



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC 'A' Grade & 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

Name of Course Instructor: A.Praneetha

Course Name & Code : Artificial Intelligence & 17CI23

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

Credits: 3

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

A.Y.:2022-23

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
C01	3	3	2	-	-	-	-	-	-	-	-	1	2	-	-
C02	3	2	1	-	-	-	-	-	-	-	-	1	1	-	-
C03	1	3	2	1	-	-	-	-	-	-	-	1	1	-	-
C04	2	3	2	1	-	-	-	-	-	-	-	1	1	-	-
C05	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%).

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, Second edition, 2005. (UNIT V).

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.	Introduction to AI	1	11/07/2022					
2.	History of AI	1	12/07/2022		TLM2	C01	T1	
3.	Intelligent agents	1	13/07/2022		TLM2	C01	T1	
4.	Structure of agents and its functions	1	14/07/2022		TLM2	C01	T1	
5.	Types of Agents	1	16/07/2022		TLM2	C01	T1	
6.	Problem spaces and search	1	18/07/2022		TLM2	C01	T1	
7.	Problem spaces and search	1	19/07/2022		TLM2	C01	T1	
8.	Search techniques	1	20/07/2022		TLM2	C01	T1	
9.	Uninformed Search techniques	1	21/07/2022		TLM2	C01	T1	
10.	Heuristic Search techniques	1	23/07/2022		TLM2	C01	T1	
11.	Best first search	1	25/07/2022		TLM2	C01	T1	
12.	Problem reduction	1	26/07/2022		TLM2	C01	T1	
13.	Constraint satisfaction	1	27/07/2022		TLM2	C01	T1	
14.	Means Ends Analysis	1	28/07/2022		TLM2	C01	T1	
15.	Production Systems	1	30/07/2022		TLM2	C01	T1	
16.	Revision of unit-1	1	01/08/2022		TLM2	C01	T1	
No. of classes required to complete UNIT-I		16			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
17.	Introduction to knowledge representation	1	02/08/2022		TLM2	CO2	T1	
18.	Approaches & issues in knowledge representation	1	03/08/2022		TLM2	CO2	T1	
19.	Knowledge - Based Agent	1	04/08/2022		TLM2	CO2	T1	
20.	Knowledge based Agent- Examples	1	06/08/2022		TLM2	CO1	T1	
21.	Propositional Logic	1	08/08/2022		TLM2	CO2	T1	
22.	Propositional Logic	1	10/08/2022		TLM2	CO2	T1	
23.	Propositional Logic-Wampus World problem	1	11/08/2022		TLM2	CO1	T1	
24.	Predicate logic	1	16/08/2022		TLM2	CO2	T1	
25.	Predicate logic	1	17/08/2022		TLM2	CO2	T1	
26.	Unification	1	18/08/2022		TLM2	CO2	T1	
27.	Resolution	1	20/08/2022		TLM2	CO2	T1	
28.	Resolution	1	22/08/2022		TLM2	CO1	T1	
29.	Weak slot – filler structure	1	23/08/2022		TLM2	CO2	T1	
30.	Weak slot – filler structure	1	24/08/2022		TLM2	CO1	T1	
31.	Weak slot – filler structure	1	25/08/2022		TLM2	CO2	T1	
32.	Weak slot – filler structure	1	27/08/2022		TLM2	CO1	T1	
33.	Strong slot - filler structure	1	29/08/2022		TLM2	CO2	T1	

34.	Strong slot - filler structure	1	30/08/2022		TLM2	C02	T1	
35.	Strong slot – filler structure	1	01/09/2022		TLM2	C01	T1	
36.	Revision of unit-2 &1	1	03/09/2022		TLM2	C02	T1	
No. of classes required to complete UNIT-II		20			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
37.	Introduction to Reasoning under	1	27/09/2022		TLM2	C03	T1	
38.	Logics of non-monotonic	1	28/09/2022		TLM2	C01	T1	
39.	Implementation-Basic probability notation	1	29/09/2022		TLM2	C03	T1	
40.	Bayes rule, Certainty factors and rule-based systems	1	01/10/2022		TLM2	C03	T1	
41.	Bayesian networks,	1	10/10/2022		TLM2	C03	T1	
42.	Dempster – Shafer Theory	1	11/10/2022		TLM2	C01	T1	
43.	Fuzzy Logic	1	12/10/2022		TLM2	C03	T1	
44.	Revision	1	13/10/2022		TLM2	C01	T1	
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
45.	Planning with state space search	1	15/10/2022		TLM2	CO4	T2	
46.	Planning and acting in real world	1	17/10/2022		TLM2	CO4	T2	
47.	Types of Planning	1	18/10/2022					
48.	Forms of learning	1	19/10/2022		TLM2	CO4	T2	
49.	Inductive learning(Learning with examples)	1	20/10/2022		TLM2	CO4	T2	
50.	Reinforcement Learning,	1	22/10/2022		TLM2	CO4	T2	
51.	Learning decision trees	1	25/10/2022					
52.	Neural Net learning	1	26/10/2022		TLM2	CO4	T2	
53.	Genetic learning	1	27/10/2022		TLM2	CO4	T2	
54.	Revision	1	29/10/2022		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
55.	Minimax search procedure	1	31/10/2022		TLM2	CO5	T3	
56.	Adding alpha-beta cutoffs.	1	01/11/2022		TLM2	CO5	T3	
57.	Expert System - Representation	1	02/11/2022		TLM2	CO5	T3	
58.	Expert System shells - Knowledge Acquisition	1	03/11/2022		TLM2	CO5	T3	
59.	Hardware - Robotic	1	05/11/2022		TLM2	CO5	T3	

60.	Hardware - Robotic Perception&Application domains	1	07/11/2022		TLM2	C05	T3	
61.	Hardware - Robotic Perception & Application domains	1	09/11/2022		TLM2	C05	T3	
62.	Swarm Intelligent Syetmes – Ant Colony system	1	10/11/2022		TLM2	C05	T3	
63.	Development of Ant Colony system	1	12/11/2022		TLM2	C05	T3	
64.	Application of Ant Colony system	1	14/11/2022		TLM2	C05	T3	
65.	Working of Ant Colony System.	1	15/11/2022		TLM2	C05	T3	
66.	Revision	1	16/11/2022		TLM2	C05	T3	
No. of classes required to complete UNIT-V		12			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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	A.Praneetha	A.Praneetha	Dr. D.V.Subbaiah	Dr. D. Veeraiah
Signature				



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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr K.V. Ramana
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 : 2022-23

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	11-07-2022		TLM2	
2.	Inter connection among specializations in Civil Engineering	1	12-7-2022		TLM2	
3.	Elements of a Building, Basic Requirements of a Building	1	13-7-2022		TLM2	
4.	Planning- Hot and dry climates	1	18-7-2022		TLM2	
5.	Hot and wet climates, Cold climatic conditions	1	19-7-2022		TLM2	
6.	Aspect and Prospect, Roominess- Grouping, Privacy, circulation	1	20-7-2022		TLM2	
7.	Sanitation and ventilation	1	25-7-2022		TLM2	
8.	Orientation, Economy, Role of Bye-laws	1	26-7-2022		TLM2	
9.	Orientation, Economy, Role of Bye-laws	1	27-7-2022		TLM2	
No. of classes required to complete UNIT-I: 9				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	1-8-2022		TLM2	
2.	Rocks, Bricks Classification, Composition, Properties, Commercial forms, Uses	1	2-8-2022		TLM2	
3.	Timber, Ply wood Classification, Composition, Properties, Commercial forms	1	3-8-2022		TLM2	
4.	Glass, Bitumen Classification, Composition, Properties, Commercial forms,	1	8-8-2022		TLM2	
5.	Aluminium, Cement Classification, Composition, Properties, Commercial forms,	1	10-8-2022		TLM2	

6.	Steel, Concrete Classification, Composition, Properties, Commercial forms, Uses	1	16-8-2022		TLM2	
7.	Mortar Classification, Composition, Properties, Commercial forms, Uses	1	17-8-2022		TLM2	
8.	Concept of eco-friendly materials, examples	1	22-8-2022		TLM2	
9.	Concept of eco-friendly materials, examples	1	23-8-2022		TLM2	
No. of classes required to complete UNIT-II: 9				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	24-8-2022		TLM2	
2.	Engineering properties	1	29-8-2022		TLM2	
3.	Bearing Capacity of soil, purpose and methods of improving bearing capacity	1	30-8-2022		TLM2	
4.	Foundations – Requirements	1	27-9-2022		TLM2	
5.	Loads, Types	1	28-9-2022		TLM2	
6.	for special structures-water tanks-	1	10-10-2022		TLM2	
7.	for special structures- silos, chimneys- transmission line towers- cooling towers, telecommunication towers	1	11-10-2022		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	12-10-2022		TLM2	
2.	theodolite, levelling, contour maps, Planimeter, EDM concept	1	17-10-2022		TLM2	
3.	linear distance and area measurement	1	18-10-2022		TLM2	
4.	Total station- GIS-Concept and applications in civil engineering.	1	19-10-2022		TLM2	
5.	Indian highways- Basic terminology- Classification of roads - PIEV theory - Traffic signs - IRC Code provisions	1	24-10-2022		TLM2	
6.	Indian railways –Permanent way and components of railway track	1	25-10-2022		TLM2	

7.	Gauges – Rails -Sleepers – Ballast.	1	26-10-2022		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	31-10-2022		TLM2	
2.	Rainfall measurement - Purpose of dams, reservoirs, intakes, infiltration galleries	1	1-11-2022		TLM2	
3.	Water demands –Water quality parameters and their impacts - Principles of water treatment	1	2-11-2022		TLM2	
4.	Objectives and methods of water distribution systems – Sewage generation in a society –	1	7-11-2022		TLM2	
5.	Wastewater characteristics and their impacts	1	8-11-2022		TLM2	
6.	Principles of sewage treatment	1	9-11-2022		TLM2	
7.	Disposal of sewage	1	14-11-2022		TLM2	
8.	Water quality standards for – drinking purpose,	1	15-11-2022		TLM2	
9.	irrigation, -making and curing of concrete	1	16-11-2022		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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
(Dr K.V.Ramana)

Course Coordinator
(Dr. K.V.Ramana)

Module Coordinator
(B. Narasimha Rao)

HOD
(Dr. D.Veeraiah)



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

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. G V Suresh

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-A A.Y. : 2022-23

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.	3	14-07-2022 21-07-2022 28-07-2022		DM5
2.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	3	04-08-2022 11-08-2022 18-08-2022		DM5
3.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	2	25-08-2022 01-09-2022		DM5
4.	Implementation of Matrix Multiplication with Hadoop Map Reduce	2	08-09-2022		DM5
5.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2	15-09-2022		DM5
6.	Implementation of K-means clustering using map reduce	2	29-09-2022		DM5
7.	Installation of Hive along with practice examples	2	06-10-2022		DM5
8.	Installation of Hive along with practice examples	2	13-10-2022		DM5
9.	Installation of HBase, Installing thrift along with Practice examples	2	20-10-2022 27-10-2022		DM5
10.	Installation of R, along with Practice examples in R.	2	03-11-2022		DM5
11.	Installation of R, along with Practice examples in R.	2	10-11-2022		DM5
12.	Internal Lab Exam	2	17-11-2022		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. G. V. Suresh	Dr.S.Jayaprada	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
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
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Name of the Faculty	Mr. S. Srinivasa Reddy	Mr. G. V. Suresh	Dr. D. Veeraiah	Dr. D. Veeraiah
Signature				



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 : 2022 - 2023

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** Anand Rajaraman and Jeffrey David Ulman, —Mining of Massive Datasets", Cambridge University Press, 2012.
- R4** Arvind Sathi, —Bigdata Analytics: 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	11-07-2022		TLM2	
2.	Big data characteristics, The Promotion of the Value of Big Data	1	12-07-2022		TLM2	
3.	Why Big Data, overview of Big Data, issues, and challenges of Big Data	1	13-07-2022		TLM2	
4.	stages of analytical evolution, State of the Practice in Analytics, The Data Scientist	1	15-07-2022		TLM2	
5.	Big Data Analytics in Industry Verticals	1	16-07-2022		TLM2	
6.	Data Analytics Lifecycle	1	18-07-2022		TLM2	
7.	Data Analytics Lifecycle	1	19-07-2022		TLM2	
8.	Basic Data Analytic Methods Using R	1	21-07-2022		TLM2	
9.	Big Data Use Cases- Characteristics of Big Data Applications	1	22-07-2022		TLM2	
10.	Assignment - 1	1	23-07-2022		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	2	25-07-2022 26-07-2022		TLM2/ TLM4/ TLM5	
12.	The design of HDFS, HDFS concepts	3	27-07-2022 29-07-2022 30-07-2022		TLM2/ TLM4/ TLM5	
13.	Command line interface to HDFS	3	01-08-2022 02-08-2022 03-08-2022		TLM2/ TLM4/ TLM5	
14.	Hadoop File system Interfaces, Java Interface to Hadoop	3	04-08-2022 05-08-2022 06-08-2022		TLM2/ TLM4/ TLM5	

15.	Anatomy of a file read, Anatomy of a file write, Replica placement and Coherency Model	3	08-08-2022 10-08-2022 12-08-2022		TLM2/ TLM4/ TLM5	
16.	Parallel copying with distcp, keeping an HDFS cluster balanced	3	13-08-2022 16-08-2022 17-08-2022		TLM2/ TLM4/ TLM5	
17.	Advantages of Hadoop and HDFS	3	18-08-2022 20-08-2022 24-08-2022		TLM2/ TLM4/ TLM5	
18.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	3	22-08-2022 23-08-2022 24-08-2022		TLM2/ TLM4/ TLM5	
19.	Assignment - 2	1	26-08-2022		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	3	27-08-2022 29-08-2022 30-08-2022		TLM2/ TLM4/ TLM5	
21.	Failures, Job Scheduling	3	02-09-2022 03-09-2022 05-09-2022		TLM2/ TLM4/ TLM5	
22.	Shuffle and Sort	3	06-09-2022 07-09-2022 09-09-2022		TLM2/ TLM4/ TLM5	
23.	Task Execution	3	10-09-2022 12-09-2022 13-09-2022		TLM2/ TLM4/ TLM5	
24.	Map Reduce Types and Formats	3	14-09-2022 16-09-2022 17-09-2022		TLM2/ TLM4/ TLM5	
25.	Map Reduce Features	1	26-09-2022		TLM2/ TLM4/ TLM5	
26.	Map Reduce Features	1	27-09-2022		TLM2/ TLM4/ TLM5	
27.	Assignment - 3	1	28-09-2022		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	30-09-2022		TLM2/ TLM4/ TLM5	
29.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	10-10-2022		TLM2/ TLM4/ TLM5	
30.	Pig: Introduction to PIG,	1	11-10-2022		TLM2/ TLM4/	

	Execution Modes of Pig				TLM5	
31.	Comparison of Pig with Databases, Grunt, Pig Latin.	1	12-10-2022		TLM2/ TLM4/ TLM5	
32.	User Defined Functions, Data Processing operators	1	14-10-2022		TLM2/ TLM4/ TLM5	
33.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	15-10-2022		TLM2/ TLM4/ TLM5	
34.	Querying Data and User Defined Functions	1	17-10-2022		TLM2/ TLM4/ TLM5	
35.	HBase: HBase Concepts, Clients, Example, HBase vs RDBMS	1	18-10-2022		TLM2/ TLM4/ TLM5	
36.	Big SQL: Introduction	1	19-10-2022		TLM2/ TLM4/ TLM5	
37.	Assignment - 4	1	21-10-2022		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	2	22-10-2022 25-10-2022		TLM2	
39.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	2	26-10-2022 28-10-2022		TLM2	
40.	Data Visualization Techniques	2	29-10-2022 31-10-2022		TLM2	
41.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	2	01-11-2022 02-11-2022		TLM2	
42.	Collaborative Filtering, Big Data Analytics with BigR	3	01-11-2022 04-11-2022 05-11-2022		TLM2	
43.	Data models for managing big data, Real-time streaming data analytics	3	07-11-2022 09-11-2022 10-11-2022		TLM2	
44.	Scalable analytics on large data sets	2	11-11-2022 12-11-2022		TLM2	
45.	Systems architecture for big data management	2	14-11-2022 15-11-2022		TLM2	
46.	Main memory data management techniques	1	16-11-2022		TLM2	
47.	Assignment - 5	1	18-11-2022		TLM6	
48.	Review	1	19-11-2022		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):

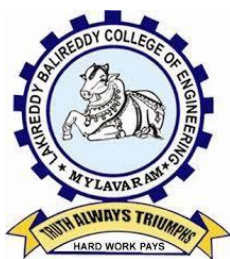
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering
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	fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
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



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.B.MANASWINI

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

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

Program/Sem/Sec : B.Tech.-CSE/VII Sem/Sec-A **A.Y.** : 2022-23

PRE-REQUISITE: Python Programming, Computer Networks.

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

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

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

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

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

REFERENCES:

R1 wwwusers.di.uniroma1.it/~spenza/files/labIoT2015/Lab-IoT-1.pdf

R2 www.mobileeducationkit.net/labmanuals/LAB-Manual-mbed.docx

PART-B

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Introduction to Raspberry Pi & Cycle-1	2	22/07/22		DM5
2.	Installation of NOOBs in Raspberry Pi	2	05/08/22		DM5
3.	Cycle-2	2	26/08/22		DM5
4.	Cycle-3	2	30/09/22		DM5
5.	Cycle-4	2	14/10/22		DM5
6.	Cycle-5	2	28/10/22		DM5
7.	Cycle-6	2	04/11/22		DM5
8.	Cycle-7	2	11/11/22		DM5
9.	Cycle-8	2	18/11/22		DM5
10.	Internal Lab Exam	2	30/11/22		DM4

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

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

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



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. MANASWINI

Course Name & Code : INTERNET OF THINGS & 17CI19

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

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

Credits: 3

A.Y.: 2022-23

PREREQUISITE: Python Programming

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

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

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

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

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

TEXTBOOKS:

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

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

REFERENCE BOOKS:

R1 Pethuru Raj and Anupama C. Raman,"The Internet of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press).

R2 Adrian McEwen, –Designing the Internet of Things||, Wiley Publishers, 2013, ISBN: 978-1-118-43062-0.

R3 Daniel Kellmerit, –The Silent Intelligence: The Internet of Things||, 2013, ISBN: 0989973700.

R4 https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf

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	2	13/07/2022		TLM2	
2.	Definition and Characteristics of IoT	2	16/07/2022		TLM2	
3.	Physical Design of IoT Part-1	2	20/07/2022		TLM2	
4.	Physical Design of IoT Part-2	2	23/07/2022		TLM2	
5.	Logical Design of IoT Part-1	2	27/07/2022		TLM2	
6.	Logical Design of IoT Part-2	2	30/07/2022		TLM2	
7.	IoT Enabled Technologies	2	03/08/2022		TLM2	
8.	IoT Levels	2	06/08/2022		TLM2	
9.	IoT Deployment Templates	3	11/08/2022		TLM2	
No. of classes required to complete UNIT-I: 19				No. of classes taken: 19		

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	2	18/08/2022		TLM2	
11.	Home Automation	1	20/08/2022		TLM2	
12.	Smart Cities	1	22/08/2022		TLM2	
13.	Environment	1	24/08/2022		TLM2	
14.	Energy	1	25/08/2022		TLM2	
15.	Retail & Logistics	1	27/08/2022		TLM2	
16.	Agriculture	1	29/08/2022		TLM2	
17.	Industry	1	01/09/2022		TLM2	
18.	Health & Lifestyle	1	03/09/2022		TLM2	
No. of classes required to complete UNIT-II: 10				No. of classes taken: 10		

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	2	29/09/2022		TLM2	
20.	Difference between IoT and M2M	2	10/10/2022		TLM2	
21.	Traditional Networking and SDN	1	12/10/2022		TLM2	
22.	NFV for IoT	1	13/10/2022		TLM2	
23.	Need for IoT Systems Management	1	15/10/2022		TLM2	
24.	Simple Network management Protocol (SNMP)	1	17/10/2022		TLM2	
25.	NETCONF, YANG	1	19/10/2022		TLM2	
26.	YANG-NETCONF	1	20/10/2022		TLM2	
27.	NETOPEER	1	22/10/2022		TLM2	
No. of classes required to complete UNIT-III: 11				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	26/10/2022		TLM2	
29.	Raspberry Pi and its Configuration	1	27/10/2022		TLM2	
30.	Linux on Raspberry Pi	1	29/10/2022		TLM2	
31.	Raspberry Pi Interfaces	1	29/10/2022		TLM2	

32.	Programming Pi with Python Part-1	1	31/11/2022		TLM2	
33.	Programming Pi with Python Part-2	1	02/11/2022		TLM2	
34.	Other IoT Devices	1	02/11/2022		TLM2	
No. of classes required to complete UNIT-IV: 06				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	03/11/2022		TLM2	
36.	Cloud Storage Models & Communication APIs	1	05/11/2022		TLM2	
37.	WAMP - AutoBahn for IoT	2	09/11/2022		TLM2	
38.	Commands for Installing AutoBahn	1	10/11/2022		TLM2	
39.	Xively Cloud for IoT	1	14/11/2022		TLM2	
40.	Python Web Application Framework - Django	1	16/11/2022		TLM2	
41.	Example Programs on Django	1	17/11/2022		TLM2	
42.	Designing a RESTful Web API	1	19/11/2022		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 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: M.SWATHI
Course Name & Code	: Information Retrieval Systems & 17CS92
L-T-P Structure	: 3-0-0 Credits: 3
Program/Sem/Sec	: B.Tech, CSE, VII-Sem, Sec-A A.Y: 2022-23

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

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

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

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

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

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

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

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

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	11-07-2022		TLM2	
2.	Functional Overview Item Normalization	2	12-07-2022 13-07-2022		TLM2	
3.	Selective dissemination AFB	1	14-07-2022		TLM2	
4.	Relationship to DBMS	1	16-07-2022		TLM2	
5.	Digital libraries and Data Warehouses	2	18-07-2022 19-07-2022		TLM2	
6.	Information Retrieval System Capabilities: Search capabilities	1	20-07-2022		TLM2	
7.	Information Retrieval System Capabilities: Browse Capabilities	1	21-07-2022		TLM2	
8.	Information Retrieval System Capabilities: Miscellaneous	1	23-07-2022		TLM2	
No. of classes required to complete UNIT-I:10				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	25-07-2022		TLM2	
2.	Inverted file structures	2	26-07-2022 27-07-2022		TLM2	
3.	N-gram data structure	1	28-07-2022		TLM2	
4.	PAT data structure	1	29-07-2022		TLM2	
5.	Signature file structure	1	01-08-2022		TLM2	
6.	Hypertext data structure	2	02-08-2022 03-08-2022		TLM2	
7.	Cataloguing and Indexing Objectives	2	04-08-2022 06-08-2022		TLM2	
8.	Indexing Process	1	08-08-2022 10-08-2022		TLM2	
9.	Automatic Indexing	3	11-08-2022 16-08-2022 23-08-2022		TLM2	
10.	Information Extraction	1	25-08-2022		TLM2	
No. of classes required to complete UNIT-II:15				No. of classes taken:		
I MID EXAMINATIONS FROM 19-09-2022 TO 24-09-2022						

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	27-09-2022		TLM2	
2.	Statistical indexing	2	28-09-2022 29-09-2022		TLM2	
3.	Natural language	1	01-10-2022		TLM2	
4.	Concept indexing	1	11-10-2022		TLM2	
5.	Hypertext linkages	1	12-10-2022		TLM2	

6.	Document and Term Clustering: Introduction	1	13-10-2022		TLM2	
7.	Thesaurus generation	1	15-10-2022			
8.	Item clustering	1	17-10-2022		TLM2	
9.	Hierarchy of clusters	2	18-10-2022 19-10-2022		TLM2	
No. of classes required to complete UNIT-III:09				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	1	20-10-2022		TLM2	
2.	Similarity measures and ranking	1	22-10-2022		TLM2	
3.	Relevance feedback, Selective dissemination of information search	2	25-10-2022 26-10-2022		TLM2	
4.	weighted searches of Boolean systems	1	27-10-2022		TLM2	
5.	Searching the Internet and hypertext	1	29-10-2022		TLM2	
6.	Information Visualization, Introduction, Cognition and perception	2	31-10-2022 01-11-2022		TLM2	
7.	Information visualization technologies.	1	02-11-2022		TLM2	
No. of classes required to complete UNIT-IV:09				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	05-11-2022		TLM2	
2.	Hardware text search systems.	1	07-11-2022		TLM2	
3.	Information System Evaluation: Introduction,	2	09-11-2022 10-11-2022		TLM2	
4.	Measures used in system evaluation,	2	12-11-2022 14-11-2022		TLM2	
5.	Measurement example – TREC results	2	15-11-2022 16-11-2022		TLM2	
6.	Revision	2	17-11-2022 19-11-2022		TLM2	
No. of classes required to complete UNIT-V:10				No. of classes taken:		
II MID EXAMINATIONS 21-11-2022 TO 26-11-2022						

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

PART-C**EVALUATION PROCESS (R17 Regulations):**

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	Head of the Department
Ms M.Swathi	Ms M.Swathi	Dr.K.Naga Prasanthi	Dr.D.Veeraiah



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Mr.A. RAJAGOPAL	
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 : 2022 - 2023
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.	Introduction to IS, Security Attacks	1	11/07/2022		TLM1, TLM2	
2.	Security Services, Security Mechanisms	1	12/07/2022		TLM1, TLM2	
3.	Integrity, Authentication Confidentiality & Non-Repudiation, Access Control, Availability	1	15/07/2022		TLM1, TLM2	
4.	A Model for Internet Security, Conventional Encryption Principles-Substitution	1	16/07/2022		TLM1, TLM2	
5.	Transposition Techniques	1	18/07/2022		TLM1, TLM2	
6.	Conventional Encryption Algorithms-DES	1	19/07/2022		TLM1, TLM2	
7.	Triple DES	1	22/07/2022		TLM1, TLM2	
8.	AES Algorithm	1	23/07/2022		TLM1, TLM2	
9.	Block Cipher & Fiestal Structure,	1	25/07/2022		TLM1, TLM2	
10.	Cipher Block Modes of Operations (CBC, CFB only)	1	26/07/2022		TLM1, TLM2	
11.	Stream Ciphers & RC4	1	29/07/2022		TLM1, TLM2	
12.	Placement of encryption(Location of Encryption Devices)	1	30/07/2022		TLM1, TLM2	

13.	Traffic Analysis, Key Distribution	1	01/08/2022		TLM1, TLM2	
14.	Assignment-1/Tutorial-1	1	02/08/2022		TLM3	
No. of classes required to complete UNIT-I		14		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
15.	Approaches of Message Authentication, Secure Hash Functions - SHA-1	1	05/08/2022		TLM1, TLM2	
16.	SHA-512	1	06/08/2022		TLM1, TLM2	
17.	HMAC Algorithm	1	08/08/2022		TLM1, TLM2	
18.	Public-Key Cryptography Principles	1	12/08/2022		TLM1, TLM2	
19.	Public-Key Cryptography Algorithms – RSA	1	16/08/2022		TLM1, TLM2	
20.	Diffie –Hellman Key Exchange Algorithm	1	20/08/2022		TLM1, TLM2	
21.	Digital Signatures	1	22/08/2022		TLM1, TLM2	
22.	Public Key Infrastructure	1	23/08/2022		TLM1, TLM2	
23.	Public Key Infrastructure	1	26/08/2022		TLM1, TLM2	
24.	Digital Certificates	1	27/08/2022		TLM1, TLM2	
25.	Certificate Authority	1	29/08/2022		TLM1, TLM2	
26.	Key Management. Kerberos	1	30/08/2022		TLM1, TLM2	
27.	X.509 Directory Authentication Service	1	02/09/2022		TLM1, TLM2	
28.	Assignment-2/ Tutorial-2	1	03/09/2022		TLM3	
No. of classes required to complete UNIT-II		14		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
29.	Email privacy, Pretty Good Privacy (PGP)	1	26/09/2022		TLM1, TLM2	
30.	PGP Key Management	1	27/09/2022		TLM1, TLM2	
31.	MIME and S/ MIME, IP Security Overview, Arch.	1	30/09/2022		TLM1, TLM2	
32.	Authentication Header Encapsulating Security Payload,	1	01/10/2022		TLM1, TLM2	
33.	Tunnel and Transport Modes	1	10/10/2022		TLM1, TLM2	
34.	Combining Security Associations, Key Exchange	1	11/10/2022		TLM1, TLM2	
35.	Cryptographic Suites	1	14/10/2022		TLM1, TLM2	
36.	Assignment – 3/ Tutorial-3	1	15/10/2022		TLM3	
No. of classes required to complete UNIT-III		09		No. of classes taken:		

UNIT-IV: WEB SECURITY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Web Security Requirements	1	17/10/2022		TLM1, TLM2	
38.	Secure Socket Layer (SSL) Architecture, Protocols	1	18/10/2022		TLM1, TLM2	
39.	SSL Handshake Protocol	1	21/10/2022		TLM1, TLM2	
40.	Transport Layer Security	1	22/10/2022		TLM1, TLM2	
41.	Transport Layer Security Approaches	1	25/10/2022		TLM1, TLM2	
42.	Secure Electronic Transaction (SET)	1	28/10/2022		TLM1, TLM2	
43.	Payment Processing	1	31/10/2022		TLM1, TLM2	
44.	HTTPs. HTTP vs HTTPs	1	04/11/2022		TLM1,	

					TLM2	
45.	Unit Overview and Discussion	1	05/11/2022		TLM1, TLM2	
46.	Assignment – 4/ Tutorial-4	1	08/11/2022		TLM3	
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
47.	Intruders	1	11/11/2022		TLM1, TLM2	
48.	Viruses and Related Threats	1	12/11/2022		TLM1, TLM2	
49.	Firewall Design principles	1	14/11/2022		TLM1, TLM2	
50.	Trusted System	1	15/11/2022		TLM1, TLM2	
51.	Introduction to Database Security and authorization, Database authorization	1	18/11/2022		TLM1, TLM2	
52.	Assignment-5/ Tutorial-5	1	19/11/2022		TLM3	
No. of classes required to complete UNIT-V		06		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	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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
Mr.A.RAJAGOPAL	Mr.A.RAJAGOPAL	Dr.K.NAGA PRASANTHI	Dr.D.VEERAI AH



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Dr. D.Venkata Subbaiah	
Course Name & Code	: Pattern Recognition (17CI26)	
L-T-P Structure	: 3-0-0	Credits: 3
Program/Sem/Sec	: B.Tech., CSE, VII-Sem., Section – A	A.Y : 2022 - 2023

Pre-Requisite: Basic knowledge of probability & statistics

Course Educational Objectives (CEOs):

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

COURSE OUTCOMES (COs):

At the end of the course, students are able to

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

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

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

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

1- Low

2 –Medium

3 High

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Pattern Recognition	1	11-07-2022		TLM2	
2.	Issues in Pattern Recognition	2	13-07-2022 & 14-07-2022		TLM2	
3.	Machine perception	1	15-07-2022		TLM2	
4.	pattern recognition example,	1	18-07-2022		TLM2	
5.	pattern recognition systems	2	20-07-2022 & 21-07-2022		TLM2	
6.	Design cycle	1	22-07-2022		TLM2	
7.	learning and adaptation	1	25-07-2022		TLM2	
8.	Bayesian Decision Theory	2	27-07-2022 & 28-07-2022		TLM2	
9.	continuous features – two categories classifications	2	29-07-2022 & 01-08-2022		TLM2	
10.	minimum error-rate classification-zero-one loss function	1	03-08-2022		TLM2	
11.	Classifiers, Discriminant functions, and decision surface	2	04-08-2022 & 05-08-2022		TLM2	
No. of classes required to complete UNIT-I		16		No. of classes taken:		

UNIT-II: Density Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Normal density	2	08-08-2022 & 10-08-2022		TLM1	

13.	Univariate density	2	11-08-2022 & 12-08-2022		TLM1	
14.	multivariate density	2	17-08-2022 & 18-08-2022		TLM2	
15.	discriminant functions for the normal Density different cases with Example problems	3	22-08-2022, 24-08-2022 & 25-08-2022		TLM1	
16.	Bayes decision theory - discrete features	2	26-08-2022 & 29-08-2022		TLM1	
17.	Compound Bayesian decision theory and context and example problems	2	01-09-2022 & 02-09-2022		TLM1	
No. of classes required to complete UNIT-II		13		No. of classes taken:		

UNIT-III: Bayesian parameter estimation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Parameter Estimation under Normal density function	1	28-09-2022		TLM1	
19.	What is maximum likelihood estimation	1	29-09-2022		TLM1	
20.	Maximum likelihood estimation	1	30-09-2022		TLM1	
21.	Example problems	1	10-10-2022		TLM1	
22.	Bayes likelihood estimation	1	12-10-2022		TLM1	
23.	Bayes parameter estimation	1	13-10-2022		TLM1	
24.	Bayes parameter estimation – Gaussian distribution	1	14-10-2022		TLM1	
25.	Example problems	1	17-10-2022		TLM1	
No. of classes required to complete UNIT-III		08		No. of classes taken:		

UNIT-IV: Unsupervised learning and clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Unsupervised Learning	1	19-10-2022		TLM1	
27.	Mixture densities and identifiability	1	20-10-2022		TLM1	
28.	Maximum likelihood estimates	1	21-10-2022		TLM1	
29.	Application to normal mixtures	1	26-10-2022		TLM1	
30.	K-means clustering	1	27-10-2022		TLM1	
31.	Data description and clustering	1	28-10-2022		TLM1	
32.	Similarity measures	1	31-10-2022		TLM1	
33.	Criteria function for clustering	1	02-11-2022		TLM1	
34.	Example Problems	1	03-11-2022		TLM1	
No. of classes required to complete UNIT-IV		09		No. of classes taken:		

UNIT-V: Hidden Markov models

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Hidden Markov Model	1	04-11-2022		TLM1	
36.	Discrete-time Markov process	1	07-11-2022		TLM1	
37.	Extensions to hidden Markov models	1	09-11-2022		TLM1	
38.	Three basic problems of HMMs & types of HMMs	1	10-11-2022		TLM1	
39.	Three basic problems of HMMs & types of HMMs	1	11-11-2022		TLM1	
40.	Continuous observation densities multiple mixtures per state	1	12-11-2022		TLM1	
41.	Continuous observation densities multiple mixtures per state	1	15-11-2022		TLM1	
42.	speech recognition applications	1	17-11-2022		TLM1	
No. of classes required to complete UNIT-V		08		No. of classes taken:		

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

PART-C**EVALUATION PROCESS (R17 Regulations):**

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr D.V.Subbaiah	Dr D.V.Subbaiah	Dr D.V.Subbaiah	Dr. D. VEERIAH



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Name of Course Instructor: A.Praneetha

Course Name & Code : Artificial Intelligence & 17CI23

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

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

Credits: 3

A.Y.:2022-23

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
C01	3	3	2	-	-	-	-	-	-	-	-	1	2	-	-
C02	3	2	1	-	-	-	-	-	-	-	-	1	1	-	-
C03	1	3	2	1	-	-	-	-	-	-	-	1	1	-	-
C04	2	3	2	1	-	-	-	-	-	-	-	1	1	-	-
C05	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%).

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, Second edition, 2005. (UNIT V).

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.	Introduction to AI	1	11/07/2022					
2.	History of AI	1	12/07/2022		TLM2	C01	T1	
3.	Intelligent agents	1	14/07/2022		TLM2	C01	T1	
4.	Structure of agents and its functions	1	15/07/2022		TLM2	C01	T1	
5.	Types of Agents	1	16/07/2022		TLM2	C01	T1	
6.	Problem spaces and search	1	18/07/2022		TLM2	C01	T1	
7.	Problem spaces and search	1	19/07/2022		TLM2	C01	T1	
8.	Search techniques	1	21/07/2022		TLM2	C01	T1	
9.	Uninformed Search techniques	1	22/07/2022		TLM2	C01	T1	
10.	Heuristic Search techniques	1	23/07/2022		TLM2	C01	T1	
11.	Best first search	1	25/07/2022		TLM2	C01	T1	
12.	Problem reduction	1	26/07/2022		TLM2	C01	T1	
13.	Constraint satisfaction	1	28/07/2022		TLM2	C01	T1	
14.	Means Ends Analysis	1	29/07/2022		TLM2	C01	T1	
15.	Production Systems	1	30/07/2022		TLM2	C01	T1	
16.	Revision of unit-1	1	01/08/2022		TLM2	C01	T1	
No. of classes required to complete UNIT-I		16			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
17.	Introduction to knowledge representation	1	02/08/2022		TLM2	C02	T1	
18.	Approaches & issues in knowledge representation	1	04/08/2022		TLM2	C02	T1	
19.	Knowledge - Based Agent	1	05/08/2022		TLM2	C02	T1	
20.	Knowledge based Agent- Examples	1	06/08/2022		TLM2	C01	T1	
21.	Propositional Logic	1	08/08/2022		TLM2	C02	T1	
22.	Propositional Logic	1	11/08/2022		TLM2	C02	T1	
23.	Propositional Logic-Wampus World problem	1	12/08/2022		TLM2	C01	T1	
24.	Predicate logic	1	16/08/2022		TLM2	C02	T1	
25.	Predicate logic	1	18/08/2022		TLM2	C02	T1	
26.	Unification	1	20/08/2022		TLM2	C02	T1	
27.	Resolution	1	22/08/2022		TLM2	C02	T1	
28.	Resolution	1	23/08/2022					
29.	Weak slot – filler structure	1	25/08/2022		TLM2	C02	T1	
30.	Weak slot – filler structure	1	26/08/2022		TLM2	C01	T1	
31.	Weak slot – filler structure	1	27/08/2022		TLM2	C02	T1	
32.	Weak slot – filler structure	1	29/08/2022					

33.	Strong slot - filler structure	1	30/08/2022		TLM2	C02	T1	
34.	Strong slot - filler structure	1	01/09/2022		TLM2	C02	T1	
35.	Strong slot - filler structure	1	02/09/2022		TLM2	C02	T1	
36.	Revision of unit-2 &1	1	03/09/2022		TLM2	C02	T1	
No. of classes required to complete UNIT-II		20			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
37.	Introduction to Reasoning under	1	27/09/2022		TLM2	C03	T1	
38.	Logics of non-monotonic	1	29/09/2022		TLM2	C03	T1	
39.	Implementation-Basic probability notation	1	30/09/2022		TLM2	C03	T1	
40.	Bayes rule, Certainty factors and rule-based systems	1	01/10/2022		TLM2	C03	T1	
41.	Bayesian networks,	1	10/10/2022		TLM2	C03	T1	
42.	Dempster - Shafer Theory	1	11/10/2022		TLM2	C03	T1	
43.	Fuzzy Logic	1	13/10/2022		TLM2	C03	T1	
44.	Revision	1	14/10/2022		TLM2	C03	T1	
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
45.	Planning with state space search	1	15/10/2022		TLM2	CO4	T2	
46.	Planning and acting in real world	1	17/10/2022		TLM2	CO4	T2	
47.	Types of Planning	1	18/10/2022					
48.	Forms of learning	1	20/10/2022		TLM2	CO4	T2	
49.	Inductive learning(Learning with examples)	1	21/10/2022		TLM2	CO4	T2	
50.	Reinforcement Learning,	1	22/10/2022		TLM2	CO4	T2	
51.	Learning decision trees	1	25/10/2022					
52.	Neural Net learning	1	27/10/2022		TLM2	CO4	T2	
53.	Genetic learning	1	28/10/2022		TLM2	CO4	T2	
54.	Revision	1	29/10/2022		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
55.	Minimax search procedure	1	31/10/2022		TLM2	CO5	T3	
56.	Adding alpha-beta cutoffs.	1	01/11/2022		TLM2	CO5	T3	
57.	Expert System - Representation	1	03/11/2022		TLM2	CO5	T3	
58.	Expert System shells - Knowledge Acquisition	1	04/11/2022		TLM2	CO5	T3	

59.	Hardware - Robotic	1	05/11/2022		TLM2	C05	T3	
60.	Hardware - Robotic Perception&Application domains	1	07/11/2022		TLM2	C05	T3	
61.	Hardware - Robotic Perception & Application domains	1	10/11/2022		TLM2	C05	T3	
62.	Swarm Intelligent Syetmes – Ant Colony system	1	11/11/2022		TLM2	C05	T3	
63.	Development of Ant Colony system	1	12/11/2022		TLM2	C05	T3	
64.	Application of Ant Colony system	1	14/11/2022		TLM2	C05	T3	
65.	Working of Ant Colony System.	1	15/11/2022		TLM2	C05	T3	
66.	Revision	1	17/11/2022		TLM2	C05	T3	
No. of classes required to complete UNIT-V		12			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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	A.Praneetha	A.Praneetha	Dr. D.V.Subbaiah	Dr. D. Veeraiah
Signature				



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr S Jayaprada

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 : 2022 - 2023

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	-	-	-	-	-	-	2	-	3	-
CO2	2	3	1	-	2	-	-	-	-	-	-	2	1	3	-
CO3	2	2	3	-	2	-	-	-	-	-	-	2	2	3	-
CO4	2	3	3	-	2	-	-	-	-	-	-	2	2	3	-
CO5	3	3	3	-	2	-	-	-	-	-	-	3	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 Jeffrey 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	11-07-2022		TLM2	
2.	Big data characteristics, The Promotion of the Value of Big Data	1	13-07-2022		TLM2	
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	14-07-2022		TLM2	
4.	stages of analytical evolution, State of the Practice in Analytics, The Data Scientist	1	15-07-2022		TLM2	
5.	Big Data Analytics in Industry Verticals	1	16-07-2022		TLM2	
6.	Data Analytics Lifecycle	1	18-07-2022		TLM2	
7.	Data Analytics Lifecycle	1	20-07-2022		TLM2	
8.	Basic Data Analytic Methods Using R	1	21-07-2022		TLM2	
9.	Big Data Use Cases- Characteristics of Big Data Applications	1	22-07-2022		TLM2	
10.	Assignment - 1	1	23-07-2022		TLM6	
No. of classes required to complete UNIT-I		10		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	25-07-2022		TLM2/ TLM4/ TLM5	
12.	The design of HDFS, HDFS concepts	1	27-07-2022		TLM2/ TLM4/ TLM5	
13.	Command line interface to HDFS	1	28-07-2022		TLM2/ TLM4/ TLM5	
14.	Hadoop File system Interfaces, Java Interface to Hadoop	1	29-07-2022		TLM2/ TLM4/ TLM5	
15.	Anatomy of a file read, Anatomy of a file write, Replica placement	1	30-07-2022		TLM2/ TLM4/	

	and Coherency Model				TLM5	
16.	Parallel copying with distcp, keeping an HDFS cluster balanced	1	01-08-2022		TLM2/ TLM4/ TLM5	
17.	Advantages of Hadoop and HDFS	1	03-08-2022		TLM2/ TLM4/ TLM5	
18.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	04-08-2022		TLM2/ TLM4/ TLM5	
19.	Assignment - 2	1	05-08-2022		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	06-08-2022		TLM2/ TLM4/ TLM5	
21.	Failures, Job Scheduling	1	08-08-2022		TLM2/ TLM4/ TLM5	
22.	Shuffle and Sort	1	10-08-2022		TLM2/ TLM4/ TLM5	
23.	Task Execution	1	11-08-2022		TLM2/ TLM4/ TLM5	
24.	Map Reduce Types and Formats	1	12-08-2022		TLM2/ TLM4/ TLM5	
25.	Map Reduce Features	1	17-08-2022		TLM2/ TLM4/ TLM5	
26.	Map Reduce Features	1	18-08-2022		TLM2/ TLM4/ TLM5	
27.	Assignment - 3	1	19-08-2022		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	20-08-2022		TLM2/ TLM4/ TLM5	
29.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	22-08-2022		TLM2/ TLM4/ TLM5	
30.	Pig: Introduction to PIG, Execution Modes of Pig	1	24-08-2022		TLM2/ TLM4/ TLM5	
31.	Comparison of Pig with Databases, Grunt, Pig Latin.	1	25-08-2022		TLM2/ TLM4/ TLM5	
32.	User Defined Functions, Data Processing operators	1	29-08-2022		TLM2/ TLM4/ TLM5	

					TLM5
05-09-2022 to 17-09-2022 Training 19-09-2022 to 27-09-2022 MID-I					
33.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	28-09-2022		TLM2/ TLM4/ TLM5
34.	Querying Data and User Defined Functions	1	29-09-2022		TLM2/ TLM4/ TLM5
35.	HBase: HBase Concepts, Clients, Example, HBase vs RDBMS	1			TLM2/ TLM4/ TLM5
36.	Big SQL: Introduction	1	30-09-2022		TLM2/ TLM4/ TLM5
37.	Assignment - 4	1	01-10-2022		TLM6
No. of classes required to complete UNIT-IV		10		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	10-10-2022		TLM2	
39.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	13-10-2022		TLM2	
40.	Data Visualization Techniques	1	14-10-2022		TLM2	
41.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	17-10-2022		TLM2	
42.	Collaborative Filtering, Big Data Analytics with BigR	1	19-10-2022		TLM2	
43.	Data models for managing big data, Real-time streaming data analytics	2	20-10-2022 22-10-2022		TLM2	
44.	Scalable analytics on large data sets	1	24-09-2022		TLM2	
45.	Systems architecture for big data management	1	26-10-2022		TLM2	
46.	Main memory data management techniques	2	27-10-2022 30-10-2022		TLM2	
47.	Assignment - 5	1	02-11-2022		TLM6	
48.	Review	1	03-11-2022		TLM2	

No. of classes required to complete UNIT-V	13	No. of classes taken:
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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.	Healthcare Data Analytics	1	04-11-2022			
50.	Social Media Analytics for Healthcare	1	05-11-2022			
51.	Medical Image Analysis Systems-	1	07-11-2022			

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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. S. Jayaprada	Dr. S. Jayaprada	Dr K Naga Prashanthi	Dr. D. Veeraiah
Signature				



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. MANASWINI

Course Name & Code : INTERNET OF THINGS & 17CI19

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

Credits: 3

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

A.Y.: 2022-23

PREREQUISITE: Python Programming

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

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

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

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

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

TEXTBOOKS:

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

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

REFERENCE BOOKS:

R1 Pethuru Raj and Anupama C. Raman,"The Internet of Things: Enabling Technologies, Platforms, and Use Cases", (CRC Press).

R2 Adrian McEwen, –Designing the Internet of Things||, Wiley Publishers, 2013, ISBN: 978-1-118-43062-0.

R3 Daniel Kellmerit, –The Silent Intelligence: The Internet of Things||, 2013, ISBN: 0989973700.

R4 https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf

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	2	12/07/2022		TLM2	
2.	Definition and Characteristics of IoT	2	16/07/2022		TLM2	
3.	Physical Design of IoT Part-1	2	19/07/2022		TLM2	
4.	Physical Design of IoT Part-2	2	23/07/2022		TLM2	
5.	Logical Design of IoT Part-1	2	26/07/2022		TLM2	
6.	Logical Design of IoT Part-2	2	30/07/2022		TLM2	
7.	IoT Enabled Technologies	2	02/08/2022		TLM2	
8.	IoT Levels	2	06/08/2022		TLM2	
9.	IoT Deployment Templates	2	10/08/2022		TLM2	
No. of classes required to complete UNIT-I: 18				No. of classes taken: 18		

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	2	17/08/2022		TLM2	
11.	Home Automation	1	20/08/2022		TLM2	
12.	Smart Cities	1	22/08/2022		TLM2	
13.	Environment	1	23/08/2022		TLM2	
14.	Energy	1	24/08/2022		TLM2	
15.	Retail & Logistics	1	27/08/2022		TLM2	
16.	Agriculture	1	29/08/2022		TLM2	
17.	Industry	1	30/08/2022		TLM2	
18.	Health & Lifestyle	1	03/09/2022		TLM2	
No. of classes required to complete UNIT-II: 10				No. of classes taken: 10		

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	27/09/2022		TLM2	
20.	Difference between IoT and M2M	1	28/09/2022		TLM2	
21.	Traditional Networking and SDN	1	01/10/2022		TLM2	
22.	NFV for IoT	1	10/10/2022		TLM2	
23.	Need for IoT Systems Management	1	11/10/2022		TLM2	
24.	Simple Network management Protocol (SNMP)	1	12/10/2022		TLM2	
25.	NETCONF, YANG	1	15/10/2022		TLM2	
26.	YANG-NETCONF	1	17/10/2022		TLM2	
27.	NETOPEER	1	18/10/2022		TLM2	
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	19/10/2022		TLM2	
29.	Raspberry Pi and its Configuration	1	22/10/2022		TLM2	
30.	Linux on Raspberry Pi	1	25/10/2022		TLM2	
31.	Raspberry Pi Interfaces	1	25/10/2022		TLM2	

32.	Programming Pi with Python Part-1	1	26/10/2022		TLM2	
33.	Programming Pi with Python Part-2	1	29/10/2022		TLM2	
34.	Other IoT Devices	1	31/10/2022		TLM2	
No. of classes required to complete UNIT-IV: 06				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	01/11/2022		TLM2	
36.	Cloud Storage Models & Communication APIs	1	02/11/2022		TLM2	
37.	WAMP - AutoBahn for IoT	2	07/11/2022		TLM2	
38.	Commands for Installing AutoBahn	1	09/11/2022		TLM2	
39.	Xively Cloud for IoT	1	14/11/2022		TLM2	
40.	Python Web Application Framework - Django	1	15/11/2022		TLM2	
41.	Example Programs on Django	1	16/11/2022		TLM2	
42.	Designing a RESTful Web API	1	19/11/2022		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 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: P.VEERA SWAMY
Course Name & Code	: Information Retrieval Systems &17CS92
L-T-P Structure	: 3-0-0 Credits: 3
Program/Sem/Sec	: B.Tech., CSE., VII-Sem., Sec-B A.Y: 2022-23

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

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

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

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

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

COs	PO1	PO2	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	1	11-07-2022		TLM2	
2.	Objectives	1	12-07-2022		TLM2	
3.	Functional Overview Item Normalization	2	15-07-2022		TLM2	
4.	Selective dissemination AFB	1	16-07-2022		TLM2	
5.	Document Database search, Index Database search	1	18-07-2022		TLM2	
6.	Relationship to DBMS	1	19-07-2022		TLM2	
7.	Digital libraries and Data Warehouses, IRS Search capabilities	2	22-07-2022		TLM2	
8.	Information Retrieval System Capabilities: Search capabilities	2	23-07-2022 25-07-2022		TLM2	
9.	Information Retrieval System Capabilities: Browse Capabilities	1	26-07-2022		TLM2	
10.	Information Retrieval System Capabilities: Browse and Miscellaneous	2	29-07-2022		TLM2	
No. of classes required to complete UNIT-I:14				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.	UNIT-II: Data Structures: Introduction	1	30-07-2022		TLM2	
2.	Stemming Algorithms	2	01-08-2022 02-08-2022		TLM2	
3.	Inverted file structures	1	05-08-2022		TLM2	
4.	N-gram data structure	1	08-08-2022		TLM2	
5.	PAT data structure	2	12-08-2022		TLM2	
6.	Signature file structure	1	16-08-2022		TLM2	
7.	Hypertext data structure	1	20-08-2022		TLM2	
8.	Cataloguing and Indexing: History	1	22-08-2022		TLM2	
9.	Objectives	1	23-08-2022		TLM2	
10.	Indexing Process	2	26-08-2022		TLM2	
11.	Automatic Indexing	2	30-08-2022 01-09-2022		TLM2	
12.	Information Extraction	2	02-09-2022		TLM2	
No. of classes required to complete UNIT-II:17				No. of classes taken:		
I MID EXAMINATIONS FROM 19-09-2022 TO 26-09-2022						

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	27-09-2022		TLM2	
2.	Statistical indexing	2	30-09-2022		TLM2	
3.	Natural language	1	01-10-2022		TLM2	
4.	Concept indexing	1	10-10-2022		TLM2	
5.	Hypertext linkages	1	11-10-2022		TLM2	
6.	Document and Term Clustering: Introduction	2	14-10-2022		TLM2	
7.	Thesaurus generation	1	15-10-2022		TLM2	
8.	Item clustering	1	17-10-2022		TLM2	
9.	Hierarchy of clusters	1	18-10-2022		TLM2	
No. of classes required to complete UNIT-III:11				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	2	21-10-2022		TLM2	
2.	Similarity measures and ranking	1	22-10-2022		TLM2	
3.	Relevance feedback	1	25-10-2022		TLM2	
4.	Selective dissemination of information search	2	28-10-2022		TLM2	

5.	weighted searches of Boolean systems	1	29-10-2022		TLM2	
6.	Searching the Internet and hypertext	2	31-10-2022 01-11-2022		TLM2	
7.	Information Visualization,	1	04-11-2022		TLM2	
8.	Introduction, Cognition and perception	2	04-11-2022 05-11-2022		TLM2	
9.	Information visualization technologies.	1	07-11-2022		TLM2	
No. of classes required to complete UNIT-IV:13				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	1	08-11-2022		TLM2	
2.	Software text search algorithms	2	11-11-2022		TLM2	
3.	Hardware text search systems.	1	12-11-2022		TLM2	
4.	Information System Evaluation: Introduction	1	15-11-2022		TLM2	
5.	Measures used in system evaluation	2	18-11-2022		TLM2	
6.	Measurement example – TREC results	1	19-11-2022		TLM2	
No. of classes required to complete UNIT-V:08				No. of classes taken:		
II MID EXAMINATIONS 21-11-2022 TO 26-11-2022						

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	Head of the Department
Mr P.Veera Swamy	Ms M.Swathi	Dr.K.Naga Prasanthi	Dr.D.Veeraiah



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Mr.A. RAJAGOPAL	
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 : 2022 - 2023
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.	Introduction to IS, Security Attacks	1	11/07/2022		TLM1, TLM2	
2.	Security Services, Security Mechanisms	1	13/07/2022		TLM1, TLM2	
3.	Integrity, Authentication Confidentiality & Non-Repudiation, Access Control, Availability	1	13/07/2022		TLM1, TLM2	
4.	A Model for Internet Security, Conventional Encryption Principles-Substitution	1	16/07/2022		TLM1, TLM2	
5.	Transposition Techniques	1	18/07/2022		TLM1, TLM2	
6.	Conventional Encryption Algorithms-DES	1	20/07/2022		TLM1, TLM2	
7.	Triple DES	1	20/07/2022		TLM1, TLM2	
8.	AES Algorithm	1	23/07/2022		TLM1, TLM2	
9.	Block Cipher & Fiestal Structure,	1	25/07/2022		TLM1, TLM2	
10.	Cipher Block Modes of Operations (CBC, CFB only)	1	27/07/2022		TLM1, TLM2	
11.	Stream Ciphers & RC4	1	27/07/2022		TLM1, TLM2	
12.	Placement of encryption(Location of Encryption Devices)	1	30/07/2022		TLM1, TLM2	

13.	Traffic Analysis, Key Distribution	1	01/08/2022		TLM1, TLM2	
14.	Assignment-1/Tutorial-1	1	03/08/2022		TLM3	
No. of classes required to complete UNIT-I		14		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
15.	Approaches of Message Authentication, Secure Hash Functions - SHA-1	1	03/08/2022		TLM1, TLM2	
16.	SHA-512	1	06/08/2022		TLM1, TLM2	
17.	HMAC Algorithm	1	08/08/2022		TLM1, TLM2	
18.	Public-Key Cryptography Principles	1	10/08/2022		TLM1, TLM2	
19.	Public-Key Cryptography Algorithms – RSA	1	10/08/2022		TLM1, TLM2	
20.	Deffie –Hellman Key Exchange Algorithm	1	17/08/2022		TLM1, TLM2	
21.	Digital Signatures	1	17/08/2022		TLM1, TLM2	
22.	Public Key Infrastructure	1	20/08/2022		TLM1, TLM2	
23.	Public Key Infrastructure	1	22/08/2022		TLM1, TLM2	
24.	Digital Certificates	1	24/08/2022		TLM1, TLM2	
25.	Certificate Authority	1	24/08/2022		TLM1, TLM2	
26.	Key Management. Kerberos	1	27/08/2022		TLM1, TLM2	
27.	X.509 Directory Authentication Service	1	29/08/2022		TLM1, TLM2	
28.	Assignment-2/ Tutorial-2	1	03/09/2022		TLM3	
No. of classes required to complete UNIT-II		14		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
29.	Email privacy, Pretty Good Privacy (PGP)	1	26/09/2022		TLM1, TLM2	
30.	PGP Key Management	1	28/09/2022		TLM1, TLM2	
31.	MIME and S/ MIME	1	28/09/2022		TLM1, TLM2	
32.	IP Security Overview, IP Security Architecture,	1	01/10/2022		TLM1, TLM2	
33.	Authentication Header Encapsulating Security Payload,	1	10/10/2022		TLM1, TLM2	
34.	Tunnel and Transport Modes	1	12/10/2022		TLM1, TLM2	
35.	Combining Security Associations, Key Exchange	1	12/10/2022		TLM1, TLM2	
36.	Cryptographic Suites	1	15/10/2022		TLM1, TLM2	
37.	Assignment – 3/ Tutorial-3	1	17/10/2022		TLM3	
No. of classes required to complete UNIT-III		09		No. of classes taken:		

UNIT-IV: WEB SECURITY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	Web Security Requirements	1	19/10/2022		TLM1, TLM2	
39.	Secure Socket Layer (SSL) Architecture, Protocols	1	19/10/2022		TLM1, TLM2	
40.	SSL Handshake Protocol	1	22/10/2022		TLM1, TLM2	
41.	Transport Layer Security	1	26/10/2022		TLM1, TLM2	
42.	Transport Layer Security Approaches	1	26/10/2022		TLM1, TLM2	
43.	Secure Electronic Transaction (SET)	1	29/10/2022		TLM1, TLM2	
44.	Payment Processing	1	31/10/2022		TLM1, TLM2	

45.	HTTPs. HTTP vs HTTPs	1	05/11/2022		TLM1, TLM2	
46.	Unit Overview and Discussion	1	07/11/2022		TLM1, TLM2	
47.	Assignment – 4/ Tutorial-4	1	09/11/2022		TLM3	
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	09/11/2022		TLM1, TLM2	
49.	Viruses and Related Threats	1	12/11/2022		TLM1, TLM2	
50.	Firewall Design principles	1	14/11/2022		TLM1, TLM2	
51.	Trusted System	1	16/11/2022		TLM1, TLM2	
52.	Introduction to Database Security and authorization, Database authorization	1	16/11/2022		TLM1, TLM2	
53.	Assignment-5/ Tutorial-5	1	19/11/2022		TLM3	
No. of classes required to complete UNIT-V		06		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	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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
Mr.A.RAJAGOPAL	Mr.A.RAJAGOPAL	Dr. K.NAGA PRASANTHI	Dr. D. VEERAI AH



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. P. Bhagath

Course Name & Code : Pattern Recognition (17CI26)

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

Credits: 3

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

A.Y : 2022 - 2023

Pre-Requirement: Basic knowledge of probability & statistics

Course Educational Objectives (CEOs):

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

COURSE OUTCOMES (COs):

At the end of the course, students are able to

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

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

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

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

1- Low

2 -Medium

3 High

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Pattern Recognition	2	11-07-2022, 13-07-2022		TLM2	
2.	Machine perception	1	14-07-2022		TLM2	
3.	pattern recognition example, pattern recognition systems	2	16-07-2022, 18-07-2022		TLM2	
4.	Design cycle, learning and adaptation	1	20-07-2022		TLM2	
5.	Bayesian Decision Theory	2	21-07-2022 23-07-2022		TLM2	
6.	continuous features – two categories classifications	2	25-07-2022 27-07-2022		TLM2	
7.	minimum error-rate classification-zero-one loss function, classifiers	2	28-07-2022, 30-07-2022		TLM2	
8.	Problems with Bayes classifier	1	01-08-2022		TLM2	
9.	Discriminant functions, and decision surface	2	03-08-2022 04-08-2022		TLM2	
No. of classes required to complete UNIT-I		15		No. of classes taken:		

UNIT-II: Density Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Normal density	1	06-08-2022		TLM1	
11.	Univariate and multivariate density	1	08-08-2022		TLM1	
12.	discriminant functions for the normal Density different cases	2	10-08-2022, 11-08-2022		TLM1	

13.	Example problems	1	13-08-2022		TLM1	
14.	Bayes decision theory - discrete features	2	17-08-2022 18-08-2022		TLM1	
15.	Example problems	1	20-08-2022		TLM1	
16.	Compound Bayesian decision theory and context	2	22-08-2022 24-08-2022		TLM1	
17.	Example problems	1	25-08-2022 27-08-2022		TLM1	
No. of classes required to complete UNIT-II		11		No. of classes taken:		

UNIT-III: Bayesian parameter estimation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Parameter Estimation under Normal density function	2	29-08-2022 31-08-2022		TLM1	
19.	What is maximum likelihood estimation	1	01-09-2022		TLM1	
20.	Maximum likelihood estimation	2	03-09-2022 05-09-2022		TLM1	
21.	Example problems	2	07-09-2022 08-09-2022		TLM1	
22.	Bayes likelihood estimation	2	10-09-2022 12-09-2022		TLM1	
23.	Bayes parameter estimation	2	14-09-2022 16-09-2022		TLM1	
24.	Bayes parameter estimation – Gaussian distribution	2	17-09-2022 17-09-2022		TLM1	
25.	Example problems	1	21-09-2022		TLM1	
No. of classes required to complete UNIT-III		14		No. of classes taken:		

UNIT-IV: Unsupervised learning and clustering

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Unsupervised Learning	1	22-09-2022		TLM1	
27.	Mixture densities and identifiability	2	24-09-2022 22-09-2022		TLM1	
28.	Maximum likelihood estimates	2	24-09-2022 10-10-2022		TLM1	
29.	Application to normal mixtures	1	12-10-2022		TLM1	
30.	K-means clustering	3	13-10-2022 15-10-2022 17-10-2022		TLM1	
31.	Data description and clustering	2	19-10-2022 20-10-2022		TLM1	
32.	Similarity measures	2	22-10-2022 24-10-2022		TLM1	
33.	Criteria function for clustering	2	26-10-2022 27-10-2022		TLM1	

34.	Example Problems	2	29-10-2022 31-10-2022		TLM1	
No. of classes required to complete UNIT-IV		18		No. of classes taken:		

UNIT-V: Hidden Markov models

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Hidden Markov Model	2	02-11-2022 03-11-2022		TLM1	
36.	Discrete-time Markov process	2	05-11-2022 07-11-2022		TLM1	
37.	Extensions to hidden Markov models	2	09-11-2022 10-11-2022		TLM1	
38.	Three basic problems of HMMs & types of HMMs	2	12-11-2022 14-11-2022		TLM1	
39.	Three basic problems of HMMs & types of HMMs	1	16-11-2022		TLM1	
40.	Continuous observation densities multiple mixtures per state	1	17-11-2022		TLM1	
41.	Continuous observation densities multiple mixtures per state	1	19-11-2022		TLM1	
42.	speech recognition applications	1	21-11-2022		TLM1	
No. of classes required to complete UNIT-V		12		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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.

PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products
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Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr P. Bhagath	Dr D. Venkata Subbaiah	Dr D. Venkata Subbaiah	Dr. D. Veeraiah



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. S. Jayaprada

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. : 2022-23

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.	3			DM5
2.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	3			DM5
3.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	3			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.	3			DM5
6.	Implementation of K-means clustering using map reduce	3			DM5
7.	Installation of Hive along with practice examples	3			DM5
8.	Installation of Hive along with practice examples	3			DM5
9.	Installation of HBase, Installing thrift along with Practice examples	3			DM5
10.	Installation of R, along with Practice examples in R.	3			DM5
11.	Installation of R, along with Practice examples in R.	3			DM5
12.	Internal Lab Exam	3			DM4

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. S. Jayaprada	Dr. S. Jayaprada	Dr K Naga Prashanthi	Dr. D. Veeraiah
Signature				

PART-C

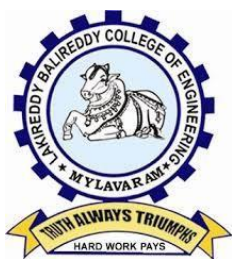
PROGRAMME OUTCOMES (POs):

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
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. S. Jayaprada	Dr. S. Jayaprada	Dr K Naga Prashanthi	Dr. D. Veeraiah
Signature				



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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.B.MANASWINI

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

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

Program/Sem/Sec : B.Tech.–CSE/VII Sem/Sec-B **A.Y.** : 2022-23

PRE-REQUISITE: Python Programming, Computer Networks.

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

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

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

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

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

REFERENCES:

R1 www.users.di.uniroma1.it/~spenza/files/labIoT2015/Lab-IoT-1.pdf

R2 www.mobileeducationkit.net/labmanuals/LAB-Manual-mbed.docx

PART-B

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Introduction to Raspberry Pi & Cycle-1	2	21/07/22		DM5
2.	Installation of NOOBs in Raspberry Pi	2	04/08/22		DM5
3.	Cycle-2	2	18/08/22		DM5
4.	Cycle-3	2	01/09/22		DM5
5.	Cycle-4	2	29/09/22		DM5
6.	Cycle-5	2	20/10/22		DM5
7.	Cycle-6	2	27/10/22		DM5
8.	Cycle-7	2	10/11/22		DM5
9.	Cycle-8	2	17/11/22		DM5
10.	Internal Lab Exam	2	30/11/22		DM4

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

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

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