		TLM2	
3.	pattern recognition systems	1	06-11-2020		TLM2	
4.	The Design cycle	1	09-11-2020		TLM2	
5.	learning and adaptation	1	11-11-2020		TLM2	
6.	Bayesian Decision Theory	1	13-11-2020		TLM2	
7.	continuous features – two categories classifications	1	16-11-2020		TLM2	
8.	minimum error-rate	1	18-11-2020		TLM2	
9.	classification-zero–one loss function, classifiers, discriminant functions, decision surface	1	20-11-2020		TLM2	
No. of classes required to complete UNIT-I:09				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.	**Normal density:** Univariate and multivariate density	1	23-11-2020		TLM2	
2.	discriminant functions for the normal Density different cases	1	25-11-2020		TLM2	
3.	discriminant functions for the normal Density different cases	1	27-11-2020		TLM2	
4.	Bayes decision theory	1	30-11-2020		TLM2	
5.	Bayes decision theory	1	04-12-2020		TLM2	
6.	Bayes decision theory - discrete features	1	07-12-2020		TLM2	
7.	compound Bayesian decision theory and context	1	09-12-2020		TLM2	
8.	compound Bayesian decision theory and context	1	11-12-2020		TLM2	
No. of classes required to complete UNIT-II:08				No. of classes taken:		
I MID EXAMINATIONS FROM 21-12-2020 TO 26-12-2020						

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.	Maximum likelihood Estimation	1	14-12-2020		TLM2	
2.	MLE examples	1	16-12-2020		TLM2	
3.	MLE examples	1	18-12-2020		TLM2	
4.	Bayesian parameter estimation	1	21-12-2020		TLM2	
5.	Bayesian parameter estimation for Univariate	1	23-12-2020		TLM2	
6.	Bayesian parameter estimation for Multivariate	1	28-12-2020		TLM2	
7.	Bayesian parameter estimation for Guassian case	1	30-12-2020		TLM2	
No. of classes required to complete UNIT-III:07				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.	Un-supervised learning	1	4-01-2021		TLM2	
2.	Introduction, mixture densities and identifiability	1	6-01-2021		TLM2	
3.	maximum likelihood estimates	1	8-01-2021		TLM2	
4.	application to normal mixtures	1	11-01-2021		TLM2	
5.	K-means clustering	1	18-01-2021		TLM2	
6.	Example of K-means	1	20-01-2021		TLM2	
7.	Date description and clustering	1	22-01-2021		TLM2	
8.	similarity measures, criteria function for clustering	1	25-01-2021		TLM2	
No. of classes required to complete UNIT-IV:08				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.	Pattern recognition using discrete hidden Markov models	1	27-01-2021		TLM2	
2.	Discrete-time Markov process	1	29-01-2021		TLM2	
3.	Extensions to hidden Markov models	1	1-02-2021		TLM2	
4.	three basic problems of	1	3-02-2021		TLM2	

	HMMs					
5.	Types of HMMs	1	5-02-2021		TLM2	
6.	Continuous Hidden Markov models	1	8-02-2021		TLM2	
7.	multiple mixtures per state, speech recognition applications	1	10-02-2021		TLM2	
8.	Examples of Speech recognition	1	15-02-2021			
9.	Examples of Speech recognition	1	17-02-2021			
No. of classes required to complete UNIT-V:09				No. of classes taken:		
II MID EXAMINATIONS 22-02-2021 TO 27-02-2021						

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**
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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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.

Course Instructor Course Coordinator Module Coordinator HOD

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : M.SRI BALA
Course Name & Code : Information Retrieval Systems 17CS92
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: 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	PO4	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
1.	UNIT - I: Introduction: Definition, Objectives	1	02-11-2020		TLM2	
2.	Functional Overview Item Normalization	1	04-11-2020		TLM2	
3.	Selective dissemination AFB	1	06-11-2020		TLM2	
4.	Relationship to DBMS	1	09-11-2020		TLM2	
5.	Digital libraries and Data Warehouses	1	11-11-2020		TLM2	
6.	Information Retrieval System Capabilities: Search capabilities	1	13-11-2020		TLM2	
7.	Information Retrieval System Capabilities: Search capabilities	1	16-11-2020		TLM2	
8.	Information Retrieval System Capabilities: Search capabilities	1	18-11-2020		TLM2	
9.	Information Retrieval System Capabilities: Browse	1	20-11-2020		TLM2	
10.	Information Retrieval System Capabilities: Browse	1	23-11-2020		TLM2	
11.	Miscellaneous Capabilities	1	25-11-2020		TLM2	
No. of classes required to complete UNIT-I:09				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	27-11-2020		TLM2	
2.	Introduction, Stemming Algorithms	1	30-12-2020		TLM2	
3.	Inverted file structures	1	02-12-2020		TLM2	
4.	N-gram data structure,	1	04-12-2020		TLM2	
5.	PAT data structure	1	07-12-2020		TLM2	
6.	Signature file structure, Hypertext data structure	1	09-12-2020		TLM2	
7.	Signature file structure, Hypertext data structure	1	14-12-2020		TLM2	

8.	Cataloguing and Indexing Objectives	1	16-12-2020		TLM2	
9.	Indexing Process, Automatic Indexing	1	18-12-2020		TLM2	
10.	Information Extraction.	1	18-12-2020		TLM2	
No. of classes required to complete UNIT-II:09				No. of classes taken:		
I MID EXAMINATIONS FROM 21-12-2020 TO 26-12-2020						

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	28-12-2020		TLM2	
2.	Statistical indexing, Natural language	1	30 -12-2020		TLM2	
3.	Concept indexing, Hypertext linkages.	1	04-01-2021		TLM2	
4.	Document and Term Clustering: Introduction, Thesaurus generation	1	06-01-2021		TLM2	
5.	Item clustering	1	08-01-2021		TLM2	
6.	Hierarchy of clusters	1	11-01-2021		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	18-01-2021		TLM2	
2.	Search statements and binding, Similarity measures and ranking	1	20-01-2021		TLM2	
3.	Relevance feedback, Selective dissemination of information search	1	22-01-2021		TLM2	
4.	Relevance feedback, Selective dissemination of information search	1	25-01-2021			
5.	weighted searches of Boolean systems	1	27-01-2021		TLM2	
6.	Searching the Internet and hypertext	1	29-01-2021		TLM2	
7.	Information Visualization, Introduction, Cognition and	1	01-02-2021		TLM2	

	perception					
8.	Information visualization technologies.	1	03-02-2021		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	05-02-2021		TLM2	
2.	Text Search Algorithms Introduction, Software text search algorithms	1	08-02-2021		TLM2	
3.	Hardware text search systems.	1	10-02-2021		TLM2	
4.	Information System Evaluation: Introduction,	1	12-02-2021		TLM2	
5.	Measures used in system evaluation,	1	15-02-2021		TLM2	
6.	Measurement example – TREC results	1	17-02-2021		TLM2	
7.	Revision	1	19-02-2021		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		
II MID EXAMINATIONS 22-02-2021 TO 27-02-2021						

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**
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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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.
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 (Name)	Course Coordinator (Name)	Module Coordinator (Name)	HOD (Name)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Eeshwar Ram.J
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 - A.Y : 2020-21

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
1.	Building Planning- Role of a Civil Engineer	1	02-11-2020		**TLM2**	
2.	Inter connection among specializations in Civil Engineering	1	05-11-2020		**TLM2**	
3.	Elements of a Building, Basic Requirements of a Building	1	07-11-2020		**TLM2**	
4.	Planning- Hot and dry climates	1	09-11-2020		**TLM2**	
5.	Hot and wet climates, Cold climatic conditions	1	12-11-2020		**TLM2**	
6.	Aspect and Prospect, Roominess- Grouping, Privacy, circulation	1	14-11-2020		**TLM2**	
7.	Sanitation and ventilation	1	16-11-2020		**TLM2**	
8.	Orientation, Economy, Role of Bye-laws	1	19-11-2020		**TLM2**	
No. of classes required to complete UNIT-I:				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	21-11-2020		**TLM2**	
2.	Rocks, Bricks Classification, Composition, Properties, Commercial forms, Uses	1	23-11-2020		**TLM2**	
3.	Timber, Ply wood Classification, Composition, Properties, Commercial forms	1	26-11-2020		**TLM2**	
4.	Glass, Bitumen Classification, Composition, Properties, Commercial forms,	1	28-11-2020		**TLM2**	
5.	Aluminium, Cement Classification, Composition, Properties, Commercial forms,	1	30-11-2020		**TLM2**	
6.	Steel, Concrete Classification, Composition, Properties,	1	03-12-2020		**TLM2**	

	Commercial forms, Uses					
7.	Mortar Classification, Composition, Properties, Commercial forms, Uses	1	05-12-2020		**TLM2**	
8.	Concept of eco-friendly materials, examples	1	07-12-2020		**TLM2**	
No. of classes required to complete UNIT-II:				No. of classes taken:		

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	10-12-2020		**TLM2**	
2.	Engineering properties	1	12-12-2020		**TLM2**	
3.	Bearing Capacity of soil, purpose and methods of improving bearing capacity	1	14-12-2020		**TLM2**	
4.	Foundations – Requirements	1	17-12-2020		**TLM2**	
5.	Loads, Types	1	19-12-2020		**TLM2**	
6.	for special structures-water tanks-	1	02-01-2021		**TLM2**	
7.	for special structures- silos, chimneys- transmission line towers- cooling towers, telecommunication towers	1	04-01-2021		**TLM2**	
No. of classes required to complete UNIT-III:07				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	07-01-2021		**TLM2**	
2.	theodolite, levelling, contour maps, Planimeter, EDM concept	1	09-01-2021		**TLM2**	
3.	linear distance and area measurement	1	11-01-2021		**TLM2**	
4.	Total station- GIS-Concept and applications in civil engineering.	1	14-01-2021		**TLM2**	
5.	Indian highways- Basic terminology- Classification of roads - PIEV theory - Traffic signs - IRC Code provisions	1	16-01-2021		**TLM2**	
6.	Indian railways –Permanent way and components of railway track	1	18-01-2021		**TLM2**	
7.	Gauges – Rails -Sleepers – Ballast.	1	21-01-2021		**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 supply-Hydrologic cycle	1	23-01-2021		**TLM2**	
2.	Rainfall measurement - Purpose of dams, reservoirs, intakes, infiltration galleries	1	28-01-2021		**TLM2**	
3.	Water demands –Water quality parameters and their impacts - Principles of water treatment	1	30-01-2021		**TLM2**	
4.	Objectives and methods of water distribution systems – Sewage generation in a society –	1	01-02-2021		**TLM2**	
5.	Wastewater characteristics and their impacts	1	04-02-2021		**TLM2**	
6.	Principles of sewage treatment	1	06-02-2021		**TLM2**	
7.	Disposal of sewage	1	15-02-2021		**TLM2**	
8.	Water quality standards for – drinking purpose,	1	18-02-2021		**TLM2**	
9.	irrigation, -making and curing of concrete	1	20-02-2021		**TLM2**	
No. of classes required to complete UNIT-V:09				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 problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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	Course Coordinator	Module Coordinator	HOD
(Eeshwar Ram.J)	(Eeshwar Ram.J)	(B.Narasimha Rao)	(Dr. D.Veeraiah)

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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: 2019 - 2020

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
1.	Installation of R, along with Practice examples in R.	2	04-11-2020		TLM2/ TLM4	
2.	Installation of R, along with Practice examples in R.	2	11-11-2020		TLM2/ TLM4	
3.	Installation of R, along with Practice examples in R.	2	18-11-2020		TLM2/ TLM4	
4.	Downloading and installing Hadoop; Understanding different Hadoop modes. Startup scripts,	2	25-11-2020		TLM2/ TLM4	

	Configuration files.					
5.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2	02-12-2020		TLM2/ TLM4	
6.	Implementation of Matrix Multiplication with Hadoop Map Reduce	2	09-12-2020		TLM2/ TLM4	
7.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2	16-12-2020		TLM2/ TLM4	
8.	Implementation of K-means clustering using map reduce	2	23-12-2020		TLM2/ TLM4	
9.	Installation of Hive along with practice examples	2	30-12-2020		TLM2/ TLM4	
10.	Installation of Hive along with practice examples	2	06-1-2021		TLM2/ TLM4	
11.	Installation of HBase, Installing thrift along with Practice examples	2	20-1-2021		TLM2/ TLM4	
12.	Installation of HBase, Installing thrift along with Practice examples	2	28-1-2021 04-02-2021		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.
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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
G V Suresh	G.V. SURESH	DR. D.VEERAIAH	DR. D.VEERAIAH

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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., Section – A A.Y : 2020 - 2021

PRE-REQUISITE: PYTHON PROGRAMMING

COURSE OBJECTIVE: The objective of this course, 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, the student will be able to:

CO1	Understand the application areas of IOT.
CO2	Understand building blocks of Internet of Things and characteristics.
CO3	Understand enabling technologies Embedded Devices and communication protocols for Hands on activities. Write programs using Python for processing Internet of Things.

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

COs	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
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
1.	Introduction to IoT, Aurduino, Raspberry Pi	2	6/11/2020		TLM2/ TLM4	
2.	Installation of NOOBs	2	13/11/2020		TLM2/ TLM4	
3.	Start Raspberry Pi and try various Linux commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.	2	20/11/2020		TLM2/ TLM4	
4.	1. Run some python programs on Pi like: 2. Read your name and print Hello message with name 3. Read two numbers and print their sum, difference, product and division. 4. Word and character count of a given string 5. Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input 6. Print a name 'n' times, where name and n are read from standard input, using for and while loops. 7. Handle Divided by Zero Exception. 8. Print current time for 10 times with an interval of 10 seconds. 9. Read a file line by line and print the word count of each line.	2	27/11/2020		TLM2/ TLM4	
5.	1. Light an LED through Python program 2. Get input from two switches and switch on corresponding LEDs 3. Flash an LED at a given on time and off time cycle, where the two times are taken from a file.	2	04/12/2020		TLM2/ TLM4	

6.	1. Flash an LED based on cron output (acts as an alarm) 2. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.	2	11/12/2020		TLM2/ TLM4	
7.	1. Access an image through a Pi web cam. 2. Control a light source using web page.	2	18/12/2020		TLM2/ TLM4	
8.	1. Implement an intruder system that sends an alert to the given email. 2. Get the status of a bulb at a remote place (on the LAN) through web.	2	08/01/2021		TLM2/ TLM4	
9.	1. Get an alarm from a remote area (through LAN) if smoke is detected. 2. Display the room temperature on the display devices using sensors.	2	22/01/2021		TLM2/ TLM4	
10.	The student should have hands on experience in using various sensors like humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.	2	29/01/2021		TLM2/ TLM4	
11.	Lab Internal Exam	2	05/02/2021			

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

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.
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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
B S R KRISHNA	B S R KRISHNA	DR. D.VEERAIAH	DR. D.VEERAIAH

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http://cse.lbrce.ac.in, cselbreddy@gmail.com, Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. S. SRINIVASA 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 : 2020 - 2021

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):

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- 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 Jefrey 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	02-11-2020			
2.	Big data characteristics, The Promotion of the Value of Big Data	1	03-11-2020			
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	04-11-2020			
4.	stages of analytical evolution, State of the Practice in Analytics	1	05-11-2020			
5.	The Data Scientist	1	09-11-2020			
6.	Big Data Analytics in Industry Verticals	1	10-11-2020			
7.	Data Analytics Lifecycle	1	11-11-2020			
8.	Data Analytics Lifecycle	1	12-11-2020			
9.	Data Analytics Lifecycle	1	16-11-2020			
10.	Basic Data Analytic Methods Using R	1	17-11-2020			
11.	Basic Data Analytic Methods Using R	1	18-11-2020			
12.	Big Data Use Cases-Characteristics of Big Data Applications	1	19-11-2020			
13.	Big Data Use Cases-Characteristics of Big Data Applications	1	23-11-2020			
14.	Assignment – 1	1	24-11-2020			
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	1	25-11-2020			

	Unstructured Data					
16.	MapReduce and Hadoop	1	26-11-2020			
17.	The design of HDFS	1	30-11-2020			
18.	HDFS concepts	1	01-12-2020			
19.	Command line interface to HDFS	1	02-12-2020			
20.	Hadoop File system Interfaces	1	03-12-2020			
21.	Java Interface to Hadoop	1	07-12-2020			
22.	Anatomy of a file read, Anatomy of a file write	1	08-12-2020			
23.	Replica placement and Coherency Model	1	09-12-2020			
24.	Parallel copying with distcp	1	10-12-2020			
25.	keeping an HDFS cluster balanced	1	14-12-2020			
26.	Advantages of Hadoop and HDFS	1	15-12-2020			
27.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	16-12-2020			
28.	Assignment - 2	1	17-12-2020			
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	21-12-2020			
30.	Anatomy of a Map Reduce Job Run	1	04-01-2021			
31.	Failures, Job Scheduling	1	05-01-2021			
32.	Failures, Job Scheduling	1	06-01-2021			
33.	Shuffle and Sort	1	07-01-2021			
34.	Task Execution	1	11-01-2021			
35.	Map Reduce Types and Formats	1	18-01-2021			
36.	Map Reduce Features	1	19-01-2021			
37.	Map Reduce Features	1	20-01-2021			
38.	Assignment - 3	1	21-01-2021			
No. of classes required to complete UNIT-III		10				

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
39.	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	25-01-2021			
40.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	27-01-2021			
41.	Pig: Introduction to PIG, Execution Modes of Pig Comparison of Pig with Databases, Grunt, Pig Latin.	1	28-01-2021			
42.	User Defined Functions, Data Processing operators	1	02-02-2021			
43.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	03-02-2021			
44.	Querying Data and User Defined Functions	1	01-02-2021			
45.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	04-02-2021			
46.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	08-02-2021			
47.	Big SQL: Introduction	1	09-02-2021			
48.	Assignment - 4	1	10-02-2021			
No. of classes required to complete UNIT-IV		07				

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
49.	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	1	11-02-2021			
50.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	15-02-2021			
51.	Data Visualization Techniques	1	16-02-2021			
52.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	17-02-2021			

53.	Collaborative Filtering, Big Data Analytics with BigR, Data models for managing big data, Real-time streaming data analytics	1	18-02-2021			
54.	Scalable analytics on large data sets, Systems architecture for big data management	1	18-02-2021			
55.	Main memory data management techniques	1	19-02-2021			
56.	Assignment - 5	1	19-02-2021			
57.	Review	1	19-02-2021			
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 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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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. S. SRINIVASA REDDY	**Mr. G. V. SURESH**	**DR. D. JAGAN MOHAN REDDY**	**DR. D. VEERAIAH**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: SHAIK JOHNY BASHA
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.:** 2020-21

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 Madisetti, —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 Kellmereit, —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
1.	Introduction to IoT	1	02/11/2020			
2.	Definition and Characteristics of IoT	1	03/11/2020			
3.	Physical Design of IoT Part-1	1	06/11/2020			
4.	Physical Design of IoT Part-2	1	09/11/2020			
5.	Logical Design of IoT Part-1	1	10/11/2020			
6.	Logical Design of IoT Part-2	1	13/11/2020			
7.	IoT Enabled Technologies	1	16/11/2020			
8.	IoT Levels	1	17/11/2020			
9.	IoT Deployment Templates	1	20/11/2020			
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	23/11/2020			
11.	Home Automation	1	24/11/2020			
12.	Smart Cities	1	27/11/2020			
13.	Environment	1	30/11/2020			
14.	Energy	1	01/12/2020			
15.	Retail & Logistics	1	04/12/2020			
16.	Agriculture	1	07/12/2020			
17.	Industry	1	08/12/2020			
18.	Health & Lifestyle	1	11/12/2020			
No. of classes required to complete UNIT-II: 09				**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	14/12/2020			
20.	Difference between IoT and M2M	1	15/12/2020			
21.	Traditional Networking and SDN	1	18/12/2020			
22.	NFV for IoT	1	28/12/2020			
23.	Need for IoT Systems Management	1	29/12/2020			
24.	Simple Network management Protocol (SNMP)	1	04/01/2021			
25.	NETCONF, YANG	1	05/01/2021			
26.	YANG-NETCONF	1	08/01/2021			
27.	NETOPEER	1	11/01/2021			
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	12/01/2021			
29.	Raspberry Pi and its Configuration	1	18/01/2021			
30.	Linux on Raspberry Pi	1	19/01/2021			
31.	Raspberry Pi Interfaces	1	22/01/2021			
32.	Programming Pi with Python Part-1	1	25/01/2021			

33.	Programming Pi with Python Part-2	1	01/02/2021			
34.	Other IoT Devices	1	29/01/2021			
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	02/02/2021			
36.	Cloud Storage Models & Communication APIs	1	05/02/2021			
37.	WAMP - AutoBahn for IoT	1	08/02/2021			
38.	Commands for Installing AutoBahn	1	09/02/2021			
39.	Xively Cloud for IoT	1	12/02/2021			
40.	Python Web Application Framework – Django	1	15/02/2021			
41.	Example Programs on Django	1	16/02/2021			
42.	Designing a RESTful Web API	1	19/02/2021			
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.
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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	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. Shaik Johny Basha**	**Mr. B. Siva Rama Krishna**	**Dr. D. Jagan Mohan Reddy**	**Dr. D. Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. M. SITHA RAM
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 : 2020 - 2021

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 antilight 's different types of cipher mechanisms and various symmetric and asymmetric algorithms. Also provides the knowledge on digital signatures, different threats, viruses, intruders and firewalls.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

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.	Security Attacks - Interruption, Interception	1	02-11-2020			
2.	Modification and Fabrication Passive and Active Attacks	1	04-11-2020			
3.	Security Services - Confidentiality, Authentication, Integrity	1	05-11-2020			
4.	Non-repudiation, Access Control and Availability Security Mechanisms	1	06-11-2020			
5.	A Model for Internetwork security, Access Security Model	1	09-11-2020			
6.	Conventional Encryption Principles, Conventional Encryption Algorithms – DES	1	11-11-2020			
7.	Conventional Encryption Algorithms -DES	1	12-11-2020			
8.	Conventional Encryption Algorithms – Triple DES and AES	1	13-11-2020			
9.	Cipher Block Modes of Operations CBC and CFB	1	16-11-2020			
10.	Stream Ciphers and RC4	1	18-11-2020			
11.	Location of Encryption Devices	1				

12.	Key Distribution	1	19-11-2020			
13.	Unit Overview and Discussion	1	20-11-2020			
14.	Assignment – 1	1	23-11-2020			
No. of classes required to complete UNIT-I		14				

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
15.	Approaches of Message Authentication	1	25-11-2020			
16.	Secure Hash Functions (SHA-1)	1	26-11-2020			
17.	SHA-512	1	27-11-2020			
18.	HMAC Algorithm	1	30-11-2020			
19.	Public Key Cryptography principles	1	02-12-2020			
20.	Public-Key Encryption Algorithm- RSA	1	03-12-2020			
21.	Diffie –Hellman Key Exchange Algorithm	1	04-12-2020			
22.	Digital Signatures	1	07-12-2020			
23.	Public Key Infrastructure, Digital Certificates	1	09-12-2020			
24.	Certificate Authority, Key Management	1	10-12-2020			
25.	Kerberos	1	11-12-2020			
26.	X.509 Directory Authentication Service	1	14-12-2020			
27.	Unit Overview and Discussion	1	16-12-2020			
28.	Assignment - 2	1	17-12-2020			
No. of classes required to complete UNIT-II		14				

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
29.	Email privacy, Pretty Good Privacy (PGP)	1	18-12-2020			
30.	PGP Key Management	1	28-12-2020			
31.	MIME and S/ MIME	1	30-12-2020			
32.	IP Security Overview, IP Security Architecture,	1	31-12-2020			
33.	Authentication Header Encapsulating Security Payload,	1	04-01-2021			

34.	Tunnel and Transport Modes	1	06-01-2021			
35.	Combining Security Associations, Key Exchange	1	07-01-2021			
36.	Cryptographic Suites	1	08-01-2021			
37.	Unit Overview and Discussion	1	11-01-2021			
38.	Assignment - 3	1	18-01-2021			
No. of classes required to complete UNIT-III		10				

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
39.	Web Security Requirements	1	20-01-2021			
40.	Secure Socket Layer (SSL) Architecture, Protocols	1	21-01-2021			
41.	SSL Handshake Protocol	1	22-01-2021			
42.	Transport Layer Security	1	25-01-2021			
43.	Transport Layer Security Approaches	1	27-01-2021			
44.	Secure Electronic Transaction (SET)	1	28-01-2021			
45.	Payment Processing	1	29-01-2021			
46.	HTTPs. HTTP vs HTTPs	1	01-02-2021			
47.	Unit Overview and Discussion	1	03-02-2021			
48.	Assignment - 4	1	04-02-2021			
No. of classes required to complete UNIT-IV		07				

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
49.	Intruders	1	05-02-2021			
50.	Viruses and Related Threats	1	08-02-2021			
51.	Firewall Design principles	1	10-02-2021			
52.	Trusted System	1	11-02-2021			
53.	Introduction to Database Security and authorization	1	12-02-2021			
54.	Database authorization	1	15-02-2021			
55.	Unit Overview and Discussion	1	17-02-2021			
56.	Assignment - 5	1	18-02-2021			
57.	Review	1	19-02-2021			
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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PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
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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.
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PSO 3	**Software Engineering:** To inculcate an ability to analyze, design and implement database applications.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. M. SITHA RAM	**Dr. M. SITHA RAM**	**DR. D. JAGAN MOHAN REDDY**	**DR. D. VEERAIAH**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., VII-Sem., B-Sec

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : **Artificial Intelligence (AI) - 17CI23**

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **A.Praneetha**

COURSE COORDINATOR : **Mr.N V Naik**

PRE-REQUISITE: Knowledge of Algorithms

COURSE OBJECTIVE: 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 and 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, a clear view of state space in search, game playing procedures, expert systems, and advanced concepts like swarm intelligent systems.

COURSE OUTCOMES (COs)

CO1: Analyse the design specifications for the structure of agents and distinguish among heuristic techniques.

CO2: Identify approaches and issues in knowledge representation and formulate propositional and predicate logic.

CO3: Formulate the logic of non-monotonic reasoning and apply the techniques in uncertainty domain.

CO4: Analyse the planning and learning techniques in state space search.

CO5: Formulate the design specification of game playing techniques, analyze expert systems, robotics, and swarm intelligence systems.

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- Lightly(33%) **2 -** Moderately(66%), **3 -** Strongly (100%).

BOS APPROVED TEXT BOOKS:

T1 1. Elaine Rich, Kevin Knight and ShivashankarB.Nair, —Artificial Intelligence‖, TMH, Third edition, 2009. (UNITs I, II, III & V).
T2 2. Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, Second edition, 2003. (UNIT IV).
T3 3. N. P. Padhy, —Artificial Intelligence and Intelligent System‖, Oxford University Press, Secondedition, 2005. (UNIT V).

BOS APPROVED REFERENCE BOOKS:

R1 RajendraAkerkar, —Introduction to Artificial Intelligence‖, PHI, 2005.
R2 2. Patrick Henry Winston, —Artificial Intelligence‖, Pearson Education Inc., Third edition,2001.
R3 3. Eugene Charniak and Drew Mc Dermott, —Introduction to Artificial Intelligence", Addison Wesley, ISE Reprint, 1998.
R4 4. Nils J.Nilsson, —Artificial Intelligence - A New Synthesis", Harcourt Asia Pvt.Ltd.,Morgan Kaufmann, 1988.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A
UNIT-I : Introduction to Artificial Intelligence

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	History of AI	1	02/11/2020		**TLM2**	CO1	T1	
2.	Intelligent agents	1	03/11/2020		**TLM2**	CO1	T1	
3.	Structure of agents and its functions	1	04/11/2020		**TLM2**	CO1	T1	
4.	Problem spaces and search	1	06/11/2020		**TLM2**	CO1	T1	
5.	Problem spaces and search	1	09/11/2020		**TLM2**	CO1	T1	

6.	Heuristic Search techniques	1	10/11/2020		**TLM2**	CO1	T1	
7.	Heuristic Search techniques	1	11/11/2020		**TLM2**	CO1	T1	
8.	Heuristic Search techniques	1	11/11/2020		**TLM2**	CO1	T1	
9.	Problem reduction	1	13/11/2020		**TLM2**	CO1	T1	
10.	Constraint satisfaction	1	16/11/2020		**TLM2**	CO1	T1	
11.	Means Ends Analysis	1	17/11/2020		**TLM2**	CO1	T1	
12.	Production Systems	1	18/11/2020		**TLM2**	CO1	T1	
13.	Revision of unit-1	1	20/11/2020		**TLM2**	CO1	T1	
No. of classes required to complete UNIT-I		13			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Introduction to knowledge representation	1	23/11/2020		**TLM2**	CO2	T1	
15.	Approaches & issues in knowledge representation	1	24/11/2020		**TLM2**	CO2	T1	
16.	Knowledge - Based Agent	1	25/11/2020		**TLM2**	CO2	T1	
17.	Propositional Logic	1	27/11/2020		**TLM2**	CO2	T1	
18.	Propositional Logic	1	30/11/2020		**TLM2**	CO2	T1	
19.	Predicate logic	1	01/12/2020		**TLM2**	CO2	T1	
20.	Predicate logic	1	02/12/2020		**TLM2**	CO2	T1	
21.	Unification	1	04/12/2020		**TLM2**	CO2	T1	

22.	Resolution	1	07/12/2020		**TLM2**	CO2	T1	
23.	Weak slot – filler structure	1	08/12/2020		**TLM2**	CO2	T1	
24.	Weak slot – filler structure	1	09/12/2020		**TLM2**	CO2	T1	
25.	Strong slot - filler structure	1	11/12/2020		**TLM2**	CO2	T1	
26.	Strong slot - filler structure	1	14/12/2020		**TLM2**	CO2		
27.	Revision of unit-2 &1	1	15/12/2020		**TLM2**	CO2	T1	
No. of classes required to complete UNIT-II		13			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
28.	Introduction to Reasoning under	1	17/12/2020		**TLM2**	CO3	T1	
29.	Logics of non-monotonic	1	18/12/2020					
30.	Implementation-Basic probability notation	1	28/12/2020		**TLM2**	CO3	T1	
31.	Bayes rule, Certainty factors and rule-based systems	1	30/12/2020		**TLM2**	CO3	T1	
32.	Bayesian networks,	1	04/01/2021		**TLM2**	CO3	T1	
33.	Dempster – Shafer Theory	1	05/01/2021					
34.	Fuzzy Logic	1	06/01/2021		**TLM2**	CO3	T1	
35.	Revision	1	08/01/2021					
No. of classes required to complete UNIT-III		08			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
36.	Planning with state space search	1	11/01/2021		**TLM2**	CO4	T2	
37.	Planning and acting in real world	1	12/01/2021		**TLM2**	CO4	T2	
38.	Types of Planning	1	18/01/2021					
39.	Forms of learning	1	19/01/2021		**TLM2**	CO4	T2	
40.	Inductive learning(Learning with examples)	1	20/01/2021		**TLM2**	CO4	T2	
41.	Reinforcement Learning,	1	22/01/2021		**TLM2**	CO4	T2	
42.	Learning decision trees	1	25/01/2021					
43.	Neural Net learning	1	27/01/2021		**TLM2**	CO4	T2	
44.	Genetic learning	1	29/01/2021					
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
45.	Minimax search procedure	1	01/02/2021		**TLM2**	CO5	T3	
46.	Adding alpha-beta cutoffs.	1	02/02/2021		**TLM2**	CO5	T3	
47.	Expert System - Representation	1	03/02/2021		**TLM2**	CO5	T3	
48.	Expert System shells - Knowledge Acquisition	1	05/02/2021		**TLM2**	CO5	T3	
49.	Hardware - Robotic	1	08/02/2021		**TLM2**	CO5	T3	
50.	Hardware - Robotic Perception&Application	1	09/02/2021		**TLM2**	CO5	T3	

	domains							
51.	Hardware - Robotic Perception & Application domains	1	10/02/2021		**TLM2**	CO5	T3	
52.	Swarm Intelligent Syetmes – Ant Colony system	1	12/02/2021		**TLM2**	CO5	T3	
53.	Development of Ant Colony system	1	15/02/2021		**TLM2**	CO5	T3	
54.	Application of Ant Colony system	1	16/02/2021		**TLM2**	CO5	T3	
55.	Working of Ant Colony System.	1	17/02/2021		**TLM2**	CO5	T3	
56.	Revision	1	19/02/2021		**TLM2**	CO5	T3	
No. of classes required to complete UNIT-V		11			No. of classes taken:			

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

EVALUATION PROCESS:

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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.

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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing 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.
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.

PROGRAM SPECIFIC OUTCOMES

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..

2. **Data Engineering:**

   The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

3. **Software Engineering:**

   To inculcate an ability to analyze, design and implement database applications.

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Jagan Mohan Reddy
Course Name & Code : Pattern Recognition & 17CI26
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sections-B A.Y : 2020-21

PRE-REQUISITE: Basic knowledge of probability &statistics, data mining.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The main objective of this course is that the concept of a pattern and the basic 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

CO 1	Analyse classification problems probabilistically and estimate classifier performance
CO 2	Understand the concepts of Bayesian decision theory
CO 3	Apply Maximum-likelihood parameter estimation in relatively complex probabilistic models
CO 4	Apply unsupervised learning algorithms to data objects & Analyze clustering algorithms
CO5	Apply 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	-	-	-	-	-	-	-	1	-	3	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	-	3	-
CO3	2	2	3	1	-	-	-	-	-	-	-	1	-	3	-
CO4	2	3	3	1	-	-	-	-	-	-	-	1	-	3	-
CO5	2	2	3	1	-	-	-	-	-	-	-	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	Pattern Classification, Book by David G. Stork, Peter E. Hart, and Richard O. Duda
T2	Pattern Recognition, Konstantinos Koutroumbas, Sergios Theodoridis

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
1.	Introduction to PR	1	03-11-2020		TLM2	
2.	Machine perception, pattern recognition example	1	05-11-2020		TLM2	
3.	pattern recognition systems	1	07-11-2020		TLM2	
4.	The Design cycle	1	10-11-2020		TLM2	
5.	learning and adaptation	1	12-11-2020		TLM2	
6.	Bayesian Decision Theory	1	17-11-2020		TLM2	
7.	continuous features – two categories classifications	1	19-11-2020		TLM2	
8.	minimum error-rate	1	21-11-2020		TLM2	
9.	classification-zero–one loss function, classifiers, discriminant functions, decision surface	1	24-11-2020		TLM2	
No. of classes required to complete UNIT-I:09				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.	**Normal density:** Univariate and multivariate density	1	26-11-2020		TLM2	
2.	discriminant functions for the normal Density different cases	1	28-11-2020		TLM2	
3.	discriminant functions for the normal Density different cases	1	01-12-2020		TLM2	
4.	Bayes decision theory	1	03-12-2020		TLM2	
5.	Bayes decision theory	1	05-12-2020		TLM2	
6.	Bayes decision theory - discrete features	1	08-12-2020		TLM2	
7.	compound Bayesian decision theory and context	1	10-12-2020		TLM2	
8.	compound Bayesian decision theory and context	1	12-12-2020		TLM2	
No. of classes required to complete UNIT-II:08				No. of classes taken:		
I MID EXAMINATIONS FROM 21-12-2020 TO 26-12-2020						

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.	Maximum likelihood Estimation	1	15-12-2020		TLM2	
2.	MLE examples	1	17-12-2020		TLM2	
3.	MLE examples	1	19-12-2020		TLM2	
4.	Bayesian parameter estimation	1	31-12-2020		TLM2	
5.	Bayesian parameter estimation for Univariate	1	02-01-2020		TLM2	
6.	Bayesian parameter estimation for Multivariate	1	05-01-2021		TLM2	
7.	Bayesian parameter estimation for Guassian case	1	07-01-2021		TLM2	
No. of classes required to complete UNIT-III:07				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.	Un-supervised learning	1	09-01-2021		TLM2	
2.	Introduction, mixture densities and identifiability	1	19-01-2021		TLM2	
3.	maximum likelihood estimates	1	21-01-2021		TLM2	
4.	application to normal mixtures	1	23-01-2021		TLM2	
5.	K-means clustering	1	28-01-2021		TLM2	
6.	Example of K-means	1	30-01-2021		TLM2	
7.	Date description and clustering	1	2-02-2021		TLM2	
8.	similarity measures, criteria function for clustering	1	4-02-2021		TLM2	
No. of classes required to complete UNIT-IV:08				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.	Pattern recognition using discrete hidden Markov models	1	6-02-2021		TLM2	
2.	Discrete-time Markov process	1	9-02-2021		TLM2	
3.	Extensions to hidden Markov models	1	11-02-2021		TLM2	
4.	three basic problems of HMMs	1	13-02-2021		TLM2	

5.	Types of HMMs	1	16-02-2021		TLM2	
6.	Continuous Hidden Markov models	1	18-02-2021		TLM2	
7.	multiple mixtures per state, speech recognition applications	1	20-02-2021		TLM2	
No. of classes required to complete UNIT-V:07				No. of classes taken:		
II MID EXAMINATIONS 22-02-2021 TO 27-02-2021						

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**
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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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**.**

Course Instructor Course Coordinator Module Coordinator HOD

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B.USHARANI
Course Name & Code : Information Retrieval Systems &17CS92
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., VII-Sem., Sections-B A.Y : 2020-21

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	PO4	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
1.	UNIT - I: Introduction: Definition, Objectives	1	03-11-2020		TLM2	
2.	Functional Overview Item Normalization	1	05-11-2020		TLM2	
3.	Selective dissemination AFB	1	07-11-2020		TLM2	
4.	Relationship to DBMS	1	10-11-2020		TLM2	
5.	Digital libraries and Data Warehouses	1	12-11-2020		TLM2	
6.	Information Retrieval System Capabilities: Search capabilities	1	17-11-2020		TLM2	
7.	Information Retrieval System Capabilities: Search capabilities	1	19-11-2020		TLM2	
8.	Information Retrieval System Capabilities: Search capabilities	1	21-11-2020		TLM2	
9.	Information Retrieval System Capabilities: Browse	1	24-11-2020		TLM2	
10.	Information Retrieval System Capabilities: Browse	1	26-11-2020		TLM2	
11.	Miscellaneous Capabilities	1	28-11-2020		TLM2	
No. of classes required to complete UNIT-I:09				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	01-12-2020		TLM2	
2.	Introduction, Stemming Algorithms	1	03-12-2020		TLM2	
3.	Inverted file structures	1	05-12-2020		TLM2	
4.	N-gram data structure,	1	08-12-2020		TLM2	
5.	PAT data structure	1	10-12-2020		TLM2	
6.	Signature file structure, Hypertext data structure	1	12-12-2020		TLM2	
7.	Signature file structure, Hypertext data structure	1	15-12-2020		TLM2	

8.	Cataloguing and Indexing Objectives	1	17-12-2020		TLM2	
9.	Indexing Process, Automatic Indexing,Information Extraction.	1	19-12-2020		TLM2	
No. of classes required to complete UNIT-II:09				No. of classes taken:		
I MID EXAMINATIONS FROM 21-12-2020 TO 26-12-2020						

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	31-12-2020		TLM2	
2.	Statistical indexing, Natural language	1	02-01-2020		TLM2	
3.	Concept indexing, Hypertext linkages.	1	05-01-2021		TLM2	
4.	Document and Term Clustering: Introduction, Thesaurus generation	1	07-01-2021		TLM2	
5.	Item clustering	1	09-01-2021		TLM2	
6.	Hierarchy of clusters	1	19-01-2021		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	21-01-2021		TLM2	
2.	Search statements and binding, Similarity measures and ranking	1	23-01-2021		TLM2	
3.	Relevance feedback, Selective dissemination of information search	1	28-01-2021		TLM2	
4.	Relevance feedback, Selective dissemination of information search	1	30-01-2021		TLM2	
5.	weighted searches of Boolean systems	1	02-02-2021		TLM2	
6.	Searching the Internet and hypertext	1	04-02-2021		TLM2	
7.	Information Visualization, Introduction, Cognition and perception	1	06-02-2021		TLM2	

8.	Information visualization technologies.	1	09-02-2021		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	11-02-2021		TLM2	
2.	Hardware text search systems.	1	13-02-2021		TLM2	
3.	Information System Evaluation: Introduction,	1	16-02-2021		TLM2	
4.	Measures used in system evaluation,	1	18-02-2021		TLM2	
5.	Measurement example – TREC results	1	20-02-2021		TLM2	
No. of classes required to complete UNIT-V:05				No. of classes taken:		
II MID EXAMINATIONS 22-02-2021 TO 27-02-2021						

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**
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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member 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.

Course Instructor Course Coordinator Module Coordinator HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. S. SRINIVASA 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			DM5
2.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2			DM5
3.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2			DM5
4.	Implementation of Matrix Multiplication with Hadoop Map Reduce	2			DM5
5.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2			DM5
6.	Implementation of K-means clustering using map reduce	2			DM5
7.	Installation of Hive along with practice examples	2			DM5
8.	Installation of Hive along with practice examples	2			DM5
9.	Installation of HBase, Installing thrift along with Practice examples	2			DM5
10.	Installation of R, along with Practice examples in R.	2			DM5
11.	Installation of R, along with Practice examples in R.	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	Mr. S. Srinivasa Reddy	Mr. G. V. Suresh	Dr. D. Veeraiah	Dr. D. Veeraiah
Signature				

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
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PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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	Mr. S. Srinivasa Reddy	Mr. G. V. Suresh	Dr. D. Veeraiah	Dr. D. Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. SHAIK JOHNY BASHA

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.** **:** 2020-21

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	**Mr. Shaik Johny Basha**	**Mr. B. Siva Rama Krishna**	**Dr. D. Jagan Mohan Reddy**	**Dr. D. Veeraiah**
Signature				

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.
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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	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.
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Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. Shaik Johny Basha**	**Mr. B. Siva Rama Krishna**	**Dr. D. Jagan Mohan Reddy**	**Dr. D. Veeraiah**
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