



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' GRADE & NBA (Under Tier - I), ISO 9001:2015 Certified  
 Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada  
 L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.  
 Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr. S.NAGARJUNA REDDY

**Course Name & Code** : THEORY OF COMPUTATION & 20CS13

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

**Program/Sem/Sec** : B.Tech/V/A

**Credits:** 3

**A.Y.:** 2022-23

**PREREQUISITE:** Discrete Mathematical Structures

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to provide a formal connection between algorithmic problem solving and the theory of automata and languages, and develop them into a mathematical view towards algorithmic design and in general computation itself.

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

<b>C01</b>	Construct finite automata for regular languages and prove it's equivalence ( <b>Apply-L3</b> )
<b>C02</b>	Construct regular expression for regular languages and prove the equivalence of regular expression and Finite Automata ( <b>Apply-L3</b> )
<b>C03</b>	Design Pushdown automata for the context free languages. ( <b>Understand-L2</b> )
<b>C04</b>	Design Turing Machine to model computational problems ( <b>Apply-L3</b> )
<b>C05</b>	Distinguish decidable and undecidable problems with the help of Turing machine ( <b>Understand-L2</b> )

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>C01</b>	3	2											1		
<b>C02</b>	3	2											1		
<b>C03</b>	3	2													
<b>C04</b>	3	2													
<b>C05</b>	1	2													
	1 - Low			2 -Medium						3 - High					

#### **TEXTBOOKS:**

**T1** John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, "Introduction to Automata Theory, Languages, and Computation", Pearson Education Asia, 1997

#### **REFERENCE BOOKS:**

<b>R1</b>	Harry R. Lewis and Christos H. Papadimitriou, "Elements of the Theory of Computation", Pearson Education Asia, 2000
<b>R2</b>	Dexter C. Kozen, "Automata and Computability", Springer, 2011.
<b>R3</b>	Michael Sipser, "Introduction to the Theory of Computation", PWS Publishing, 2005.
<b>R4</b>	John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill, 2 <sup>nd</sup> Edition, 2003

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: FINITE AUTOMATA

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- Course Objective & Outcomes	1	18-07-2022		TLM1	
2.	Basic Concepts of Finite Automata	1	21-07-2022		TLM1	
3.	Finite automata Classification	1	22-07-2022		TLM1	
4.	DFA Construction	2	23-07-2022 25-07-2022		TLM1	
5.	NFA Construction	1	28-07-2022		TLM1	
6.	Equivalence of NFA & DFA	1	29-07-2022		TLM1	
7.	NFA with epsilon to NFA without epsilon	1	30-07-2022		TLM1	
8.	Minimization of Finite Automata	2	01-08-2022 04-08-2022		TLM1	
9.	Finite Automata with output	1	05-08-2022		TLM1	
10.	Construction of Moore and Melay Machine	2	06-08-2022 08-08-2022		TLM1	
11.	Equivalence of Moore and Melay	2	11-08-2022 12-08-2022		TLM1	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Regular Expression and Regular Languages

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Introduction to Regular Expressions	1	18-08-2022		TLM1	
13.	Construction of RE	1	19-08-2022		TLM1	
14.	RE to Finite Automata	1	20-08-2022		TLM1	
15.	FA to Regular expressions	1	22-08-2022		TLM1	
16.	Regular grammar, Construction	1	25-08-2022		TLM1	
17.	Parse Trees	1	26-08-2022		TLM1	
18.	Equivalence of grammar to Finite Automata	1	27-08-2022		TLM1	
19.	Pumping Lemma for regular languages	1	29-08-2022		TLM1	
20.	Closure Properties for Regular Language	1	01-09-2022		TLM1	
<b>No. of classes required to complete UNIT-II: 09</b>				<b>No. of classes taken:</b>		

**UNIT-III: CONTEXT FREE GRAMMER AND PUSH DOWN AUTOMATA**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Context Free Grammar	1	02-09-2022		TLM1	
22.	Ambiguity of CFG	1	03-09-2022		TLM1	
23.	Simplification of CFG	1	05-09-2022		TLM1	
24.	CNF	1	08-09-2022		TLM1	
25.	GNF	2	09-09-2022 10-09-2022		TLM1	
26.	PDA Definition	1	03-10-2022		TLM1	
27.	Deterministic PDA and Non Deterministic PDA	1	10-10-2022		TLM1	
28.	Construction of PDA	1	13-10-2022		TLM1	
29.	CFG to PDA	1	14-10-2022		TLM1	
30.	PDA to CFG	1	15-10-2022		TLM1	
31.	Pumping lemma for CFL's	1	17-10-2022		TLM1	
32.	Closure properties of CFL's	1	20-10-2022		TLM1	
<b>No. of classes required to complete UNIT-III: 13</b>				<b>No. of classes taken:</b>		

**UNIT-IV: Turing Machine**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Introduction, Basic Model of TM	1	21-10-2022		TLM1	
34.	Languages, closure properties	1	22-10-2022		TLM1	
35.	TM Construction	3	24-10-2022 27-10-2022 28-10-2022		TLM1	
36.	Variants of TM	2	29-10-2022 31-10-2022		TLM1	
37.	NDTM equivalence with DTM	2	03-11-2022 04-11-2022		TLM1	
38.	Unrestricted Grammar and its equivalence TM	1	05-11-2022		TLM1	
39.	TM as enumerators	2	07-11-2022 10-11-2022			
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>		

**UNIT-V: Undecidability**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
40.	Introduction	1	11-11-2022		TLM1	
41.	Church Turing Thesis	1	12-11-2022		TLM1	
42.	Universal Turing Machine	1	14-11-2022		TLM1	
43.	The universal and diagonalization Languages	1	17-11-2022		TLM1	
44.	Reduction between Languages	1	18-11-2022		TLM1	
45.	Rice Theorem	1	19-11-2022		TLM1	
46.	PCP Problem	1	21-11-2022		TLM1	
47.	Undecidable problems about Languages	2	24-11-2022 25-11-2022		TLM1	
<b>No. of classes required to complete UNIT-V: 09</b>				<b>No. of classes taken:</b>		

### 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
1.	Phases of Compiler	1	26-11-2022		TLM1	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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



## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO 6</b>	<b>The engineer and society:</b> 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.
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
<b>PSO 2</b>	To inculcate an ability to analyze, design and implement data driven applications into the students
<b>PSO 3</b>	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr. S.Nagarjuna Reddy</b>	<b>Dr. D.Veeraiah</b>	<b>Dr. S.Jayaprada</b>	<b>Dr. D.Veeraiah</b>
<b>Signature</b>				



## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	AI Introduction	1	18/7/22		TLM1	
2.	Applications of AI	1	20/7/22		TLM1	
3.	History of AI	1	21/7/22		TLM1	
4.	Types of AI	1	23/7/22		TLM1	
5.	Agents and rationality	1	25/7/22		TLM2	
6.	Structure of the agents	1	27/7/22		TLM2	
7.	Agent environment and nature of the environment	1	28/7/22		TLM2	
8.	Types of agents-Simple reflex agents and model-based agents	1	30/7/22		TLM2	
9.	Types of agents-Goal based agents and Utility-based agents	1	01/8/22		TLM2	
10.	Types of agents-Learning agents	1	03/8/22		TLM2	
11.	Problems, search spaces	1	04/8/22		TLM2	
12.	Defining the problem as state space search	1	06/8/22		TLM2	
13.	Production system	1	08/8/22		TLM2	
14.	Problem characteristics	1	11/8/22		TLM2	
15.	Issues in the design of search programs.	1	13/8/22		TLM2	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Problem solving agents and search algorithm terminologies	1	17/8/22		TLM2	
17.	Properties of search algorithms and types of search algorithms	1	18/8/22		TLM2	
18.	Uninformed search algorithms: Breadth-first Search	1	20/8/22		TLM2	
19.	Depth-first Search and Depth-limited Search	1	22/8/22		TLM2	
20.	Iterative deepening depth-first search.	1	24/8/22		TLM2	
21.	Uniform cost search, Bidirectional search.	1	25/8/22		TLM2	
22.	Informed/Heuristic Search algorithms: Greedy best-first search algorithm	1	27/8/22		TLM2	
23.	A* Search algorithm	1	29/8/22		TLM2	
24.	Hill climbing algorithm	1	01/9/22		TLM2	
25.	Constraint satisfaction problem	1	03/9/22		TLM2	
26.	Means-Ends Analysis	1	05/09/22		TLM2	
<b>No. of classes required to complete UNIT-II: 11</b>				<b>No. of classes taken:</b>		

#### UNIT-III:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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27.	Adversarial search/Game playing: Introduction	1	07/9/22		TLM2	
28.	Minmax Algorithm	1	08/9/22		TLM2	
29.	Alpha-Beta Pruning	1	10/9/22		TLM2	
30.	Knowledge representation: Representations and mappings	2	03/10/22 06/10/22		TLM2	
31.	Approaches of Knowledge representation	2	08/10/22 10/10/22		TLM2	
32.	Issues in Knowledge Representation	2	12/10/22 13/10/22		TLM2	
<b>No. of classes required to complete UNIT-III: 09</b>					<b>No. of classes taken:</b>	

#### UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Knowledge Representation Using predicate logic: Representing simple facts in logic.	1	15/10/22		TLM2	
34.	Representing instance and Isa relationships	2	17/10/22 19/10/22		TLM2	
35.	Computable functions and predicates	1	20/10/22		TLM2	
36.	Resolution	2	22/10/22 26/10/22		TLM2	
37.	Natural deduction	1	27/10/22		TLM2	
38.	Representing knowledge using Rules: Procedural verses declarative knowledge	1	29/10/22		TLM2	
39.	Logic programming	1	31/10/22		TLM2	
40.	Forward verses backward reasoning	1	02/11/22		TLM2	
41.	Matching	1	03/11/22		TLM2	
42.	Control knowledge	1	05/11/22		TLM2	
<b>No. of classes required to complete UNIT-IV: 12</b>					<b>No. of classes taken:</b>	

#### UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Uncertain knowledge and Reasoning: Probability and Bayes theorem	2	07/11/22 09/11/22		TLM2	
44.	Certainty factors and rule-based systems	2	10/11/22 12/11/22		TLM2	
45.	Bayesian networks	2	14/11/22 16/11/22		TLM2	
46.	Dempster – Shafer Theory	2	17/11/22 19/11/22		TLM2	
47.	Fuzzy logic	1	21/11/22		TLM2	
48.	Learning: Overview of different forms of learning	1	23/11/22		TLM2	
49.	Learning Decision Trees	1	24/11/22		TLM2	
50.	Neural networks	1	26/11/22		TLM2	
<b>No. of classes required to complete UNIT-V: 12</b>					<b>No. of classes taken:</b>	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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	in diverse teams, and in multidisciplinary settings.
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<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Mr.N V Naik</b>	<b>Mr.N V Naik</b>	<b>Dr.D V Subbaiah</b>	<b>Dr.D Veeraiah</b>
<b>Signature</b>				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)  
Accredited by NAAC with '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

**PROGRAM** : B.Tech. V-Sem. (A)  
**ACADEMIC YEAR** : 2022-23  
**COURSE NAME & CODE** : **Computer Networks–20CS12**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : Dr.K Naga Prasanthi  
**COURSE COORDINATOR** : Dr.K Naga Prasanthi  
**PRE-REQUISITE: Basic Computer Fundamentals and Concepts**

**COURSE OBJECTIVE:**The Objective of the course is to provide a foundation to understand computer networks using layered architectures. It also helps students understand the various network models, addressing concept, routing protocols and design aspects of computer networks.

**COURSE OUTCOMES (CO):**After the completion of this course, student will be able to:

**CO1:** Demonstrate the modern network architectures from a design perspective (Understand-L2)

**CO2:** Apply various Data Link layer design issues and error detection & correction techniques to solve collisions problems. (Apply-L3)

**CO3:** Demonstrate the network Layer functionalities (**Understand- L2**)

**CO4:** Outline the functions of transport layer protocols (Understand-L2)

**CO5:** Examine different application layer protocols. (**Understand-L2**)

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	2											1	
CO2	1	2	2									1		1	
CO3	1	3	3									1		1	
CO4	2	3	3	1								1	1		
CO5	2	2	2									1	1		

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

**TEXT BOOKS:**

**T1** 1 B. A. Frouzan, Data Communication, Tata Mc Graw Hill.

2 S. Tanenbaum —Computer Network: Second Ed. Prentice Hall, India.

**REFERENCE BOOKS:**

**R** William Stallings, "Data and Computer Communication", Pearson Prentice Hall India,  
**1** 8<sup>th</sup> Edition.

**R** Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1,  
**2** 6<sup>th</sup> Edition, 2009.

**R** Richard Stevens, "TCP/IP Illustrated" , Addison-Wesley, Volume 1, 2001.

**3** <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>

**R** <http://www.tcpiptide.com/free/tOSIReferenceModelLayers.htm>

**4**

**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I:**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to computer networks	1	19-7-22		TLM2	CO1	T1,T2	
2.	<b>Data Communication Components</b>	1	20-7-22		TLM2	CO1	T1	
3.	Representation of data and its flow Networks	1	22-7-22		TLM2	CO1	T1	
4.	Various Connection Topology	1	23-7-22		TLM2	CO1	T1,R3	
5.	Protocols and Standards	1	26-7-22		TLM2	CO1	T1,R3	
6.	OSI model	1	27-7-22		TLM2	CO1	T1,R1	
7.	TCP/IP model	1	29-7-22		TLM2	CO1	T1,R2	
8.	Transmission Media	2	30-7-22 02-8-22		TLM2	CO1	T1,T2	



9.	LAN:Wired LAN, Wireless LANs	1	03-8-22		TLM2	CO1	T1	
10.	Connecting LAN and VirtualLAN.	1	05-8-22		TLM2	CO1	T1	
No. of classes required to complete UNIT-I		10			No. of classes taken:			

### UNIT-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
11.	<b>DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER</b>	1	06-8-22		TLM2	CO2	T1,R1	
12.	Error Detection and Error Correction - Fundamentals	1	10-8-22		TLM2	CO2	T1,R1	
13.	Block coding, Hamming Distance, CRC	1	12-8-22		TLM2	CO2	T1,R2	
14.	Flow Control and Error control protocols	2	13-8-22 16-8-22		TLM2	CO2	T1,R3	
15.	Stop and Wait, Go back – N ARQ	1	17-8-22		TLM2	CO2	T1,R2	
16.	Selective Repeat ARQ	1	20-8-22		TLM2	CO2	T1,R2	
17.	Sliding Window, Piggybacking	2	23-8-22 24-8-22		TLM2	CO2	T1,R3	
18.	Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA	1	26-8-22		TLM2	CO2	T1,R3	
19.	CSMA/CD,CDMA/CA	2	27-8-22 30-8-22		TLM2	CO2	T1,R3	
No. of classes required to complete UNIT-II		9			No. of classes taken:			

### UNIT-III:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
20.	<b>NetworkLayer</b>	1	02-9-22		TLM2	CO3	T1,R3	

21.	Switching	1	03-9-22		TLM2	C03	T1	
22.	Logical addressing— IPV4, IPV6	2	06-9-22 07-9-22		TLM2	C03	T1	
23.	Address mapping— ARP	1	09-9-22		TLM2	C03	T1	
24.	RARP, BOOTP and DHCP—Delivery	2	10-9-22 07-10-22		TLM2	C03	T1,R2	
25.	Forwarding	1	08-10-22		TLM2	C03	T1	
26.	Unicast Routing protocols.	3	11-10-22 12-10-22 14-10-22		TLM2	C03	T1	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

#### UNIT-IV:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
27.	<b>Transport Layer</b>	1	15-10-22		TLM2	C04	T1,R1	
28.	Process to Process Communication	2	18-10-22 19-10-22		TLM2	C04	T1	
29.	User Datagram Protocol (UDP)	1	21-10-22		TLM2	C04	T1	
30.	Transmission Control Protocol (TCP)	2	22-10-22 25-10-22		TLM2	C04	T1	
31.	SCTP Congestion Control	1	26-10-22		TLM2	C04	T1	
32.	Quality of Service	1	28-10-22		TLM2	C04	T1	
33.	QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	2	29-10-22 01-11-22		TLM2	C04	T1	
No. of classes required to complete UNIT-IV		10			No. of classes taken:			

#### UNIT-V:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	Application Layer	1	04-11-22		TLM2	C05	T1,R3	
35.	Domain Name Space (DNS), DDNS	2	05-11-22 09-11-22		TLM2	C05	T1,R3	
36.	TELNET, EMAIL	2	11-11-22 12-11-22		TLM2	C05	T1,R4	

37.	File Transfer Protocol (FTP)	1	15-11-22		TLM2	C05	T1,R3	
38.	WWW, HTTP	2	16-11-22 18-11-22		TLM2	C05	T1,R3	
39.	SNMP, Bluetooth, Firewalls	3	19-11-22 22-11-22 23-11-22		TLM2	C05	T1,R3	
40.	Revision	2	25-11-22 26-11-22					
No. of classes required to complete UNIT-V		5			No. of classes taken:			

Teaching Learning Methods					
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

### EVALUATION PROCESS:

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

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOS)**

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

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

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

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

## **PROGRAM OUTCOMES**

### **Engineering Graduates will be able to:**

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

responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the 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.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### **PROGRAM SPECIFIC OUTCOMES**

##### **1. PS01:**

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

##### **2. PS02:**

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

##### **3. PS03:**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr.K Naga Prasanthi	Dr.K Naga Prasanthi	Dr.D.V.Subbaiah	Dr. D Veeraiah
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : Dr. K DEVIPRIYA  
Course Name & Code : Machine Learning (20AD04)  
L-T-P Structure : 3-0-0 Credits : 3  
Program/Sem/Sec : B.Tech., CSE., V-A A.Y: 2022-23

**PRE-REQUISITE: Probability and Statistics, Data Warehousing and Data Mining**

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

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

CO 1	Identify the characteristics of machine learning. (Understand- L2)
CO 2	Understand the Model building and evaluation approaches (Understand- L2)
CO 3	Apply regression algorithms for real-world Problems. (Apply- L3)
CO 4	Handle classification problems via supervised learning algorithms. (Apply- L3)
CO 5	Learn advanced learning techniques to deal with complex data (Apply- L3)

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

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

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

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

#### **TEXT BOOKS:**

1. Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India, 1st edition, 2015.
2. Tom M. Mitchell, "Machine Learning", MGH, 1997.

#### **REFERENCE BOOKS:**

1. Shai Shalev-Shwartz, Shai Ben David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge
2. Peter Harington, "Machine Learning in Action", Cengage, 1st edition, 2012.

3. Peter Flach, “Machine Learning: The art and science of algorithms that make sense of data”, Cambridge university press,2012.
4. Jason Brownlee, “Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End”, Edition: v1.4, 2011.

## **PART-B**

### **COURSE DELIVERY PLAN (LESSON PLAN): Section C**

#### **UNIT-I : Introduction to Machine Learning and Preparing to Model**

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	1	18-7-2022		TLM1	
2.	Types of Machine Learning-supervise Learning	1	19-7-2022		TLM1	
3.	Unsupervised Learning	1	21-7-2022		TLM1	
4.	Reinforcement Learning	1	23-7-2022		TLM1	
5.	Applications of Machine Learning,	1	25-7-2022		TLM1	
6.	Issues in Machine Learning	1	26-7-2022		TLM1	
7.	Introduction, Machine Learning Activities	1	28-7-2022		TLM1	
8.	Basic Types of Data in Machine Learning	1	30-7-2022		TLM1	
9.	Exploring Structure of Data	1	1-8-2022		TLM1	
10.	Exploring Structure of Data	1	2-8-2022		TLM1	
11.	Data Quality and Remediation,	1	4-8-2022		TLM1	
12.	Data PreProcessing	1	6-8-2022		TLM3	
<b>No. of classes required to complete UNIT-I</b>		<b>12</b>		<b>No of classes taken</b>		

#### **UNIT-II: Modelling & Evaluation, Basics of Feature 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
13	Introduction,	1	8-8-2022			
14.	selecting a Model, training a Model (for Supervised Learning),	2	11-8-2022, 16-8-2022		TLM1	
15.	, Model Representation and Interpretability	1	11-8-2022		TLM1	
16.	Evaluating Performance of a Model.	1	16-8-2022		TLM1	
17.	Feature Transformation	1	18-8-2022		TLM1	
18.	Feature Construction	1	20-8-2022		TLM1	
19.	Feature Extraction	1	22-8-2022		TLM1	
20.	Principal Component Analysis (PCA),	1	23-8-2022		TLM1	
21.	Singular Value Decomposition	1	25-8-2022		TLM3	

22	Linear Discriminant Analysis (LDA), Feature Subset Selection	1	27-8-2022			
<b>No. of classes required to complete UNIT-II</b>		<b>12</b>		<b>No of classes taken</b>		

### UNIT-III: Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Introduction to regression analysis, Simple linear regression	1	29-8-2022		TLM1	
24.	Multiple linear regression	2	30-8-2022, 1-9-22		TLM1	
25.	Assumptions in Regression Analysis, Main Problems in Regression Analysis	1	3-9-22		TLM1	
26.	Improving Accuracy of the linear regression model,	2	5-9-22 6-9-22		TLM1	
27.	Polynomial Regression Model	1	8-9-22		TLM1	
28.	Logistic Regression	1	10-9-22		TLM1	
29.	Regularization	1	6-10-22		TLM1	
30.	Regularized Linear Regression	1	8-10-22		TLM1	
31.	Regularized Logistic Regression.	1	10-10-22		TLM3	
<b>No. of classes required to complete UNIT-III</b>		<b>11</b>		<b>No of classes taken</b>		

### UNIT-IV: Supervised Learning: Classification

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Supervised Learning Introduction and example	1	11-10-22		TLM1	
33.	Classification Model	2	15-10-22 17-10-22		TLM1	
34.	Classification Learning Steps	1	18-10-22		TLM1	
35.	k-Nearest Neighbour (kNN)	2	20-10-22 22-10-22		TLM1	
36.	Support vector Machines	2	25-10-22 27-10-22		TLM1	
37.	Random Forest model	2	29-10-22 31-10-22		TLM3	
<b>No. of classes required to complete UNIT-IV</b>		<b>10</b>		<b>No of classes taken</b>		



**UNIT-V: Other Types of Learning**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	Bagging	2	1-11-22 3-11-22		TLM1	
39.	Boosting	2	5-11-22 7-11-22		TLM2	
40	Stacking and its impact on bias and variance	2	10-11-22 12-11-22		TLM2	
41	AdaBoost	2	14-11-22 15-11-22		TLM2	
42	,Gradient Boosting Machines	2	17-11-22 19-11-22		TLM2	
43	XGBoost	2	22-11-22 24-11-22		TLM2	
44	Reinforcement Learning-Q learning	1	26-11-22		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-V</b>		<b>13</b>	<b>26-11-2022</b>	<b>No of classes taken</b>		

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

**PART-C****EVALUATION PROCESS (R20 Regulations):**

<b>Evaluation Task</b>	<b>Marks</b>
Assignment-I (Unit-I , Unit-II , Unit-III)	A1=5
Assignment-II (Unit-III , Unit-IV , Unit-V)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks = 75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks = 75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10

Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF CIVIL ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** B RAMA KRISHNA

**Course Name & Code** : Disaster Management & 20CE82

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech, V SEM, CSE - C

**A.Y.:** 2022-23

**PREREQUISITE:** NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

<b>CO1</b>	Identify the basic terms, types of disasters and their impact (Understand - L2)
<b>CO2</b>	Illustrate the role of technology in handling disaster management situations(Understand-L2)
<b>CO3</b>	Identify the stake-holders concerned and design the different action plans for responding in case of disaster occurrence (Understand - L2)
<b>CO4</b>	Evaluate the importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand - L2)

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

**TEXTBOOKS:**

- T1** Tushar Bhattacharya, "Disaster Science and Management", Tata McGraw Hill Publications, New Delhi, 2012.
- T2** R.Subramanian, "Disaster Management", Vikas Publishing house Pvt. Ltd, 2022.

**REFERENCE BOOKS:**

- R1** G.K. Ghosh, "Disaster Management", APH Publishing Corporation, 2006.
- R2** U.K. Chakrabarty, "Industrial Disaster Management and Emergency Response", Asian Books Pvt. Ltd., New Delhi 2007.
- R3** H K Gupta (Ed.), "Disaster Management", Universities Press, 2003
- R4** W.N. Carter, "Disaster Management: A Disaster Management Handbook", Asian Development Bank, Bangkok, 1991.
- R5** Government of India website on Disaster Management: [www.ndmindia.nic.in](http://www.ndmindia.nic.in)

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: DEFINITIONS & TYPES OF DISASTER

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 CO's & PO's, Subject	1	18.07.2022		TLM2	
2.	Definitions – types of Disasters	1	22.07.2022		TLM2	
3.	Concept of disaster management - Disaster Management Cycle	1	21.07.2022		TLM2	
4.	Vulnerability -	1	23.07.2022		TLM2	
5.	Mitigation	1	25.07.2022		TLM2	
6.	Various types of disasters: Natural: Drought, cyclone, earthquake, and landslides.	1	27.07.2022		TLM2	
7.	Manmade and Industrial: Engineering and Technical failure, Nuclear and Chemical disasters,	1	28.07.2022		TLM2	
8.	Accident-Related Disasters	1	30.07.2022		TLM2	
9.	High Power Committee on Disaster Management in India	1	01.08.2022		TLM2	
10.	Disaster Management Act 2005	1	03.08.2022		TLM2	
11.	Tutorial- 1/ Quick revision	1	04.08.2022		TLM3	
<b>No. of classes required to complete UNIT-I: 11</b>				<b>No. of classes taken:</b>		

#### UNIT-II: IMPACT OF DISASTERS

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.	Impact due to – Earthquake	1	06.08.2022		TLM2	
13.	Impact due to – Cyclone	1	08.08.2022		TLM2	
14.	Landslides, Fire hazards	1	10.08.2022		TLM2	
15.	Life & livestock, Habitation	1	11.08.2022		TLM2	
16.	Agriculture & livelihood loss- Health hazards	1	13.08.2022		TLM2	
17.	Malnutrition problems- Contamination of water	1	17.08.2022		TLM2	
18.	Impact on children - environmental loss.	1	18.08.2022		TLM2	
19.	Tutorial- 2/ Quick revision	1	20.08.2022		TLM3	
<b>No. of classes required to complete UNIT-II:08</b>				<b>No. of classes taken:</b>		

#### UNIT-III: ROLE OF TECHNOLOGY IN DISASTER 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
20.	Role of remote sensing	1	22.08.2022		TLM2	
21.	information systems and decision making tools	1	24.08.2022		TLM2	
22.	Disaster management for infra structures - electrical substations	1	25.08.2022		TLM2	
23.	Roads and bridges	1	27.08.2022		TLM2	
24.	mitigation programme for earthquakes	1	29.08.2022		TLM2	

25.	Geospatial information in agriculture	1	01.09.2022		TLM2
26.	drought assessment	1	03.09.2022		TLM2
27.	Multimedia technology in disaster risk management and training	1	05.09.2022		TLM2
28.	Transformable indigenous knowledge in disaster reduction.	2	07.09.2022 08.10.2022		TLM2
29.	Tutorial- 3/ Quick revision	1	10.10.2022		TLM3
<b>No. of classes required to complete UNIT-III: 11</b>				<b>No. of classes taken:</b>	

#### UNIT-IV: PLANNING & RISK PREVENTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
<b>Technical training</b>		<b>12.09.2022 – 24.09.2022</b>				
<b>MID - I Examination</b>		<b>26.09.2022 – 01.10.2022</b>				
30.	Planning, early warning system	1	06.10.2022		TLM2	
31.	crisis intervention and management	2	08.10.2022 10.10.2022		TLM2	
32.	Response and Rehabilitation after Disasters	1	12.10.2022		TLM2	
33.	temporary shelter – food and nutrition- safe drinking water	1	13.10.2022 15.10.2022		TLM2	
34.	rehabilitation after cyclones- response to drought,	1	17.10.2022		TLM2	
35.	response to river erosion	1	19.10.2022		TLM2	
36.	response after earthquake	1	20.10.2022		TLM3	
37.	response after Tsunami- Hunger and Disaster	1	22.10.2022		TLM2	
38.	Tutorial- 4/ Quick revision	1	26.10.2022		TLM3	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-V: EDUCATION AND COMMUNITY PREPAREDNESS & CASE STUDIES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Essentials of disaster education – school awareness and safety programs	2	27.10.2022 29.10.2022		TLM2	
40.	Community based disaster recovery – voluntary agencies	1	31.10.2022		TLM2	
41.	Community participation at various stages of disaster management	1	02.11.2022		TLM1	
42.	Building community capacity for action	1	03.11.2022		TLM1	
43.	Corporate sector and disaster risk reduction	1	05.11.2022		TLM1	
44.	A community focused approach	1	07.11.2022		TLM2	
45.	Case studies on different disasters in the world	2	09.11.2022 10.11.2022		TLM2	
46.	Impacts, Technology usage	1	12.11.2022		TLM3	
47.	Risk prevention, Education and community preparedness	2	14.11.2022 16.11.2022		TLM2	
48.	Tutorial- 5/ Quick revision	1	17.11.2022		TLM3	
49.	Revision		19.11.2022 TO 26.11.2022		TLM3	
<b>MID - II Examination</b>		<b>28.11.2022 – 03.12.2022</b>				
<b>No. of classes required to complete UNIT-V: 13</b>				<b>No. of classes taken:</b>		

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

### PART-C

#### EVALUATION PROCESS (R17 Regulation):

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	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.
<b>PO 3</b>	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.
<b>PO 4</b>	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.
<b>PO 5</b>	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
<b>PO 6</b>	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.
<b>PO 7</b>	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.

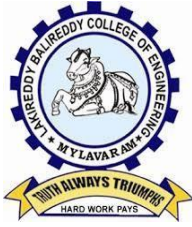
<b>PO 8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	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.
<b>PO 11</b>	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.
<b>PO 12</b>	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):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>B. Rama krishna</b>			
<b>Signature</b>				





# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

[hodcse@lbrce.ac.in](mailto:hodcse@lbrce.ac.in), [csefbreddy@gmail.com](mailto:csefbreddy@gmail.com), Phone: 08659-222933, Fax: 08659-222931

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

**Name of Course Instructor** : Dr K Naga Prasanthi  
**Course Name & Code** : COMPUTER NETWORKS LAB&20CS60  
**L-T-P Structure** : 0-0-3 Credits : 1.5  
**Program/Sem/Sec** : B.Tech., CSE., V-Sem., Section-A A.Y: 2022-23

**PRE-REQUISITES** :Data Structures and Operating Systems

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**:The main objective of this course is to prepare students to write programs to illustrate communication in networks, configure different networks(LAN, WAN) and prepare students to differentiate various protocols and their performance.

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

<b>CO 1</b>	Implement Network layer functionalities using NS3 simulator
<b>CO 2</b>	Demonstrate Transport Layer functionalities
<b>CO 3</b>	Analyze Application layer protocols using Wireshark
<b>CO 4</b>	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
<b>CO1</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO2</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO3</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO4</b>	-	-	-	-	-	-	-	1	3	2	-	-	-	-	-

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

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

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN): Section - A

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	Introduction	3	22-07-2022		
2.	Basic network commands & utilities	3	29-07-2022		
3.	Network layer tools and analyze captures for congestion	3	05-08-2022		
4.	Network layer tools and analyze captures for congestion	3	12-08-2022		
5.	Queue management techniques and global routing in NS3	3	26-08-2022		
6.	Broadcasting, multicasting and bridging in LAN using ns3	3	02-09-2022		
7.	Learn about Wifi and mobile Adhoc topologies with NS3	3	09-09-2022		
8.	Socket programming in TCP and UDP	3	07-10-2022		
9.	Observation of TCP Connection states, Flags and Flow control	3	14-10-2022		
10.	TCP Flow control, Error control and Congestion	3	21-10-2022		
11.	Wireshark & tcpdump, observation of packets in a LAN	3	28-10-2022		
12.	Analyze HTTP packets using Wireshark tool and understand records returned by DNS Server.	3	04-11-2022		
13.	Practise	3	11-11-2022		
14.	Practise	3	18-11-2022		
15.	Lab Internal Exam		25-11-2022		

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr.K. Naga Prasanthi	Dr.K. Naga Prasanthi	Dr. D. Venkata Subbaiah	Dr. D. Veeraiah

<b>Signature</b>				
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Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

Name of Course Instructor: Dr. K DEVI PRIYA

Course Name & Code :- Machine learning Lab-20AD53

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

Credits:1

Program/Sem/Sec : B.Tech. – CSE V/A

A.Y.:2022-23

PREREQUISITE: Knowledge of basic Computer hardware & software.

#### COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of this lab is to make use of Data sets in implementing the machine learning algorithms in any suitable language of choice.

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

CO1	Apply the appropriate pre-processing techniques on data set. ( <b>Apply – L3</b> )
CO2	Implement supervised Machine Learning algorithms. ( <b>Apply – L3</b> )
CO3	Implement unsupervised Machine Learning algorithms ( <b>Apply – L3</b> )
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	-	2	3	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	2	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	3	-	-	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	-	2	-	-	-	2	-
			1 - Low			2 -Medium			3 - High						

COURSE DELIVERY PLAN (LESSON PLAN):

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.	Lab Cycle-1	3	20-07-2022		DM5	
2.	Lab Cycle-1	3	27-07-2022		DM5	
3.	Lab Cycle -2	3	03-08-2022		DM5	
4.	Lab Cycle-2	3	10-08-2022 17-08-2022		DM5	

5.	Lab Cycle-2	3	24-08-2022		<b>DM5</b>	
6.	Lab Cycle-3	3	07-09-2022		<b>DM5</b>	
7.	Lab Cycle-3	3	7-9-2022		<b>DM5</b>	
8.	Lab Cycle-4	3	21-09-2022		<b>DM5</b>	
9.	Lab Cycle-4	3	12-10-2022		<b>DM5</b>	
10.	Lab Cycle5	3	19-10-2022		<b>DM5</b>	
11.	Lab Cycle6	3	26-10-2022		<b>DM5</b>	
12.	Lab Cycle 6	3	02-11-2022		<b>DM5</b>	
13.	Lab Cycle7	3	16-11-2022		<b>DM5</b>	
14.	Lab Cycle-8	3	16-11-2022		<b>DM5</b>	
15.	Internal exam	3	23-10-2022			

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

### **PART-C**

#### **EVALUATION PROCESS (R20 Regulations):**

<b>Evaluation Task</b>	<b>Marks</b>
Day-to-day work	A1 = 05
Record	A2 = 05
Internal test	A3 = 05
<b>CIE Total: (A1+A2+A3)</b>	<b>M1 = 15</b>
Procedure/Algorithm	B1 = 5
Experimentation/Program execution	B2 = 10
Observations/Calculations/Validation	B3 = 10
Result/Inference	B4 = 5
Viva voce	B5 = 5
<b>SEE Total: (B1+B2+B3+B4+B5)</b>	<b>M2 = 35</b>
<b>Total Marks = CIE + SEE = (M1+M2)</b>	<b>50</b>

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
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<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	(Dr. K DeviPriya)	(Dr. P.Bhagat)	(Dr.K Naga prasanthi)	(Dr. D. Veeraiah)
<b>Signature</b>				



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

**Name of Course Instructor:** Mr.AMANATULLA MOHAMMAD

**Course Name & Code** : Mean Stack Technologies  
(Full Stack Development) & 20CSS3

**L-T-P Structure** : 1-0-3

**Credits:** 2

**Program/Sem/Sec** : B.Tech. - CSE/V/A

**A.Y.:** 2021-22

**PREREQUISITE:** t Full Stack Development

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

<b>CO1</b>	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles ( <b>Apply-L3</b> )
<b>CO2</b>	Build a basic web server using Node.js , Express.js and also working with Node Package Manager (NPM) ( <b>Apply-L3</b> )
<b>CO3</b>	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking. ( <b>Apply-L3</b> )
<b>CO4</b>	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
<b>CO1</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	1	3
<b>CO2</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	3	-
<b>CO3</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
			1 - Low			2 -Medium			3 - High						

**Text Books &REFERENCE BOOKS:**

<b>T1</b>	Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson
<b>T2</b>	Pro Mean Stack Development, 1st Edition, ELadElrom, Apress O'Reilly.
<b>T3</b>	Budi Kurniawan, "Struts 2 Design and Programming: A Tutorial", BrainySoftware, 2nd Edition, 2008.
<b>R1</b>	Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech.
<b>R2</b>	An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning.



## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Cycle-1(HTML)	4	18-07-22 & 22-07-22		DM5	
2.	Cycle -2(HTML)	4	25-07-22 & 29-07-22		DM5	
3.	Cycle-3(JS)	4	02-08-22& 05-08-22		DM5	
4.	Cycle-4(JS)	4	12-08-22& 16-08-22		DM5	
5.	Cycle-5(JS)	4	23-08-22& 26-08-22		DM5	
6.	Cycle-6(Node.JS)	4	30-08-22& 02-09-22		DM5	
7.	Cycle-6(Node.JS)	4	06-09-22& 09-09-22		DM5	
8.	Cycle-7(Express.js)	4	04-10-22& 07-10-22		DM5	
9.	Cycle-8(Express.js)	4	11-10-22& 14-10-22		DM5	
10.	Cycle-9 (Typescript)	4	18-10-22& 21-10-22		DM5	
11.	Cycle-10 (Typescript)	4	25-10-22& 28-10-22		DM5	
12.	Cycle-11 (Typescript)	4	01-11-22& 04-11-22		DM5	
13.	Cycle-12 (Typescript)	4	08-11-22& 11-11-22		DM5	
14.	Cycle-12 (Typescript)	4	15-11-22& 18-11-22		DM5	
15.	Lab Internal Exam	4	22-11-22& 25-11-22		DM5	

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

## PART-C

### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

## PART-D

### PROGRAMME OUTCOMES (POs):

PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> 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	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems:</b> 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	<b>Modern tool usage:</b> 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	<b>The engineer and society:</b> 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	<b>Environment and sustainability:</b> 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	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
PO 11	<b>Project management and finance:</b> 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	<b>Life-long learning:</b> 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
Signature				
Name of the Faculty	(Mr.MD.Amanatulla)	(Dr.K.Devi Priya)	(Dr.Y.V.B.Reddy)	(Dr.D.Veeraiah)



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr. D. VEERAAIAH

**Course Name & Code** : THEORY OF COMPUTATION & 20CS13

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech/V/B

**A.Y.:** 2022-23

**PREREQUISITE:** Discrete Mathematical Structures

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to provide a formal connection between algorithmic problem solving and the theory of automata and languages, and develop them into a mathematical view towards algorithmic design and in general computation itself.

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

<b>C01</b>	Construct finite automata for regular languages and prove it's equivalence ( <b>Apply-L3</b> )
<b>C02</b>	Construct regular expression for regular languages and prove the equivalence of regular expression and Finite Automata ( <b>Apply-L3</b> )
<b>C03</b>	Design Pushdown automata for the context free languages. ( <b>Understand-L2</b> )
<b>C04</b>	Design Turing Machine to model computational problems ( <b>Apply-L3</b> )
<b>C05</b>	Distinguish decidable and undecidable problems with the help of Turing machine ( <b>Understand-L2</b> )

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>C01</b>	3	2											1		
<b>C02</b>	3	2											1		
<b>C03</b>	3	2													
<b>C04</b>	3	2													
<b>C05</b>	1	2													
	1 - Low			2 -Medium						3 - High					

#### **TEXTBOOKS:**

**T1** John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, "Introduction to Automata Theory, Languages, and Computation", Pearson Education Asia, 1997

#### **REFERENCE BOOKS:**

<b>R1</b>	Harry R. Lewis and Christos H. Papadimitriou, "Elements of the Theory of Computation", Pearson Education Asia, 2000
<b>R2</b>	Dexter C. Kozen, "Automata and Computability", Springer, 2011.
<b>R3</b>	Michael Sipser, "Introduction to the Theory of Computation", PWS Publishing, 2005.
<b>R4</b>	John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill, 2 <sup>nd</sup> Edition, 2003

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: FINITE AUTOMATA

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- Course Objective & Outcomes	1	18-07-2022		TLM1	
2.	Basic Concepts of Finite Automata	1	20-07-2022		TLM1	
3.	Finite automata Classification	1	22-07-2022		TLM1	
4.	DFA Construction	2	23-07-2022 25-07-2022		TLM1	
5.	NFA Construction	1	27-07-2022		TLM1	
6.	Equivalence of NFA & DFA	1	29-07-2022		TLM1	
7.	NFA with epsilon to NFA without epsilon	1	30-07-2022		TLM1	
8.	Minimization of Finite Automata	2	01-08-2022 03-08-2022		TLM1	
9.	Finite Automata with output	1	05-08-2022		TLM1	
10.	Construction of Moore and Melay Machine	2	06-08-2022 08-08-2022		TLM1	
11.	Equivalence of Moore and Melay	2	10-08-2022 12-08-2022		TLM1	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Regular Expression and Regular Languages

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Introduction to Regular Expressions	1	17-08-2022		TLM1	
13.	Construction of RE	1	19-08-2022		TLM1	
14.	RE to Finite Automata	1	22-08-2022		TLM1	
15.	FA to Regular expressions	1	24-08-2022		TLM1	
16.	Regular grammar, Construction	1	26-08-2022		TLM1	
17.	Parse Trees	1	27-08-2022		TLM1	
18.	Equivalence of grammar to Finite Automata	1	29-08-2022		TLM1	
19.	Pumping Lemma for regular languages	1	31-08-2022		TLM1	
20.	Closure Properties for Regular Language					
<b>No. of classes required to complete UNIT-II: 09</b>				<b>No. of classes taken:</b>		

**UNIT-III: CONTEXT FREE GRAMMER AND PUSH DOWN AUTOMATA**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Context Free Grammar	1	02-09-2022		TLM1	
22.	Ambiguity of CFG	1	03-09-2022		TLM1	
23.	Simplification of CFG	1	05-09-2022		TLM1	
24.	CNF	1	07-09-2022		TLM1	
25.	GNF	2	09-09-2022 10-09-2022		TLM1	
26.	PDA Definition	1	03-10-2022		TLM1	
27.	Deterministic PDA and Non Deterministic PDA	1	10-10-2022		TLM1	
28.	Construction of PDA	1	12-10-2022		TLM1	
29.	CFG to PDA	1	14-10-2022		TLM1	
30.	PDA to CFG	1	15-10-2022		TLM1	
31.	Pumping lemma for CFL's	1	17-10-2022		TLM1	
32.	Closure properties of CFL's	1	19-10-2022		TLM1	
<b>No. of classes required to complete UNIT-III: 13</b>				<b>No. of classes taken:</b>		

**UNIT-IV: Turing Machine**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Introduction, Basic Model of TM	1	21-10-2022		TLM1	
34.	Languages, closure properties	1	22-10-2022		TLM1	
35.	TM Construction	3	24-10-2022 26-10-2022 28-10-2022		TLM1	
36.	Variants of TM	2	29-10-2022 31-10-2022		TLM1	
37.	NDTM equivalence with DTM	2	02-11-2022 04-11-2022		TLM1	
38.	Unrestricted Grammar and its equivalence TM	1	05-11-2022		TLM1	
39.	TM as enumerators	2	07-11-2022 09-11-2022			
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>		

**UNIT-V: Undecidability**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
40.	Introduction	1	11-11-2022		TLM1	
41.	Church Turing Thesis	1	12-11-2022		TLM1	
42.	Universal Turing Machine	1	14-11-2022		TLM1	
43.	The universal and diagonalization Languages	1	16-11-2022		TLM1	
44.	Reduction between Languages	1	18-11-2022		TLM1	
45.	Rice Theorem	1	19-11-2022		TLM1	
46.	PCP Problem	2	21-11-2022 23-11-2022		TLM1	
47.	Undecidable problems about Languages	1	25-11-2022		TLM1	
<b>No. of classes required to complete UNIT-V: 010</b>				<b>No. of classes taken:</b>		

### 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
1.	Phases of Compiler	1	26-11-2022		TLM1	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO 6</b>	<b>The engineer and society:</b> 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.
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
<b>PSO 2</b>	To inculcate an ability to analyze, design and implement data driven applications into the students
<b>PSO 3</b>	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr. D.Veeraiah</b>	<b>Dr. D.Veeraiah</b>	<b>Dr. S.Jayaprada</b>	<b>Dr. D.Veeraiah</b>
<b>Signature</b>				



### **COURSE HANDOUT**

**PROGRAM** : B.Tech. V-Sem. (B)  
**ACADEMIC YEAR** : 2022-23  
**COURSE NAME & CODE** : **Computer Networks -20CS12**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **Dr.K Naga Prasanthi**  
**COURSE COORDINATOR** : **Dr.K Naga Prasanthi**  
**PRE-REQUISITE: Basic Computer Fundamentals and Concepts**

**COURSE OBJECTIVE:** The Objective of the course is to provide a foundation to understand computer networks using layered architectures. It also helps students to understand the various network models, addressing concept, routing protocols and design aspects of computer networks.

**COURSE OUTCOMES (CO):** After the completion of this course, student will be able to:

**CO1:** Demonstrate the modern network architectures from a design perspective (Understand- L2)

**CO2:** Apply various Data Link layer design issues and error detection & correction techniques to solve collisions problems. (Apply- L3)

**CO3:** Demonstrate the network Layer functionalities (**Understand- L2**)

**CO4:** Outline the functions of transport layer protocols (Understand- L2)

**CO5:** Examine different application layer protocols. (**Understand- L2**)

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	2											1	
CO2	1	2	2									1		1	
CO3	1	3	3									1		1	
CO4	2	3	3	1								1	1		
CO5	2	2	2									1	1		

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



**TEXT BOOKS:**

**T1** 1 B. A. Frouzan, Data Communication, Tata Mc Graw Hill.

2 S. Tanenbaum —Computer Network: Second Ed. Prentice Hall, India.

**REFERENCE BOOKS:**

**R1** William Stallings, "Data and Computer Communication", Pearson Prentice Hall India, 8<sup>th</sup> Edition.

**R2** Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1, 6<sup>th</sup> Edition, 2009.

**R3** Richard Stevens, "TCP/IP Illustrated" , Addison-Wesley, Volume 1, 2001.

**R4** <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>  
[http://www.tcpiptide.com/free/t\\_OSReferenceModelLayers.htm](http://www.tcpiptide.com/free/t_OSReferenceModelLayers.htm)

**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I:**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to computer networks	1	19-7-22		TLM2	CO1	T1,T2	
2.	<b>Data Communication Components</b>	1	20-7-22		TLM2	CO1	T1	
3.	Representation of data and its flow Networks	1	21-7-22		TLM2	CO1	T1	
4.	Various Connection Topology	1	23-7-22		TLM2	CO1	T1,R3	
5.	Protocols and Standards	1	26-7-22		TLM2	CO1	T1,R3	
6.	OSI model	1	27-7-22		TLM2	CO1	T1,R1	
7.	TCP/IP model	1	28-7-22		TLM2	CO1	T1,R2	
8.	Transmission Media	2	30-7-22 02-8-22		TLM2	CO1	T1,T2	

9.	LAN: Wired LAN, Wireless LANs	1	03-8-22		TLM2	CO1	T1	
10.	Connecting LAN and Virtual LAN.	1	04-8-22		TLM2	CO1	T1	
No. of classes required to complete UNIT-I		10			No. of classes taken:			

### UNIT-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
11.	<b>DATA LINK LAYER AND MEDIUM ACCESS SUBLAYER</b>	1	06-8-22		TLM2	CO2	T1,R1	
12.	Error Detection and Error Correction - Fundamentals	1	10-8-22		TLM2	CO2	T1,R1	
13.	Block coding, Hamming Distance, CRC	1	11-8-22		TLM2	CO2	T1,R2	
14.	Flow Control and Error control protocols	2	13-8-22 16-8-22		TLM2	CO2	T1,R3	
15.	Stop and Wait, Go back – N ARQ	1	17-8-22		TLM2	CO2	T1,R2	
16.	Selective Repeat ARQ	1	18-8-22		TLM2	CO2	T1,R2	
17.	Sliding Window, Piggybacking	2	20-8-22 23-8-22		TLM2	CO2	T1,R3	
18.	Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA	1	24-8-22		TLM2	CO2	T1,R3	
19.	CSMA/CD,CDMA/CA	2	25-8-22 27-8-22		TLM2	CO2	T1,R3	
No. of classes required to complete UNIT-II		9			No. of classes taken:			

### UNIT-III:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
20.	<b>Network Layer</b>	1	30-8-22		TLM2	CO3	T1,R3	

21.	Switching	1	01-9-22		TLM2	C03	T1	
22.	Logical addressing — IPV4, IPV6	2	03-9-22		TLM2	C03	T1	
23.			06-9-22					
24.	Address mapping — ARP	1	07-9-22		TLM2	C03	T1	
24.			08-9-22					
	RARP, BOOTP and DHCP—Delivery	2	10-9-22		TLM2	C03	T1,R2	
25.	Forwarding	1	06-10-22		TLM2	C03	T1	
26.	Unicast Routing protocols.	3	08-10-22		TLM2	C03	T1	
			11-10-22					
			12-10-22					
No. of classes required to complete UNIT-III		10			No. of classes taken:			

#### UNIT-IV:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
27.	<b>Transport Layer</b>	1	13-10-22		TLM2	C04	T1,R1	
28.	Process to Process Communication	2	15-10-22 18-10-22		TLM2	C04	T1	
29.	User Datagram Protocol (UDP)	1	19-10-22		TLM2	C04	T1	
30.	Transmission Control Protocol (TCP)	2	20-10-22 22-10-22		TLM2	C04	T1	
31.	SCTP Congestion Control	1	25-10-22		TLM2	C04	T1	
32.	Quality of Service	1	26-10-22		TLM2	C04	T1	
33.	QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	2	27-10-22 29-10-22		TLM2	C04	T1	
No. of classes required to complete UNIT-IV		10			No. of classes taken:			

#### UNIT-V:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	Application Layer	1	01-11-22		TLM2	C05	T1,R3	
35.	Domain Name Space (DNS), DDNS	2	02-11-22 03-11-22		TLM2	C05	T1,R3	
36.	TELNET, EMAIL	2	05-11-22 09-11-22		TLM2	C05	T1,R4	

37.	File Transfer Protocol (FTP)	1	10-11-22		TLM2	C05	T1,R3	
38.	WWW, HTTP	2	12-11-22 15-11-22		TLM2	C05	T1,R3	
39.	SNMP, Bluetooth, Firewalls	3	16-11-22 17-11-22 19-11-22		TLM2	C05	T1,R3	
40.	Revision	4	22-11-22 23-11-22 24-11-22 26-11-22					
No. of classes required to complete UNIT-V		5			No. of classes taken:			

Teaching Learning Methods					
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

### EVALUATION PROCESS (R20 Regulation):

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

## **PART-D**

### **PROGRAM EDUCATIONAL OBJECTIVES (PEOS)**

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

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

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

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

### **PROGRAM OUTCOMES**

#### **Engineering Graduates will be able to:**

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

knowledge of, and need for sustainable development.

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

#### **PROGRAM SPECIFIC OUTCOMES**

##### **1. PS01:**

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

##### **2. PS02:**

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

##### **3. PS03:**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr.K Naga Prasanthi	Dr.K Naga Prasanthi	Dr.D.V. Subbaiah	Dr. D Veeraiah
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : Dr. P. BHAGATH  
Course Name & Code : Machine Learning (20AD04)  
L-T-P Structure : 3-0-0 Credits : 3  
Program/Sem/Sec : B.Tech., CSE., V-B A.Y: 2022-23

**PRE-REQUISITE: Probability and Statistics, Data Warehousing and Data Mining**

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to provide the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

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

CO 1	Identify the characteristics of machine learning. (Understand- L2)
CO 2	Understand the Model building and evaluation approaches (Understand- L2)
CO 3	Apply regression algorithms for real-world Problems. (Apply- L3)
CO 4	Handle classification problems via supervised learning algorithms. (Apply- L3)
CO 5	Learn advanced learning techniques to deal with complex data (Apply- L3)

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

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

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

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

#### **TEXT BOOKS:**

1. Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India, 1st edition, 2015.
2. Tom M. Mitchell, "Machine Learning", MGH, 1997.

#### **REFERENCE BOOKS:**

1. Shai Shalev-Shwartz, Shai Ben David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge
2. Peter Harington, "Machine Learning in Action", Cengage, 1st edition, 2012.

3. Peter Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge university press,2012.
4. Jason Brownlee, "Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End", Edition: v1.4, 2011.

## **PART-B**

### **COURSE DELIVERY PLAN (LESSON PLAN): Section B**

#### **UNIT-I : Introduction to Machine Learning and Preparing to Model**

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	1	18-7-2022		TLM1	
2.	Types of Machine Learning-supervise Learning	1	20-7-2022		TLM1	
3.	Unsupervised Learning	1	22-7-2022		TLM1	
4.	Reinforcement Learning	1	23-7-2022		TLM1	
5.	Applications of Machine Learning	1	25-7-2022		TLM1	
6.	Issues in Machine Learning	1	27-7-2022		TLM1	
7.	Introduction, Machine Learning Activities	1	29-7-2022		TLM1	
8.	Basic Types of Data in Machine Learning	1	30-7-2022		TLM1	
9.	Exploring Structure of Data	1	01-8-2022		TLM1	
10.	Exploring Structure of Data	1	03-8-2022		TLM1	
11.	Data Quality and Remediation	1	05-8-2022		TLM1	
12.	Data Pre-Processing	1	06-8-2022		TLM3	
<b>No. of classes required to complete UNIT-I</b>		<b>12</b>		<b>No of classes taken</b>		

#### **UNIT-II: Modelling & Evaluation, Basics of Feature 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
13	Introduction,	1	08-08-2022			
14.	selecting a Model, training a Model (for Supervised Learning),	2	10-8-2022, 12-8-2022		TLM1	
15.	, Model Representation and Interpretability	1	13-8-2022		TLM1	
16.	Evaluating Performance of a Model.	1	17-8-2022		TLM1	
17.	Feature Transformation	1	19-8-2022		TLM1	
18.	Feature Construction	1	20-8-2022		TLM1	
19.	Feature Extraction	1	22-8-2022		TLM1	
20.	Principal Component Analysis (PCA),	1	22-8-2022		TLM1	



21.	Singular Value Decomposition	1	24-8-2022		TLM3	
22	Linear Discriminant Analysis (LDA), Feature Subset Selection	1	26-8-2022			
<b>No. of classes required to complete UNIT-II</b>		<b>12</b>		<b>No of classes taken</b>		

### UNIT-III: Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Introduction to regression analysis, Simple linear regression	1	29-8-2022		TLM1	
24.	Multiple linear regression	2	31-8-2022,		TLM1	
25.	Assumptions in Regression Analysis, Main Problems in Regression Analysis	1	02-09-22		TLM1	
26.	Improving Accuracy of the linear regression model,	2	03-09-22 05-09-22		TLM1	
27.	Polynomial Regression Model	1	07-09-22		TLM1	
28.	Logistic Regression	1	09-09-22		TLM1	
29.	Regularization	1	10-09-22		TLM1	
30.	Regularized Linear Regression	1	12-09-22		TLM1	
31.	Regularized Logistic Regression.	1	14-09-22		TLM3	
<b>No. of classes required to complete UNIT-III</b>		<b>11</b>		<b>No of classes taken</b>		

### UNIT-IV: Supervised Learning: Classification

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Supervised Learning Introduction and example	1	16-09-22		TLM1	
33.	Classification Model	2	17-09-22 19-09-22		TLM1	
34.	Classification Learning Steps	1	21-09-22		TLM1	
35.	k-Nearest Neighbour (kNN)	2	23-09-22 24-09-22		TLM1	
36.	Support vector Machines	2	26-09-22 28-09-22		TLM1	
37.	Random Forest model	2	30-09-22 01-10-22		TLM3	
<b>No. of classes required to complete UNIT-IV</b>		<b>10</b>		<b>No of classes</b>		

			taken	
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### UNIT-V: Other Types of Learning

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	Bagging	2	03-10-22 05-10-22		TLM1	
39.	Boosting	2	07-10-22 08-10-22		TLM2	
40	Stacking and its impact on bias and variance	2	10-11-22 12-11-22		TLM2	
41	AdaBoost	2	14-11-22 15-11-22		TLM2	
42	,Gradient Boosting Machines	2	17-11-22 19-11-22		TLM2	
43	XGBoost	2	22-11-22 24-11-22		TLM2	
44	Reinforcement Learning- Q learning	1	26-11-22		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-V</b>		<b>13</b>		<b>No of classes taken</b>		

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

### PART-C

#### EVALUATION PROCESS (R20 Regulations):

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

Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>HOD</b>
Dr. P. Bhagath	Dr. P. Bhagath	Dr. K. Naga Prasanthi	Dr. D. Veeraiah



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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr.N V NAIK

**Course Name & Code** : PAI & 20CS16

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

**Program/Sem/Sec** :BTECH/V/B

**Credits:** 3

**A.Y.:** 2022-23

**PREREQUISITE:** Basic Engineering and Mathematics knowledge

**COURSE EDUCATIONAL OBJECTIVES (CEOs):**

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

<b>CO1</b>	Understand the fundamentals of Artificial Intelligence types of AI agents and their structures to solve engineering problems. ( <b>Understand - L2</b> )
<b>CO2</b>	Identify different search algorithms to find and optimise the solution for the given problem. ( <b>Understand-L2</b> )
<b>CO3</b>	Apply different gaming algorithms and identify the importance of knowledge representations in Artificial Intelligence. ( <b>Apply-L3</b> )
<b>CO4</b>	Make use of predicate logic and rule-based system to represent the knowledge in AI domain. ( <b>Understand-L2</b> )
<b>CO5</b>	Interpret the forms of learning in the AI domain as well as present efficient technologies to remove uncertainty in knowledge domain. ( <b>Understand -L2</b> )

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

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

**TEXTBOOKS:**

<b>T1</b>	Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, third edition, 2009.can also second edition,2003.
<b>T2</b>	Elaine Rich, Kevin Knight Artificial Intelligence, TMH, second edition, 2007.

**REFERENCE BOOKS:**

<b>R1</b>	Nils J.Nilsson "Artificial Intelligence - A New Synthesis", ,Morgan Kaufmann, 1988
<b>R2</b>	David poole,Alan Mackworth, "Artificial Intelligence: Foundations for computational agents",Cambridge Univ.press,2010.
<b>R3</b>	Ronald Brachman, "Knowledge representation and Reasoning", Morgan Kaufmann,2004.
<b>R4</b>	Frank van Harmelen,Vladimir Lifschitz,Bruce Porter(Eds),"Handbook of Knowledge representation",Elsevier,2008.
<b>R5</b>	Ivan Bratko," Prolog Programming for Artificial Intelligence",4 <sup>th</sup> Ed., Addition-Wesley,2011.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	AI Introduction	1	18/7/22		TLM1	
2.	Applications of AI	1	19/7/22		TLM1	
3.	History of AI	1	20/7/22		TLM1	
4.	Types of AI	1	23/7/22		TLM1	
5.	Agents and rationality	1	25/7/22		TLM2	
6.	Structure of the agents	1	26/7/22		TLM2	
7.	Agent environment and nature of the environment	1	27/7/22		TLM2	
8.	Types of agents-Simple reflex agents and model-based agents	1	30/7/22		TLM2	
9.	Types of agents-Goal based agents and Utility-based agents	1	01/8/22		TLM2	
10.	Types of agents-Learning agents	1	02/8/22		TLM2	
11.	Problems, search spaces	1	03/8/22		TLM2	
12.	Defining the problem as state space search	1	06/8/22		TLM2	
13.	Production system	1	08/8/22		TLM2	
14.	Problem characteristics	1	10/8/22		TLM2	
15.	Issues in the design of search programs.	1	13/8/22		TLM2	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Problem solving agents and search algorithm terminologies	1	16/8/22		TLM2	
17.	Properties of search algorithms and types of search algorithms	1	17/8/22		TLM2	
18.	Uninformed search algorithms: Breadth-first Search	1	20/8/22		TLM2	
19.	Depth-first Search and Depth-limited Search	1	22/8/22		TLM2	
20.	Iterative deepening depth-first search.	1	23/8/22		TLM2	
21.	Uniform cost search, Bidirectional search.	1	24/8/22		TLM2	
22.	Informed/Heuristic Search algorithms: Greedy best-first search algorithm	1	27/8/22		TLM2	
23.	A* Search algorithm	1	29/8/22		TLM2	
24.	Hill climbing algorithm	1	30/8/22		TLM2	
25.	Constraint satisfaction problem	1	03/9/22		TLM2	
26.	Means-Ends Analysis	1	05/09/22		TLM2	
<b>No. of classes required to complete UNIT-II: 11</b>				<b>No. of classes taken:</b>		

#### UNIT-III:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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27.	Adversarial search/Game playing: Introduction	1	06/9/22		TLM2	
28.	Minmax Algorithm	1	07/9/22		TLM2	
29.	Alpha-Beta Pruning	1	10/9/22		TLM2	
30.	Knowledge representation: Representations and mappings	2	03/10/22 04/10/22		TLM2	
31.	Approaches of Knowledge representation	2	08/10/22 10/10/22		TLM2	
32.	Issues in Knowledge Representation	2	11/10/22 12/10/22		TLM2	
<b>No. of classes required to complete UNIT-III: 09</b>					<b>No. of classes taken:</b>	

#### UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Knowledge Representation Using predicate logic: Representing simple facts in logic.	1	15/10/22		TLM2	
34.	Representing instance and Isa relationships	2	17/10/22 18/10/22		TLM2	
35.	Computable functions and predicates	1	19/10/22		TLM2	
36.	Resolution	2	22/10/22 25/10/22		TLM2	
37.	Natural deduction	1	26/10/22		TLM2	
38.	Representing knowledge using Rules: Procedural verses declarative knowledge	1	29/10/22		TLM2	
39.	Logic programming	1	31/10/22		TLM2	
40.	Forward verses backward reasoning	1	01/11/22		TLM2	
41.	Matching	1	02/11/22		TLM2	
42.	Control knowledge	1	05/11/22		TLM2	
<b>No. of classes required to complete UNIT-IV: 12</b>					<b>No. of classes taken:</b>	

#### UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Uncertain knowledge and Reasoning: Probability and Bayes theorem	2	07/11/22 08/11/22		TLM2	
44.	Certainty factors and rule-based systems	2	09/11/22 12/11/22		TLM2	
45.	Bayesian networks	2	14/11/22 15/11/22		TLM2	
46.	Dempster – Shafer Theory	2	16/11/22 19/11/22		TLM2	
47.	Fuzzy logic	1	21/11/22		TLM2	
48.	Learning: Overview of different forms of learning	1	22/11/22		TLM2	
49.	Learning Decision Trees	1	23/11/22		TLM2	
50.	Neural networks	1	26/11/22		TLM2	
<b>No. of classes required to complete UNIT-V: 12</b>					<b>No. of classes taken:</b>	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO 6</b>	<b>The engineer and society:</b> 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.
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader



	in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Mr.N V Naik</b>	<b>Mr.N V Naik</b>	<b>Dr.D V Subbaiah</b>	<b>Dr.D Veeraiah</b>
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(Autonomous)

Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada  
Accredited by NAAC and NBA (CSE, IT, ECE, EEE & ME) under Tier - I



## DEPARTMENT OF MECHANICAL ENGINEERING COURSE HANDOUT

### Part-A

**PROGRAM** : B.Tech., V-Sem., CSE, B-Section  
**ACADEMIC YEAR** : 2022-23  
**COURSE NAME & CODE** : RENEWABLE ENERGY SOURCES- 20ME81  
**L-T-P STRUCTURE** : 4-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : K. Lakshmi Prasad  
**COURSE COORDINATOR** : K. Lakshmi Prasad  
**PRE-REQUISITES:** Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To provide the insights on different non-conventional energy sources, potential, salient features and utilization of solar, wind, geothermal, ocean thermal energy, bio energy and direct energy conversion systems.

#### **COURSE OUTCOMES (COs)**

After completion of the course, the student will be able to

**CO1:** Compute the performance of solar energy harnessing devices and its energy scenario. **(Applying- L3)**

**CO2:** Apply the principles of energy conversion for wind and geothermal power generating plants. **(Applying - L3)**

**CO3:** Compare the power generating capacities of tidal energy, wave energy and ocean thermal energy plants. **(Understanding - L2)**

**CO4:** Illustrate the various biomass power generation system technologies. **(Understanding - L2)**

**CO5:** Comprehend the direct energy power generation systems. **(Understanding - L2)**

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

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

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

#### **BOS APPROVED TEXT BOOKS:**

**T1** G.D.Rai, Non-Conventional Energy Sources, 5<sup>th</sup> Edition 2011, Khanna Publishers, New Delhi, India.

**T2** Kreith, F and Kreider, J. F., Principles of Solar Engineering, McGraw-Hill, 1978.

**BOS APPROVED REFERENCE BOOKS:**

- R1** John Twidell&Tony Weir, Renewable Energy Resources – 2<sup>nd</sup> Edition, Taylor & Francis
- R2** G.N.Tiwari, Solar Energy – Fundamentals, Design, Modelling and Applications –Narosa Publication Ltd.,2000.
- R3** Ashok V Desai, Non-Conventional Energy- Wiley Eastern, 2000.

**Part-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-A****UNIT-I : GLOBAL AND NATIONAL ENERGY SCENARIO & SOLAR ENERGY HARNESSING DEVICES**

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.	Course Outcomes & Blooms Taxonomy Levels	2	18.07.22 21.02.22		TLM1/ TLM2			
2.	Over view of conventional & renewable energy sources	2	22.07.22 23.07.22		TLM1/ TLM2	CO1	T1	
3.	Need & Development of renewable energy sources	2	25.07.22 28.07.22		TLM1/ TLM2	CO1	T1	
4.	Types of renewable energy systems.	2	29.07.22 30.07.22		TLM1/ TLM2	CO1	T1	
5.	Energy available from Sun, Solar radiation data,	1	01.08.222		TLM1/ TLM2	CO1	T1	
6.	Flat plate and Concentrating collectors	1	04.08.22		TLM1/ TLM2	CO1	T1	
7.	Mathematical analysis of Flat plate collectors and collector efficiency	2	05.08.22 06.08.22		TLM1/ TLM2	CO1	T1	
8.	Solar water Heating, Space Heating – Active and Passive heating	1	08.08.22		TLM1/ TLM2	CO1	T1	
9.	solar stills and ponds	1	11.08.22		TLM1/ TLM2	CO1	T1	
10.	basic principle of power generation in photovoltaic cell	1	12.08.22		TLM1/ TLM2	CO1	T1	
11.	Problems	1	13.08.22		TLM1/ TLM2	CO1	T1	
12.	<b>Quiz/Assignment</b>							
No. of classes required to complete UNIT-I		14			No. of classes taken:			

## UNIT-II : Z-WIND ENERGY & GEOTHERMAL ENERGY

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	
13.	Wind – characteristics – wind energy conversion systems – types	2	18.08.22 20.08.22		TLM1/ TLM2	CO2	T1		
14.	Betz model & Interference factor, Power Coefficient Torque Coefficient and thrust coefficient	3	22.08.22 25.08.22 26.08.22		TLM1/ TLM2	CO2	T1		
15.	site selection requirements.	1	27.08.22		TLM1/ TLM2	CO2	T1		
16.	GEOTHERMAL ENERGY: Structure of Earth, Geothermal sources	1	29.08.22		TLM1/ TLM2	CO2	T1		
17.	Hot springs, Hot Rocks & Hot Aquifers	1	01.09.22		TLM1/ TLM2	CO2	T1		
18.	Interconnection of geothermal fossil systems	1	02.09.22		TLM1/ TLM2	CO2	T1		
19.	Problems	1	03.09.22		TLM1/ TLM2	CO1	T1		
20.	<b>Quiz/Assignment</b>								
No. of classes required to complete UNIT-II		10			No. of classes taken:				

## UNIT-III : TIDAL ENERGY, WAVE ENERGY and OCEAN THERMAL ENERGY

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
21.	<b>Tidal Energy-</b> Introduction, Origin of Tides, Tidal Power generation	2	05.09.22 08.09.22		TLM1/ TLM2	CO3	T1, R8	
22.	Classification of Tidal Power Plant,	1	09.09.22		TLM1/ TLM2	CO3	T1	
23.	Site requirements	1	10.09.22		TLM1/ TLM2	CO3	T1	
24.	<b>WAVE ENERGY:</b> Introduction, Wave energy and Power	2	06.10.22 07.10.22		TLM1/ TLM2	CO3	T1	
25.	Wave Energy devices – Merits and	2	08.10.22		TLM1/	CO3	T1	

	Demerits		10.10.22		<b>TLM2</b>			
26.	<b>OCEAN THERMAL ENERGY:</b> Introduction	1	13.10.22		<b>TLM1/ TLM2</b>	CO3	T1	
27.	Working principle of Ocean Thermal Energy Conversion	1	14.10.22		<b>TLM1/ TLM2</b>	CO3	T1	
28.	OTEC Systems, Advantages and Disadvantages of OTEC plants.	2	15.10.22 17.10.22		<b>TLM1/ TLM2</b>	CO3	T1	
29.	<b>Quiz/Assignment</b>	12				CO3		
No. of classes required to complete UNIT-III		08			No. of classes taken:			

#### UNIT-IV : BIO – ENERGY

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
30.	<b>BIO – ENERGY:</b> Introduction	1	20.10.22		<b>TLM1/ TLM2</b>	CO4	T1	
31.	Biomass Energy Sources	1	21.10.22		<b>TLM1/ TLM2</b>	CO4	T1	
32.	Aerobic and Anaerobic bio-conversion processes	1	22.10.22		<b>TLM1/ TLM2</b>	CO4	T1	
33.	Types of Biogas plants	2	27.10.22 28.10.22					
34.	Raw Materials and properties of Bio-gas	1	29.10.22		<b>TLM1/ TLM2</b>	CO4	T1	
35.	Bio-gas plant Technology and Status	1	31.10.22		<b>TLM1/ TLM2</b>	CO4	T1	
36.	Biomass gasification	1	03.11.22		<b>TLM1/ TLM2</b>	CO4	T1	
37.	Types and application of gasifier	2	04.11.22 05.11.22		<b>TLM1/ TLM2</b>	CO4	T1	
38.	<b>Quiz/Assignment</b>					CO4		
No. of classes required to complete UNIT-IV		10			No. of classes taken:			

#### UNIT-V : DIRECT ENERGY CONVERSION SYSTEMS

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
39.	DIRECT ENERGY CONVERSION SYSTEMS:	1	07.11.22		<b>TLM1/ TLM2</b>	CO5	T1	

	Introduction						
40.	Peltier effect, seebeck effect, Thomson effect,	1	10.11.22		<b>TLM1/ TLM2</b>	CO5	T1
41.	Fuel Cells-Types.	1	11.11.22		<b>TLM1/ TLM2</b>	CO5	T1
42.	Efficiency of Fuel Cells.	1	12.11.22		<b>TLM1/ TLM2</b>	CO5	T1
43.	Thermoelectric power Generation	2	14.11.22 17.11.22		<b>TLM1/ TLM2</b>	CO5	T1
44.	Thermionic electro power Generation	1	18.11.22				
45.	MHD Generator	1	19.11.22		<b>TLM1/ TLM2</b>	CO5	T1
46.	Open and closed systems	2	21.11.22 24.11.22		<b>TLM1/ TLM2</b>	CO5	T1
47.	applications of direct energy energy conversion systems	1	25.11.22		<b>TLM1/ TLM2</b>	CO5	T1
48.	<b>Quiz/Assignment</b>					CO5	
No. of classes required to complete UNIT-V		11			No. of classes taken:		

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

#### Academic Calender-A.Y-2020-21

Description	From	To	Weeks
<b>B Tech V Semester</b>			
Commencement of class work	18.07.2022		
I phase of Instructions	18.07.2022	10.09.2022	8
Technical Training/Value added course	12.09.2022	24.09.2022	2
I Mid Examination	<b>26.09.2022</b>	<b>01.10.2022</b>	<b>1</b>
II phase of Instructions	03.10.2022	26.11.2022	8
II Mid Examination	<b>28.11.2022</b>	<b>03.12.2022</b>	<b>1</b>
Preparation and Practical	05.12.2022	10.12.2022	1
Semester End Examination	<b>12.12.2022</b>	<b>24.12.2022</b>	<b>2</b>

## Part - C

### EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment 1	1	A1=5
Assignment 2	2	A2=5
I-Mid Examination	1,2,3	B1=15
Quiz – 1	1,2,3	Q1=10
Assignment 3	3	A3=5
Assignment 4	4	A4=5
Assignment 5	5	A5=5
II-Mid Examination	3,4,5	B2=15
Quiz – 2	3,4,5	Q2=10
Evaluation of Assignment: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of $\text{Max}(B1,B2)+25\%$ of $\text{Min}(B1,B2)$	1,2,3,4,5	B=15
Evaluation of Quiz Marks: $Q=75\%$ of $\text{Max}(Q1,Q2)+25\%$ of $\text{Min}(Q1,Q2)$	1,2,3,4,5	Q=10
<b>Cumulative Internal Examination: A+B+Q</b>	<b>1,2,3,4,5</b>	<b>CIE=30</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>SEE=70</b>
<b>Total Marks: CIE+SEE</b>	<b>1,2,3,4,5</b>	<b>100</b>

### PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

**PEO1:** To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

**PEO2:** To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.

**PEO3:** To develop inquisitiveness towards good communication and lifelong learning.

### PROGRAMME OUTCOMES (POs)

**Engineering Graduates will be able to:**

**1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex

engineering activities with an understanding of the limitations.

**6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**11. Project management and finance:** Demonstrate knowledge and understanding of the 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.

**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.

### PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.

2. To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.

3. To apply the basic principles of mechanical engineering design or evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. K Lakshmi Prasad	Mr. K. Lakshmi Prasad	Dr. P. Vijay Kumar	Dr. S. Pichi Reddy





# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with '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

### PART-A

**Name of Course Instructor** : Dr K Naga Prasanthi  
**Course Name & Code** : COMPUTER NETWORKS LAB&20CS60  
**L-T-P Structure** : 0-0-3 Credits : 1.5  
**Program/Sem/Sec** : B.Tech., CSE., V-Sem., Section-B A.Y: 2022-23

**PRE-REQUISITES** : Data Structures and Operating Systems

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: The main objective of this course is to prepare students to write programs to illustrate communication in networks, configure different networks(LAN, WAN) and prepare students to differentiate various protocols and their performance.

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

<b>CO 1</b>	Implement Network layer functionalities using NS3 simulator
<b>CO 2</b>	Demonstrate Transport Layer functionalities
<b>CO 3</b>	Analyze Application layer protocols using Wireshark
<b>CO 4</b>	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
<b>CO1</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO2</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO3</b>	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
<b>CO4</b>	-	-	-	-	-	-	-	1	3	2	-	-	-	-	-

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

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

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN): Section - A

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	Introduction	3	18-07-2022		
2.	Basic network commands & utilities	3	25-07-2022		
3.	Network layer tools and analyze captures for congestion	3	01-08-2022		
4.	Network layer tools and analyze captures for congestion	3	08-08-2022		
5.	Queue management techniques and global routing in NS3	3	22-08-2022		
6.	Broadcasting, multicasting and bridging in LAN using ns3	3	29-08-2022		
7.	Learn about Wifi and mobile Adhoc topologies with NS3	3	05-09-2022		
8.	Socket programming in TCP and UDP	3	10-10-2022		
9.	Observation of TCP Connection states, Flags and Flow control	3	17-10-2022		
10.	TCP Flow control, Error control and Congestion	3	31-10-2022		
11.	Wireshark & tcpdump, observation of packets in a LAN	3	07-11-2022		
12.	Analyze HTTP packets using Wireshark tool and understand records returned by DNS Server.	3	14-11-2022		
13.	Lab Internal Exam	3	21-11-2022		

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.

<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr.K. Naga Prasanthi	Dr.K. Naga Prasanthi	Dr. D. Venkata Subbaiah	Dr. D. Veeraiah
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

hodcse@lbrce.ac.in, cselbreddy@gmail.com, Phone: 08659-222 933, Fax: 08659-222931

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : Dr. P. Bhagath  
 Course Name & Code : Machine Learning using Python Lab (20AD53)  
 L-T-P Structure : 0-0-3 Credits: 1.5  
 Program/Sem/Sec : B.Tech., CSE., V-Sem., Sec-B A.Y : 2021-22

**PRE-REQUISITE : Python Programming and Data Mining**

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of this lab is to Practical exposure on implementation of well-known data mining algorithms and Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.

**COURSE OUTCOMES (COs):** At the end of the course, students can

CO 1	Apply the appropriate pre-processing techniques on data set. (Apply – L3)
CO 2	Implement supervised Machine Learning algorithms. (Apply – L3)
CO 3	Implement advanced Machine Learning algorithms (Apply – L3)
CO 4	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	2	1	-	-	-	-	-	-	-	-	1	1	-	3
CO2	3	2	-	2	-	-	-	-	-	-	-	-	2	-	-
CO3	2	3	2	2	-	-	-	-	-	-	-	2	-	2	2

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

### PART-B

**COURSE DELIVERY PLAN (LESSON PLAN): Section-B**

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	Basic statistical functions for data exploration	6	19.07.22		TLM4	

2	Basic statistical functions for data exploration	3	26.07.22		TLM4
3	Data Visualization: Box plot, scatter plot, histogram	6	09.08.22		TLM4
4	Data Pre-processing: Handling missing values, outliers, normalization, Scaling	6	23.08.22		TLM4
5	Principal Component Analysis (PCA)	3	30.08.22		TLM4
6	Singular Value Decomposition (SVD)	3	06.09.22		TLM4
7	Linear Discriminant Analysis (LDA)	3	13.09.22		TLM4
8	Regression Analysis: Linear regression, Logistic regression,	6	20.09.22		TLM4
9	Polynomial Regression, Regularized Regression	6	27.09.22		TLM4
10	K-Nearest Neighbour (kNN) Classifier	3	11.10.22		TLM4
11	Support Vector Machines (SVMs)	3	18.10.22		TLM4
12	Random Forest model	3	01.11.22		TLM4
13	AdaBoost Classifier and XGBoost	3	15.11.22		TLM4

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

## PART-C

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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

<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr. P. Bhagath</b>	<b>Dr. P. Bhagath</b>	<b>Dr. K. Naga Prasanthi</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

**Name of Course Instructor:** Dr. S.Nagarjuna Reddy

**Course Name & Code** : Mean Stack Technologies  
 (Backend Development) & 20CSS3

**L-T-P Structure** : 1-0-3

**Credits:** 2

**Program/Sem/Sec** : B.Tech. - CSE/V/B

**A.Y.:** 20212-23

**PREREQUISITE:** t Full Stack Development

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

<b>CO1</b>	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles ( <b>Apply-L3</b> )
<b>CO2</b>	Build a basic web server using Node.js , Express.js and also working with Node Package Manager (NPM) ( <b>Apply-L3</b> )
<b>CO3</b>	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking. ( <b>Apply-L3</b> )
<b>CO4</b>	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
<b>CO1</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	1	3
<b>CO2</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	3	-
<b>CO3</b>	-	-	2	-	2	-	-	-	-	-	-	-	-	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
			1 - Low			2 -Medium			3 - High						

**Text Books &REFERENCE BOOKS:**

<b>T1</b>	Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson
<b>T2</b>	Pro Mean Stack Development, 1st Edition, ELadElrom, Apress O'Reilly.
<b>T3</b>	Budi Kurniawan, "Struts 2 Design and Programming: A Tutorial", BrainySoftware, 2nd Edition, 2008.
<b>R1</b>	Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech.
<b>R2</b>	An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Cycle-1, Cycle -2(HTML)	4	21-07-22, 22-07-22		DM5	
2.	Cycle-3(JS)	4	28-07-22, 29-07-22		DM5	
3.	Cycle-4,5(JS)	4	04-08-22 05-08-22		DM5	
4.	Cycle-6(Node.JS)	4	11-08-22 12-08-22		DM5	
5.	Cycle-6(Node.JS)	6	18-08-22 25-08-22 26-08-22		DM5	
6.	Cycle-6(Node.JS)	4	01-09-22 02-09-22		DM5	
7.	Cycle-6(Node.JS)	4	08-09-22 09-09-22		DM5	
8.	Cycle-7(Express.JS)	4	13-10-22 14-10-22		DM5	
9.	Cycle-8(Expres.JS)	4	20-10-22 21-10-22		DM5	
10.	Cycle-8(Expres.JS)	4	27-10-22 28-10-22		DM5	
11.	Cycle-8(Expres.JS)	4	03-11-22 04-11-22			
12.	Cycle-8(Expres.JS)	4	10-11-22 11-11-22		DM5	
13.	Cycle-9(Type Script)	4	17-11-22 18-22-22			
14.	Cycle-9(Type Script)	4	23-11-22 24-11-22		DM5	

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



## **PART-C**

### **EVALUATION PROCESS (R20 Regulation):**

<b>Evaluation Task</b>	<b>Marks</b>
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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<b>PO 10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	(Dr. S.Nagarjuna Reddy)	(Dr. K. Devi Priya)	(Dr. K. Naga Prasanthi)	(Dr. D. Veeraiah)
<b>Signature</b>				



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr B SIVARAMAKRISHNA

**Course Name & Code** : Computer Networks (20CS12)

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

**Program/Sem/Sec** : B.Tech V Sem Sec –C CSE

**Credits:** 3

**A.Y.:** 2022-23

**PREREQUISITE:** Data Structures and Operating Systems

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The Objective of the course is to provide a foundation to understand computer networks using layered architectures. It also helps students to understand the various network models, addressing concept, routing protocols and design aspects of computer networks.

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

<b>CO1</b>	Demonstrate the modern network architectures from a design perspective (Understand-L2)
<b>CO2</b>	Apply various Data Link layer design issues and error detection & correction techniques to solve collisions problems.(Apply-L3)
<b>CO3</b>	Demonstrate the network Layer functionalities (Understand-L2)
<b>CO4</b>	Outline the functions of transport layer protocols (Understand-L2)
<b>CO5</b>	Examine different application layer protocols (Understand-L2)

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

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

#### **TEXTBOOKS:**

**T1** BehrouzA. Forouzan, , “Data Communication andNetworking”,McGraw-Hill,4thEdition,2011.

**T2** AndrewS.Tanenbaum, “Computer Networks”, Pearson New InternationalEdition,8thEdition,2013.

#### **REFERENCE BOOKS:**

**R1** WilliamStallings,“DataandComputerCommunication”,PearsonPrenticeHallIndia,8th Edition.

**R2** Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1,6thEdition,2009. Richard Stevens, “TCP/IP Illustrated”, Addison-Wesley

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: Data Communication Components

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.	CEOs and COs discussion, Computer Networks Syllabus Discussion	1	18-07-2022		1 & 2	
2.	Data Communication components :Representation of data	1	19-07-2022		1 & 2	
3.	Data Flow	1	21-07-2022		1 & 2	
4.	Network	1	22-07-2022		1 & 2	
5.	Connection in topology	1	22-07-2022		1 & 2	
6.	Protocols and standards	1	26-07-2022		1 & 2	
7.	OSI Model	1	28-07-2022		1 & 2	
8.	Transmission Media	1	29-07-2022		1 & 2	
9.	LAN :Wired LAN, Wireless LANs	1	01-08-2022		1 & 2	
10.	Connecting LAN and Virtual LAN	1	02-08-2022		1 & 2	
<b>No. of classes required to complete UNIT-I: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Data Link Layer and Medium Access Sub Layer

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.	Error Detection and Error Correction - Fundamentals,	1	04-08-2022		1 & 2	
12.	Block coding, Hamming Distance,	1	05-08-2022		1 & 2	
13.	CRC	1	08-08-2022		1 & 2	
14.	Flow Control and Error control protocols - Stop and Wait	1	11-08-2022		1 & 2	
15.	Go back - N ARQ	1	12-08-2022		1 & 2	
16.	Selective Repeat ARQ,	1	16-08-2022		1 & 2	
17.	Sliding Window, Piggybacking	1	18-08-2022		1 & 2	
18.	Random Access, Multiple access protocols -Pure ALOHA	1	22-08-2022		1 & 2	
19.	Slotted ALOHA,	1	23-08-2022		1 & 2	
20.	CSMA/CD,CDMA/CA	1	25-08-2022		1 & 2	
<b>No. of classes required to complete UNIT-II: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-III: Network Layer

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Switching	1	26-08-2022		1 & 2	
22.	Logical addressing - IPV4	2	29,30-08-2022		1 & 2	
23.	IPV6	1	01-09-2022		1 & 2	
24.	Address mapping -ARP,RARP	1	02-09-2022		1 & 2	
25.	BOOTP	1	05-09-2022		1 & 2	
26.	DHCP-Delivery	1	06-09-2022		1 & 2	
27.	Forwarding protocols	1	08-09-2022		1 & 2	
28.	and Unicast Routing protocols	1	09-09-2022			
<b>No. of classes required to complete UNIT-III: 09</b>				<b>No. of classes taken:</b>		

**UNIT-IV: Transport Layer**

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.	Process to Process Communication	1	06-10-22		1 & 2	
30.	User Datagram Protocol(UDP),	1	07-10-22		1 & 2	
31.	Transmission Control Protocol (TCP)	2	10-10-22 11-10-22		1 & 2	
32.	SCTP	1	13-10-22		1 & 2	
33.	Congestion Control	2	14-10-22 17-10-22		1 & 2	
34.	Quality of Service	1	18-10-22		1 & 2	
35.	QoS improving techniques: Leaky Bucket	1	20-10-22		1 & 2	
36.	Token Bucket algorithm	1	21-10-22		1 & 2	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

**UNIT-V: Application layer**

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.	Domain Name Space(DNS)	2	25-10-22 27-10-22		1 & 2	
38.	DDNS	1	28-10-22		1 & 2	
39.	TELNET	1	31-10-22		1 & 2	
40.	EMAIL,	1	01-11-22		1 & 2	
41.	File Transfer Protocol (FTP)	1	03-11-22		1 & 2	
42.	WWW ,HTTP	1	04-11-22		1 & 2	
43.	SNMP	1	07-11-22		1 & 2	
44.	Bluetooth,	1	10-11-22		1 & 2	
45.	Firewalls	2	11-11-22 14-11-22		1 & 2	
<b>No. of classes required to complete UNIT-V: 12</b>				<b>No. of classes taken:</b>		

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

**PART-C****EVALUATION PROCESS (R20 Regulation):**

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
<b>Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))</b>	<b>M=30</b>

Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	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.
<b>PO 3</b>	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.
<b>PO 4</b>	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.
<b>PO 5</b>	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
<b>PO 6</b>	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
<b>PO 7</b>	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.
<b>PO 8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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<b>PO 10</b>	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
<b>PO 11</b>	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.
<b>PO 12</b>	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):

<b>PSO 1</b>	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
<b>PSO 2</b>	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
<b>PSO 3</b>	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	B S R Krishna	Dr.K Naga Prasanthi	Dr.D.V. Subbaiah	Dr. D Veeraiah
Signature				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr. B SIVARAMAKRISHNA

**Course Name & Code** : Computer Networks Lab (20CS60)

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

**Credits:** 1.5

**Program/Sem/Sec** : B.Tech V Sem Sec \_C CSE

**A.Y.:** 2022-23

**PRE-REQUISITE** : Data Structures, and Operating Systems

**COURSE EDUCATIONAL OBJECTIVES (CEOs):**The Objective of the course is to prepare students to write programs to illustrate communication in networks, configure different networks (LAN,WAN) and prepare students to differentiate various protocols and their performance.

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

<b>CO 1</b>	Implement Network layer functionalities using NS3 simulator.(Apply-L3)
<b>CO 2</b>	Demonstrate Transport Layer functionalities.(Understand-L2)
<b>CO 3</b>	Analyze Application layer protocols using Wire shark.(Analyze-L4)
<b>CO 4</b>	Improve individual / team work 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
<b>CO1</b>	-	2	2	-	2	-	-	-	-	-	-	-	-	-	3
<b>CO2</b>	-	1	1	1	1	-	-	-	-	-	-	-	-	-	3
<b>CO3</b>	3	-	1	1	1	-	-	-	-	-	-	-	-	-	3
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

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

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	To gain familiarity with the basic network commands & utilities available in the Linux OS.	3	22.07.22		TLM4	
2	To learn about network layer tools and analyze captures for congestion.	3	29.07.22		TLM4	
3	To learn about queue management techniques, and global routing inns3.	3	05.08.22		TLM4	
4	To learn about broadcasting, multicasting, and bridging in a Local Area Network using ns3.	3	12.08.22		TLM4	
5	To learn about Wifi and Mobile Adhoc topologies with ns3.	3	26.08.22		TLM4	
6	To introduce Socket Programming in TCP and UDP.	3	02.09.22		TLM4	
7	Observations of Transmission Control Protocol(TCP) Connection states, Flags and Flow control.	3	09.09.22		TLM4	
8	To learn Transmission Control Protocol(TCP) Flow Control, ErrorControl, and Congestion.	3	07.10.22		TLM4	
9	To introduce Wire shark & tcp dump, and observation of packets in a LAN network.	3	21.10.22		TLM4	
10	To analyze HTTP packets using Wire shark tool, and understand the records returned by a DNS server.	3	04.11.22		TLM4	
11	Internal Exam	3	18.11.22		TLM4	

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



## PART-C

### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

## PART-D

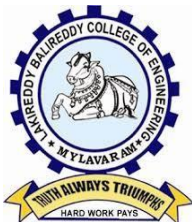
### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>B S R Krishna</b>	<b>Dr.K Naga Prasanthi</b>	<b>Dr.D.V. Subbaiah</b>	<b>Dr. D Veeraiah</b>
<b>Signature</b>				



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : Dr. Y. Vijay Bhaskar Reddy  
Course Name & Code : Machine Learning (20AD04)  
L-T-P Structure : 3-0-0 Credits : 3  
Program/Sem/Sec : B.Tech., CSE., V-C A.Y: 2022-23

**PRE-REQUISITE: Probability and Statistics, Data Warehousing and Data Mining**

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

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

CO 1	Identify the characteristics of machine learning. (Understand- L2)
CO 2	Understand the Model building and evaluation approaches (Understand- L2)
CO 3	Apply regression algorithms for real-world Problems. (Apply- L3)
CO 4	Handle classification problems via supervised learning algorithms. (Apply- L3)
CO 5	Learn advanced learning techniques to deal with complex data (Apply- L3)

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

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

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

#### **TEXT BOOKS:**

1. Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India, 1st edition, 2015.
2. Tom M. Mitchell, "Machine Learning", MGH, 1997.

#### **REFERENCE BOOKS:**

1. Shai Shalev-Shwartz, Shai Ben David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge
2. Peter Harington, "Machine Learning in Action", Cengage, 1st edition, 2012.

3. Peter Flach, “Machine Learning: The art and science of algorithms that make sense of data”, Cambridge university press,2012.
4. Jason Brownlee, “Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End”, Edition: v1.4, 2011.

## **PART-B**

### **COURSE DELIVERY PLAN (LESSON PLAN): Section C**

#### **UNIT-I : Introduction to Machine Learning and Preparing to Model**

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	1	18-07-2022		TLM1	
2.	Types of Machine Learning-supervise Learning	1	20-07-2022		TLM1	
3.	Unsupervised Learning	1	21-07-2022		TLM1	
4.	Reinforcement Learning	1	23-07-2022		TLM1	
5.	Applications of Machine Learning,	1	25-07-2022		TLM1	
6.	Issues in Machine Learning	1	27-07-2022		TLM1	
7.	Introduction, Machine Learning Activities	1	28-07-2022		TLM1	
8.	Basic Types of Data in Machine Learning	1	30-07-2022		TLM1	
9.	Exploring Structure of Data	1	01-08-2022		TLM1	
10.	Exploring Structure of Data	1	03-08-2022		TLM1	
11.	Data Quality and Remediation,	1	04-08-2022		TLM1	
12.	Data Preprocessing	1	06-08-2022		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-I</b>		<b>12</b>		<b>No of classes taken</b>		

#### **UNIT-II: Modeling & Evaluation, Basics of Feature 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
14.	Introduction,	1	08-08-2022		TLM1	
15.	selecting a Model, training a Model (for Supervised Learning),	2	10-08-2022		TLM1	
16.	, Model Representation and Interpretability	1	11-08-2022		TLM1	
17.	Evaluating Performance of a Model.	2	13-08-2022		TLM1	
18.	Feature Transformation	1	18-08-2022		TLM1	
19.	Feature Construction	1	20-08-2022		TLM1	
20.	Feature Extraction	1	22-08-2022		TLM1	
21.	Principal Component	1	22-08-2022		TLM3	

	Analysis (PCA),					
22	Singular Value Decomposition	1	24-08-2022			
23	Linear Discriminant Analysis (LDA), Feature Subset Selection	1	25-08-2022			
<b>No. of classes required to complete UNIT-II</b>		<b>12</b>		<b>No of classes taken</b>		

### UNIT-III: Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Introduction to regression analysis, Simple linear regression	1	27-08-2022		TLM1	
23.	Multiple linear regression	2	28-08-2022		TLM1	
24.	Assumptions in Regression Analysis, Main Problems in Regression Analysis	1	31-08-2022		TLM1	
25.	Improving Accuracy of the linear regression model,	2	01-09-2022		TLM1	
26.	Polynomial Regression Model	1	05-09-2022		TLM1	
27.	Logistic Regression	2	07-09-2022		TLM1	
28.	Regularization	1	10-09-2022		TLM1	
29.	Regularized Linear Regression	2	10-10-2022		TLM1	
30.	Regularized Logistic Regression.	2	13-10-2022		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-III</b>		<b>14</b>		<b>No of classes taken</b>		

### UNIT-IV: Supervised Learning: Classification

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	Supervised Learning Introduction and example	1	17-10-2022		TLM1	
32.	Classification Model	2	19-10-2022		TLM1	
33.	Classification Learning Steps	1	22-10-2022		TLM1	
34.	k-Nearest Neighbour (kNN)	2	26-10-2022		TLM1	
35.	Support vector Machines	1	29-10-2022		TLM1	
36.	Random Forest model	1	31-10-2022		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-IV</b>		<b>08</b>		<b>No of classes taken</b>		

**UNIT-V: Other Types of Learning**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Bagging	1	02-11-2022		TLM1	
44.	Boosting	2	03-11-2022		TLM2	
45.	Stacking and its impact on bias and variance	1	07-11-2022		TLM2	
46.	AdaBoost	2	09-11-2022		TLM2	
47.	, Gradient Boosting Machines	2	12-11-2022		TLM2	
48.	XGBoost	1	16-11-2022		TLM2	
49.	Reinforcement Learning	2	17-11-2022		<b>TLM3</b>	
50.	Q learning	2	21-11-22		<b>TLM3</b>	
<b>No. of classes required to complete UNIT-V</b>		<b>13</b>		<b>No of classes taken</b>		

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

**PART-C****EVALUATION PROCESS (R20 Regulations):**

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

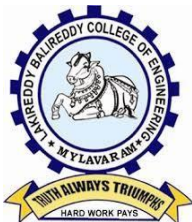
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<b>PSO 3</b>	To inculcate an ability to analyze, design and implement database applications.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.Y.Vijay Bhaskar Reddy	Dr. P. Bhagath	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. Y. Vijay Bhaskar Reddy	
Course Name & Code	: Machine Learning Lab (20AD54)	
L-T-P Structure	: 0-0-3	Credits : 1.5
Program/Sem/Sec	: B.Tech., CSE., V-C	A.Y: 2022-23

**PRE-REQUISITE: Probability and Statistics, Programming Knowledge**

**Course Educational Objective:** The objective of this lab is to Make use of Data sets in implementing the machine learning algorithms in any suitable language of choice.

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

CO 1	Apply the appropriate pre-processing techniques on data set. ( <b>Apply - L3</b> )
CO 2	Implement supervised Machine Learning algorithms. ( <b>Apply - L3</b> )
CO 3	Implement advanced Machine Learning algorithms ( <b>Apply - L3</b> )
CO 4	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		2	3										
CO2		2		2	3									2	
CO3	2	2			3									2	
CO4										2					

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

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

### **TEXT BOOKS:**

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4. Jason Brownlee, "Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End", Edition: v1.4, 2011.



## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN): Section C

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.	Basic statistical functions for data exploration	3	27-07-2022		<b>TLM4</b>	
2.	Data Visualization: Box plot, scatter plot, histogram	3	03-08-2022		<b>TLM4</b>	
3.	Data Pre-processing: Handling missing values, outliers, normalization, Scaling	3	17-08-2022		<b>TLM4</b>	
4.	Principal Component Analysis (PCA)	3	07-09-2022		<b>TLM4</b>	
5.	Singular Value Decomposition (SVD)	3	14-09-2022		<b>TLM4</b>	
6.	Linear Discriminant Analysis (LDA)	3	21-09-2022		<b>TLM4</b>	
7.	Regression	3	12-10-2022		<b>TLM4</b>	
8.	Regularized Regression		12-10-2022		<b>TLM4</b>	
9.	K-Nearest Neighbour (kNN) Classifier	3	19-10-2022		<b>TLM4</b>	
10.	Support Vector Machines (SVMs)	3	26-10-2022		<b>TLM4</b>	
11.	Random Forest model	3	02-11-2022		<b>TLM4</b>	
12.	AdaBoost Classifier and XGBoost	3	09-11-2022		<b>TLM4</b>	
13.	<b>Lab Internal</b>	3	16-11-2022			
<b>No. of classes required to complete</b>		<b>39</b>		<b>No of classes taken</b>	<b>39</b>	

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

## PART-C

### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.Y.Vijay Bhaskar Reddy	Dr. P. Bhagath	Dr.D.Venkata Subbaiah	Dr.D.Veeraiah



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

[hodcse@lbrce.ac.in](mailto:hodcse@lbrce.ac.in), [cselbreddy@gmail.com](mailto:cselbreddy@gmail.com), Phone: 08659-222933, Fax: 08659-222931

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

**Name of Course Instructor:** Dr. K Devi Priya

**Course Name & Code** : Mean Stack Technologies - 20CSS3

**L-T-P Structure** : 1-0-3

**Credits:** 2

**Program/Sem/Sec** : B.Tech. - CSE/V/A

**A.Y.:** 2022-23

**PREREQUISITE:** Full Stack Development

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

<b>CO1</b>	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles ( <b>Apply-L3</b> )
<b>CO2</b>	Build a basic web server using Node.js , Express.js and also working with Node Package Manager (NPM) ( <b>Apply-L3</b> )
<b>CO3</b>	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking. ( <b>Apply-L3</b> )
<b>CO4</b>	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
<b>CO1</b>	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
<b>CO2</b>	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
<b>CO3</b>	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
	1 - Low			2 -Medium				3 - High							

**Text Books &REFERENCE BOOKS:**

<b>T1</b>	Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson
<b>T2</b>	Pro Mean Stack Development, 1st Edition, ELadElrom, Apress O'Reilly.
<b>T3</b>	Budi Kurniawan, "Struts 2 Design and Programming: A Tutorial", BrainySoftware, 2nd Edition, 2008.
<b>R1</b>	Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech.
<b>R2</b>	An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Cycle-1(HTML)	4	19-07-22 & 22-07-22		DM5/ DM6	
2.	Cycle -2(HTML)	4	26-07-22 & 29-07-22		DM5/ DM6	
3.	Cycle-3(JS)	4	02-08-22& 05-08-22		DM5/ DM6	
4.	Cycle-4(JS)	4	12-08-22& 16-08-22		DM5/ DM6	
5.	Cycle-5(JS)	4	23-08-22& 26-08-22		DM5/ DM6	
6.	Cycle-6(Node.JS)	4	30-08-22& 02-09-22		DM5/ DM6	
7.	Cycle-6(Node.JS)	4	06-09-22& 09-09-22		DM5/ DM6	
8.	Cycle-7(Express.js)	4	04-10-22& 07-10-22		DM5/ DM6	
9.	Cycle-8(Express.js)	4	11-10-22& 14-10-22		DM5/ DM6	
10.	Cycle-9 (Typescript)	4	18-10-22& 21-10-22		DM5/ DM6	
11.	Cycle-10 (Typescript)	4	25-10-22& 28-10-22		DM5/ DM6	
12.	Cycle-11 (Typescript)	4	01-11-22& 04-11-22		DM5/ DM6	
13.	Cycle-12 (Typescript)	4	08-11-22& 11-11-22		DM5/ DM6	
14.	Cycle-12 (Typescript)	4	15-11-22& 18-11-22		DM5/ DM6	
15.	Assessment	4	22-11-22& 25-11-22		DM5/ DM6	

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

## PART-C

### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

## PART-D

### PROGRAMME OUTCOMES (POs):

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<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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.

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<b>PSO 1</b>	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
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<b>PSO 3</b>	To inculcate an ability to analyze, design and implement database applications.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	(Dr. K. Devi Priya)	(Dr. K. Devi Priya)	(Dr. K.Naga Prasathi)	(Dr. D. Veeraiah)
<b>Signature</b>				



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

Name of Course Instructor: Ms. T VINEETHA

Course Name & Code : PAI & 20CS16

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

Program/Sem/Sec :BTECH/V/C

Credits: 3

A.Y.: 2022-23

PREREQUISITE: Basic Engineering and Mathematics knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

CO1	Understand the fundamentals of Artificial Intelligence types of AI agents and their structures to solve engineering problems. ( <b>Understand - L2</b> )
CO2	Identify different search algorithms to find and optimise the solution for the given problem. ( <b>Understand-L2</b> )
CO3	Apply different gaming algorithms and identify the importance of knowledge representations in Artificial Intelligence. ( <b>Apply-L3</b> )
CO4	Make use of predicate logic and rule-based system to represent the knowledge in AI domain. ( <b>Understand-L2</b> )
CO5	Interpret the forms of learning in the AI domain as well as present efficient technologies to remove uncertainty in knowledge domain. ( <b>Understand -L2</b> )

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

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

TEXTBOOKS:

T1	Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, third edition, 2009.can also second edition,2003.
T2	Elaine Rich, Kevin Knight Artificial Intelligence, TMH, second edition, 2007.

REFERENCE BOOKS:

R1	Nils J.Nilsson "Artificial Intelligence - A New Synthesis", ,Morgan Kaufmann, 1988
R2	David poole,Alan Mackworth, "Artificial Intelligence: Foundations for computational agents",Cambridge Univ.press,2010.
R3	Ronald Brachman, "Knowledge representation and Reasoning", Morgan Kaufmann,2004.
R4	Frank van Harmelen,Vladimir Lifschitz,Bruce Porter(Eds),"Handbook of Knowledge representation",Elsevier,2008.
R5	Ivan Bratko," Prolog Programming for Artificial Intelligence",4 <sup>th</sup> Ed., Addition-Wesley,2011.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	AI Introduction	1	18/7/22		TLM1	
2.	Applications of AI	1	20/7/22		TLM1	
3.	History of AI	1	21/7/22		TLM1	
4.	Types of AI	1	22/7/22		TLM1	
5.	Agents and rationality	1	25/7/22		TLM2	
6.	Structure of the agents	1	27/7/22		TLM2	
7.	Agent environment and nature of the environment	1	28/7/22		TLM2	
8.	Types of agents-Simple reflex agents and model-based agents	1	29/7/22		TLM2	
9.	Types of agents-Goal based agents and Utility-based agents	1	01/8/22		TLM2	
10.	Types of agents-Learning agents	1	03/8/22		TLM2	
11.	Problems, search spaces	1	04/8/22		TLM2	
12.	Defining the problem as state space search	1	05/8/22		TLM2	
13.	Production system	1	08/8/22		TLM2	
14.	Problem characteristics	1	10/8/22		TLM2	
15.	Issues in the design of search programs.	1	11/8/22		TLM2	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Problem solving agents and search algorithm terminologies	1	12/8/22		TLM2	
17.	Properties of search algorithms and types of search algorithms	1	17/8/22		TLM2	
18.	Uninformed search algorithms: Breadth-first Search	1	18/8/22		TLM2	
19.	Depth-first Search and Depth-limited Search	1	22/8/22		TLM2	
20.	Iterative deepening depth-first search.	1	24/8/22		TLM2	
21.	Uniform cost search, Bidirectional search.	1	25/8/22		TLM2	
22.	Informed/Heuristic Search algorithms: Greedy best-first search algorithm	1	26/8/22		TLM2	
23.	A* Search algorithm	1	29/8/22		TLM2	
24.	Hill climbing algorithm	1	30/8/22		TLM2	
25.	Constraint satisfaction problem	1	01/9/22		TLM2	
26.	Means-Ends Analysis	1	02/9/22		TLM2	
<b>No. of classes required to complete UNIT-II: 11</b>				<b>No. of classes taken:</b>		

#### UNIT-III:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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27.	Adversarial search/Game playing: Introduction	1	05/9/22		TLM2	
28.	Minmax Algorithm	1	07/9/22		TLM2	
29.	Alpha-Beta Pruning	1	08/9/22		TLM2	
30.	Knowledge representation: Representations and mappings	2	09/09/22 19/09/22		TLM2	
31.	Approaches of Knowledge representation	2	21/09/22 22/09/22		TLM2	
32.	Issues in Knowledge Representation	2	23/09/22 10/10/22		TLM2	
<b>No. of classes required to complete UNIT-III: 09</b>				<b>No. of classes taken:</b>		

#### UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Knowledge Representation Using predicate logic: Representing simple facts in logic.	1	12/10/22		TLM2	
34.	Representing instance and Isa relationships	2	13/10/22 14/10/22		TLM2	
35.	Computable functions and predicates	1	17/10/22		TLM2	
36.	Resolution	2	19/10/22 20/10/22		TLM2	
37.	Natural deduction	1	21/10/22		TLM2	
38.	Representing knowledge using Rules: Procedural verses declarative knowledge	1	24/10/22		TLM2	
39.	Logic programming	1	26/10/22		TLM2	
40.	Forward verses backward reasoning	1	27/10/22		TLM2	
41.	Matching	1	28/10/22		TLM2	
42.	Control knowledge	1	31/10/22		TLM2	
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>		

#### UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Uncertain knowledge and Reasoning: Probability and Bayes theorem	2	02/11/22 03/11/22		TLM2	
44.	Certainty factors and rule-based systems	2	04/11/22 07/11/22		TLM2	
45.	Bayesian networks	2	09/11/22 10/11/22		TLM2	
46.	Dempster – Shafer Theory	2	11/11/22 14/11/22		TLM2	
47.	Fuzzy logic	1	16/11/22		TLM2	
48.	Learning: Overview of different forms of learning	2	17/11/22 18/11/22		TLM2	
49.	Learning Decision Trees	2	21/11/22 23/11/22		TLM2	
50.	Neural networks	2	24/11/22 25/11/22		TLM2	
<b>No. of classes required to complete UNIT-V: 15</b>				<b>No. of classes taken:</b>		

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

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<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Ms. T Vineetha</b>	<b>Mr.N V Naik</b>	<b>Dr.D V Subbaiah</b>	<b>Dr.D Veeraiah</b>
<b>Signature</b>				



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## DEPARTMENT OF CIVIL ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** K. HARISH KUMAR

**Course Name & Code** : Disaster Management & 20CE82

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech, V SEM, CSE - C

**A.Y.:** 2022-23

**PREREQUISITE:** NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

<b>CO1</b>	Identify the basic terms, types of disasters and their impact (Understand - L2)
<b>CO2</b>	Illustrate the role of technology in handling disaster management situations (Understand-L2)
<b>CO3</b>	Identify the stakeholders concerned and design the different action plans for responding in case of disaster occurrence (Understand - L2)
<b>CO4</b>	Evaluate the importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand - L2)

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

**TEXTBOOKS:**

**T1** Tushar Bhattacharya, "Disaster Science and Management", Tata McGraw Hill Publications, New Delhi, 2012.

**T2** R. Subramanian, "Disaster Management", Vikas Publishing house Pvt. Ltd, 2022.

**REFERENCE BOOKS:**

**R1** G.K. Ghosh, "Disaster Management", APH Publishing Corporation, 2006.

**R2** U.K. Chakrabarty, "Industrial Disaster Management and Emergency Response", Asian Books Pvt. Ltd., New Delhi 2007.

**R3** H K Gupta (Ed.), "Disaster Management", Universities Press, 2003

**R4** W.N. Carter, "Disaster Management: A Disaster Management Handbook", Asian Development Bank, Bangkok, 1991.

**R5** Government of India website on Disaster Management: [www.ndmindia.nic.in](http://www.ndmindia.nic.in)

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: DEFINITIONS & TYPES OF DISASTER

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 CO's & PO's, Subject	1	18.07.2022		TLM2	
2.	Definitions – types of Disasters	1	21.07.2022		TLM2	
3.	Concept of disaster management - Disaster Management Cycle	1	22.07.2022		TLM2	
4.	Vulnerability	1	23.07.2022		TLM2	
5.	Mitigation	1	25.07.2022		TLM2	
6.	Various types of disasters: Natural: Drought, cyclone, earthquake, and landslides.	1	28.07.2022		TLM2	
7.	Manmade and Industrial: Engineering and Technical failure, Nuclear and Chemical disasters,	1	29.07.2022		TLM1	
8.	Accident-Related Disasters.	1	30.07.2022		TLM2	
9.	High Power Committee on Disaster Management in India	1	01.08.2022		TLM2	
10.	Disaster Management Act 2005	1	04.08.2022		TLM2	
11.	Tutorial- 1/ Quick revision	1	05.08.2022		TLM3	
<b>No. of classes required to complete UNIT-I: 11</b>				<b>No. of classes taken:</b>		

#### UNIT-II: IMPACT OF DISASTERS

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.	Impact due to – Earthquake	1	06.08.2022		TLM2	
13.	Impact due to – Cyclone	1	08.08.2022		TLM2	
14.	Landslides, Fire hazards	1	11.08.2022		TLM2	
15.	Life & livestock, Habitation	1	12.08.2022		TLM2	
16.	Agriculture & livelihood loss- Health hazards	1	18.08.2022		TLM2	
17.	Malnutrition problems- Contamination of water	1	20.08.2022		TLM2	
18.	Impact on children - environmental loss.	1	22.08.2022		TLM2	
19.	Tutorial- 2/ Quick revision	1	25.08.2022		TLM3	
<b>No. of classes required to complete UNIT-II:08</b>				<b>No. of classes taken:</b>		

#### UNIT-III: ROLE OF TECHNOLOGY IN DISASTER 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
20.	Role of remote sensing	1	26.08.2022		TLM2	
21.	information systems and decision-making tools	1	27.08.2022		TLM2	
22.	Disaster management for infra structures - electrical substations	1	29.09.2022		TLM2	
23.	Roads and bridges	1	01.09.2022		TLM2	
24.	mitigation programme for earthquakes	1	02.09.2022		TLM2	

25.	Geospatial information in agriculture drought assessment	1	03.09.2022		TLM2
26.	Multimedia technology in disaster risk management and training	1	05.09.2022		TLM2
27.	Transformable indigenous knowledge in disaster reduction.	1	08.09.2022		TLM2
28.	Tutorial- 3/ Quick revision	1	09.09.2022		TLM3
<b>No. of classes required to complete UNIT-III:09</b>				<b>No. of classes taken:</b>	

#### UNIT-IV: PLANNING & RISK PREVENTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
<b>Technical training</b>		<b>12.09.2022 – 24.09.2022</b>				
<b>MID - I Examination</b>		<b>26.09.2022 – 01.10.2022</b>				
29.	Planning, early warning system	1	06.10.2022		TLM2	
30.	crisis intervention and management	1	07.10.2022		TLM2	
31.	crisis intervention and management	1	10.10.2022		TLM2	
32.	Response and Rehabilitation after Disasters	1	13.10.2022		TLM2	
33.	temporary shelter – food and nutrition- safe drinking water	1	14.10.2022		TLM2	
34.	rehabilitation after cyclones- response to drought,	1	15.10.2022		TLM2	
35.	response to river erosion	1	17.10.2022		TLM2	
36.	response after earthquake	1	20.10.2022 21.10.2022		TLM2	
37.	response after Tsunami- Hunger and Disaster	1	22.10.2022		TLM2	
38.	Tutorial- 4/ Quick revision	1	27.10.2022		TLM3	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-V: EDUCATION AND COMMUNITY PREPAREDNESS & CASE STUDIES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Essentials of disaster education – school awareness	1	28.10.2022		TLM2	
40.	safety programs	1	29.10.2022		TLM2	
41.	Community based disaster recovery	1	31.10.2022		TLM2	
42.	voluntary agencies	1	03.11.2022		TLM2	
43.	Community participation at various stages of disaster management	1	04.11.2022		TLM2	
44.	Building community capacity for action	1	05.11.2022		TLM2	
45.	Corporate sector and disaster risk reduction	1	07.11.2022		TLM2	
46.	A community focused approach	1	10.11.2022		TLM2	
47.	Case studies on different disasters in the world 1	1	11.11.2022		TLM2	
48.	Case studies on different disasters in the world 2	1	14.11.2022		TLM2	
49.	Impacts, Technology usage	1	17.11.2022		TLM2	
50.	Risk prevention, Education and community preparedness	2	18.11.2022 19.11.2022		TLM2	
51.	Tutorial- 5/ Quick revision	1	21.11.2022		TLM3	

52.	Revision	1	24.11.2022		<b>TLM3</b>	
53.	Revision	1	25.11.2022		<b>TLM3</b>	
<b>MID - II Examination</b>		<b>28.11.2022 - 03.12.2022</b>				
<b>No. of classes required to complete UNIT-V: 16</b>				<b>No. of classes taken:</b>		

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

### **PART-C**

#### **EVALUATION PROCESS (R17 Regulation):**

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

### **PART-D**

#### **PROGRAMME OUTCOMES (POs):**

<b>PO 1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	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.
<b>PO 3</b>	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.
<b>PO 4</b>	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.
<b>PO 5</b>	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

<b>PO 6</b>	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.
<b>PO 7</b>	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.
<b>PO 8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	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.
<b>PO 11</b>	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.
<b>PO 12</b>	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):

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>				
<b>Signature</b>				





# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr. D. Veeraiah

**Course Name & Code** : THEORY OF COMPUTATION & 20CS13

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

**Program/Sem/Sec** : B.Tech/V/C

**Credits:** 3

**A.Y.:** 2022-23

**PREREQUISITE:** Discrete Mathematical Structures

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to provide a formal connection between algorithmic problem solving and the theory of automata and languages, and develop them into a mathematical view towards algorithmic design and in general computation itself.

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

<b>C01</b>	Construct finite automata for regular languages and prove it's equivalence ( <b>Apply-L3</b> )
<b>C02</b>	Construct regular expression for regular languages and prove the equivalence of regular expression and Finite Automata ( <b>Apply-L3</b> )
<b>C03</b>	Design Pushdown automata for the context free languages. ( <b>Understand-L2</b> )
<b>C04</b>	Design Turing Machine to model computational problems ( <b>Apply-L3</b> )
<b>C05</b>	Distinguish decidable and undecidable problems with the help of Turing machine ( <b>Understand-L2</b> )

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>C01</b>	3	2											1		
<b>C02</b>	3	2											1		
<b>C03</b>	3	2													
<b>C04</b>	3	2													
<b>C05</b>	1	2													
	1 - Low			2 -Medium						3 - High					

#### **TEXTBOOKS:**

**T1** John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, "Introduction to Automata Theory, Languages, and Computation", Pearson Education Asia, 1997

#### **REFERENCE BOOKS:**

<b>R1</b>	Harry R. Lewis and Christos H. Papadimitriou, "Elements of the Theory of Computation", Pearson Education Asia, 2000
<b>R2</b>	Dexter C. Kozen, "Automata and Computability", Springer, 2011.
<b>R3</b>	Michael Sipser, "Introduction to the Theory of Computation", PWS Publishing, 2005.
<b>R4</b>	John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill, 2 <sup>nd</sup> Edition, 2003

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: FINITE AUTOMATA

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- Course Objective & Outcomes	1	19-07-2022		TLM1	
2.	Basic Concepts of Finite Automata	1	21-07-2022		TLM1	
3.	Finite automata Classification	1	22-07-2022		TLM1	
4.	DFA Construction	2	23-07-2022 26-07-2022		TLM1	
5.	NFA Construction	1	28-07-2022		TLM1	
6.	Equivalence of NFA & DFA	1	29-07-2022		TLM1	
7.	NFA with epsilon to NFA without epsilon	1	30-07-2022		TLM1	
8.	Minimization of Finite Automata	2	02-08-2022 04-08-2022		TLM1	
9.	Finite Automata with output	1	05-08-2022		TLM1	
10.	Construction of Moore and Melay Machine	2	06-08-2022 09-08-2022		TLM1	
11.	Equivalence of Moore and Melay	2	11-08-2022 12-08-2022		TLM1	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Regular Expression and Regular Languages

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Introduction to Regular Expressions	1	18-08-2022		TLM1	
13.	Construction of RE	1	19-08-2022		TLM1	
14.	RE to Finite Automata	1	22-08-2022		TLM1	
15.	FA to Regular expressions	1	23-08-2022		TLM1	
16.	Regular grammar, Construction	1	25-08-2022		TLM1	
17.	Parse Trees	1	26-08-2022		TLM1	
18.	Equivalence of grammar to Finite Automata	1	27-08-2022		TLM1	
19.	Pumping Lemma for regular languages	1	30-08-2022		TLM1	
20.	Closure Properties for Regular Language	1	01-09-2022		TLM1	
<b>No. of classes required to complete UNIT-II: 09</b>				<b>No. of classes taken:</b>		

**UNIT-III: CONTEXT FREE GRAMMER AND PUSH DOWN AUTOMATA**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Context Free Grammar	1	02-09-2022		TLM1	
22.	Ambiguity of CFG	1	03-09-2022		TLM1	
23.	Simplification of CFG	1	06-09-2022		TLM1	
24.	CNF	1	08-09-2022		TLM1	
25.	GNF	2	09-09-2022 10-09-2022		TLM1	
26.	PDA Definition	1	04-10-2022		TLM1	
27.	Deterministic PDA and Non Deterministic PDA	1	11-10-2022		TLM1	
28.	Construction of PDA	1	13-10-2022		TLM1	
29.	CFG to PDA	1	14-10-2022		TLM1	
30.	PDA to CFG	1	15-10-2022		TLM1	
31.	Pumping lemma for CFL's	1	18-10-2022		TLM1	
32.	Closure properties of CFL's	1	20-10-2022		TLM1	
<b>No. of classes required to complete UNIT-III: 13</b>				<b>No. of classes taken:</b>		

**UNIT-IV: Turing Machine**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Introduction, Basic Model of TM	1	21-10-2022		TLM1	
34.	Languages, closure properties	1	22-10-2022		TLM1	
35.	TM Construction	3	27-10-2022 28-10-2022 29-10-2022		TLM1	
36.	Variants of TM	1	01-11-2022		TLM1	
37.	NDTM equivalence with DTM	2	03-11-2022 04-11-2022		TLM1	
38.	Unrestricted Grammar and its equivalence TM	1	05-11-2022		TLM1	
39.	TM as enumerators	2	08-11-2022 10-11-2022			
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>		

**UNIT-V: Undecidability**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
40.	Introduction	1	11-11-2022		TLM1	
41.	Church Turing Thesis	1	12-11-2022		TLM1	
42.	Universal Turing Machine	1	15-11-2022		TLM1	
43.	The universal and diagonalization Languages	1	17-11-2022		TLM1	
44.	Reduction between Languages	1	18-11-2022		TLM1	
45.	Rice Theorem	1	19-11-2022		TLM1	
46.	PCP Problem	1	22-11-2022		TLM1	
47.	Undecidable problems about Languages	2	24-11-2022 25-11-2022		TLM1	
<b>No. of classes required to complete UNIT-V: 09</b>				<b>No. of classes taken:</b>		

### 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
1.	Phases of Compiler	1	26-11-2022		TLM1	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO 6</b>	<b>The engineer and society:</b> 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.
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.
<b>PSO 2</b>	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
<b>PSO 3</b>	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. D.Veeraiah	Dr. D.Veeraiah	Dr. S.Jayaprada	Dr. D.Veeraiah
Signature				