



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 OF ARTIFICIAL INTELLIGENCE DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. K. SRIDEVI

Course Name & Code : PC-I, 20FE01

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

Credits: 02

Program/Sem/Sec : AI & DS-B – I SEM

A.Y. : 2022-23

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading & Writing skills.

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

CO1	Write sentences and paragraphs using proper grammatical structures and word forms.	L1
CO2	Comprehend the given text by employing suitable strategies for skimming and Scanning and draw inferences	L2
CO3	Write summaries of reading texts using correct tense forms & Appropriate structures.	L1
CO4	Write Formal Letters; Memos & E-Mails	L3
CO5	Edit the sentences/short texts by identifying basic errors of grammar/ vocabulary/syntax	L2

Unit-I

Exploration - 'A Proposal to Girdle the Earth – Nellie Bly'; Reading: Skimming for main idea; Scanning for specific information; Grammar & Vocabulary: Content Words; Function Words; Word Forms: verbs, nouns, adjectives and adverbs; Nouns: Countable and Uncountable, Singular and Plural forms; Wh - Questions; Word Order in Sentences; Writing: Paragraph Analysis; Paragraph Writing; Punctuation and Capital Letters

Unit-II

On Campus- 'The District School as it Was by One Who Went to it – Warren Burton'; Reading: Identifying Sequence of Ideas;

Grammar&Vocabulary: Cohesive Devices:Linkers/signposts/Transition signals, Synonyms, MeaningsofWords/Phrasesin thecontext; Writing: Memo Drafting.

Unit-III

WorkingTogether-'The Future of Work'

Reading: Making basic inferences; Strategies to use text clues for comprehension; Summarizing;Grammar & Vocabulary: Verbs: Tenses; Reporting Verbs for Academic Purpose; Writing: Rephrasing what is read; Avoiding redundancies and repetitions Abstract Writing/Summarizing.

Unit-IV

'A.P.J.AbdulKalam'; Grammar & Vocabulary: Direct & Indirect Speech; articles and their Omission; Writing :E-Mail Drafting.

Unit-V

'C.V.Raman'; Grammar & Vocabulary: Subject-verb Agreement; Prepositions; Writing: Formal Letter Writing.

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

TEXTBOOKS:

- T1** Prabhavati. Y & etal , "English All Round –Communication Skills for Undergraduate Learners" ,Orient Black Swan, Hyderabad, 2019
- T2** "The Great Indian Scientists" published by Cengage Learning India Pvt. Ltd., Delhi, 2017

REFERENCE BOOKS:

- R1** Swan, M., "Practical English Usage", Oxford University Press, 2016.
- R2** Kumar, Sand Latha, P, "Communication Skills", Oxford University Press, 2018.

R3 Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, NewDelhi, 2008.

R4 Baradwaj Kumkum, "Professional Communication", I. K. International PublishingHousePvt.Lt., NewDelhi, 2008.

R5 Wood, F. T., "Remedial English Grammar", Macmillan, 2007.

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.	Introduction to syllabus	01	18-10-2022		TLM2	
2.	Proposal to Girdle The Earth by Nellie Bly	02	19-10-2022 20-10-2022		TLM2	
3.	Reading: Skimming for main idea ; Scanning for specific information	01	25-10-2022		TLM2	
4.	Content words and Function words	01	26-10-2022		TLM2	
5.	Word forms – verbs; Adjectives & adverbs	01	27-10-2022		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns Word order in sentences, "Wh" questions	02	01-11-2022 02-11-2022		TLM2	
7.	Writing: Paragraph writing, Paragraph analysis	03	03-11-2022 08-11-2022 09-11-2022		TLM2 TLM6	
No. of classes required to complete UNIT-I: 11				No. of classes taken:		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	03	10-11-2022 15-11-2022 16-11-2022		TLM2	
9.	Identifying sequence of ideas	01	17-11-2022		TLM2	

10.	Cohesive devices: linkers /signposts/transition signals	02	22-11-2022 23-11-2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	02	24-11-2022 29-11-2022		TLM2	
12.	Essay Writing - Memo drafting	02	30-11-2022 01-12-2023		TLM2 TLM6	
No. of classes required to complete UNIT-II: 10				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	HOD Sign Weekly
13.	The Future of Work	02	06-12-2023 07-12-2023		TLM2 TLM6	
14.	Making basic inferences, Strategies to uses text clues for comprehension	01	08-12-2022		TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	20-12-2022 21-12-2022		TLM2	
16.	Summarizing rephrasing what is read	01	22-12-2022		TLM2	
17.	avoiding redundancies and repetitions - Abstract Writing	02	27-12-2022 28-12-2022		TLM2 TLM6	
No. of classes required to complete UNIT-III: 08				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	HOD Sign Weekly
18.	APJ Abdul Kalam	02	29-12-2022 03-01-2023		TLM2 TLM2	
19.	Direct-Indirect speech	02	04-01-2023 05-01-2023		TLM2	
20.	Articles and their omission	02	10-01-2023 11-01-2023		TLM2	
21.	E-mail drafting	03	18-01-2023 19-01-2023 24-01-2023		TLM2 TLM6	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V:

S.	Topics to be covered	No. of	Tentative	Actual	Teaching	HOD
----	----------------------	--------	-----------	--------	----------	-----

No.		Classes Required	Date of Completion	Date of Completion	Learning Methods	Sign Weekly
22.	C.V.Raman	03	25-01-2023 26-01-2023 31-01-2023		TLM2	
23.	Subject – Verb agreement	02	01-02-2023 02-02-2023		TLM2	
24.	Prepositions	01	07-02-2023		TLM2	
25.	Formal Letter Writing	02	08-02-2023 09-02-2023		TLM2 TLM6	
No. of classes required to complete UNIT-V: 08				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	K. Sridevi	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				



COURSE HANDOUT

Part-A

PROGRAM	: I B. Tech., I-Sem., AI & DS - A
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Differential Equations
L-T-P STRUCTURE	: 3-2-0
COURSE CREDITS	: 4
COURSE INSTRUCTOR	: D. Vijaya Kumar
COURSE COORDINATOR	: Dr. A. Rami Reddy
PRE-REQUISITES	: None

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to introduce the first order and higher order differential equations, functions of several variables. The students will also learn solving of first order partial differential equations.

COURSE OUTCOMES (COs)

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

CO1: Apply first order and first degree differential equations to find orthogonal trajectories.

CO2: Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients.

CO3: Apply various Numerical methods to solve initial value problem.

CO4: Generate the infinite series for continuous functions and investigate the functional dependence.

CO5: Solve partial differential equations using Lagrange's method.

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

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

BOS APPROVED TEXT BOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

BOS APPROVED REFERENCE BOOKS:

R1 M. D. Greenberg, "Advanced Engineering Mathematics", 2nd Edition, TMH Publications, New Delhi, 2011.

R2 Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley & sons, New Delhi, 2011.

R3 W.E. Boyce and R. C. DiPrima, "Elementary Differential Equations", 7th Edition, John Wiley & sons, New Delhi, 2011.

R4 S. S. Sastry, "Introductory Methods of Numerical Analysis" 5th Edition, PHI Learning Private Limited, New Delhi, 2012.

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to the course, Course Outcomes	1	17/10/2022		TLM1			

UNIT-I: Differential Equations of First Order and First Degree

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
2.	Introduction to UNIT I	1	18/10/2022		TLM2	CO1	T1,T2	
3.	Formation of Differential Equations	1	20/10/2022		TLM1	CO1	T1,T2	
4.	Exact DE	1	21/10/2022		TLM1	CO1	T1,T2	
5.	Non-exact DE Type I	2	22/10/2022 25/10/2022		TLM1	CO1	T1,T2	
6.	Non-exact DE Type II	2	27/10/2022 28/10/2022		TLM1	CO1	T1,T2	
7.	Non-exact DE Type III	2	29/10/2022 31/10/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type IV	2	01/11/2022		TLM3	CO1	T1,T2	
9.	Orthogonal Trajectories (Cartesian)	2	03/11/2022 04/11/2022		TLM1	CO1	T1,T2	
10.	Orthogonal Trajectories (polar)	2	05/11/2022 07/11/2022		TLM1	CO1	T1,T2	
11.	Tutorial	1	08/11/2022		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		17			No. of classes taken:			

UNIT-II: Higher Order Differential Equations

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
12.	Introduction to UNIT II	1	10/11/2022		TLM2	CO2	T1,T2	
13.	Solving a homogeneous DE	1	11/11/2022		TLM1	CO2	T1,T2	
14.	Finding Particular Integral, P.I for e^{ax+b}	1	12/11/2022		TLM1	CO2	T1,T2	
15.	P.I for Cos bx, or sin bx	1	14/11/2022		TLM1	CO2	T1,T2	

16.	P.I for polynomial function	2	14/11/2022 15/11/2022		TLM1	CO2	T1,T2	
17.	P.I for $e^{ax+b}v(x)$	2	17/11/2022 18/11/2022		TLM1	CO2	T1,T2	
18.	P.I for $x^k v(x)$	2	19/11/2022 21/11/2022		TLM1	CO2	T1,T2	
19.	Method of Variation of parameters	2	22/11/2022 24/11/2022		TLM1	CO2	T1,T2	
20.	TUTORIAL 2	1	25/11/2022		TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		13			No. of classes taken:			

UNIT-III: Numerical solution of Ordinary Differential Equations

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.	Introduction to Unit-III	1	26/11/2022		TLM2	CO3	T1,T2	
22.	Taylor's series	2	28/11/2022		TLM1	CO3	T1,T2	
23.	Solution by Taylor's series	2	29/11/2022 01/12/2022		TLM1	CO3	T1,T2	
24.	Picard's Method	1	02/12/2022		TLM1	CO3	T1,T2	
25.	Solution by Picard's Method	2	03/12/2022 05/12/2022		TLM1	CO3	T1,T2	
26.	Revision	4	06/12/2022 08/12/2022 09/12/2022 10/12/2022		TLM1	CO3	T1,T2	
I MID EXAMINATIONS (12-12-2022 TO 16-12-2022)								
27.	Euler's Method	1	17/12/2022		TLM1	CO3	T1,T2	
28.	Modified Euler's Method	1	19/12/2022					
29.	Solution by Modified Euler's Method	2	20/12/2022 22/12/2022		TLM1	CO3	T1,T2	
30.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Runge Kutta Method	2	24/12/2022					

			26/12/200					
32.	TUTORIAL 3	1	27/12/2022		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		18		No. of classes taken:				

UNIT-IV: Functions of Several Variables

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
33.	Introduction to UNIT IV	1	29/12/2022		TLM1	CO4	T1,T2	
34.	Generalized Mean Value Theorem, Taylor's series	2	30/12/2022 31/12/2022		TLM1	CO4	T1,T2	
35.	Maclaurin's series	1	02/01/2023		TLM1	CO4	T1,T2	
36.	Functions of several variables	2	03/01/2023 05/01/2023		TLM1	CO4	T1,T2	
37.	Jacobians (polar, cylindrical, spherical coordinates)	2	06/01/2023 07/01/2023		TLM1	CO4	T1,T2	
38.	Functional dependence	2	09/01/2021 10/01/2023		TLM1	CO4	T1,T2	
39.	Maxima and Minima of functions of two variables	2	12/01/2023 19/01/2023		TLM1	CO4	T1,T2	
40.	Maxima and Minima of functions of two variables	1	20/01/2023		TLM1	CO4	T1,T2	
41.	TUTORIAL 4	1	21/01/2023		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		14		No. of classes taken:				

UNIT-V: Partial Differential Equations

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
42.	Introduction to UNIT V	1	23/01/2023		TLM1	CO5	T1,T2	
43.	Formation of PDE by elimination of arbitrary constants	2	24/01/2023 27/01/2023		TLM1	CO5	T1,T2	
44.	Formation of PDE by elimination of arbitrary functions	2	28/01/2023 30/01/2023		TLM1	CO5	T1,T2	
45.	Solving of PDE	1	31/01/2023		TLM1	CO5	T1,T2	
46.	Lagrange's Method	2	02/02/2023 03/02/2023		TLM1	CO5	T1,T2	
47.	Revision	3	04/02/2023 06/02/2023 07/02/2023 09/02/2023		TLM1	CO5	T1,T2	
48.	TUTORIAL 5	1	10/02/2023		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		12		No. of classes taken:				

Contents beyond the Syllabus

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

49.	Solving of PDE other methods	1	11/02/2023		TLM5	CO5	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (13-02-2023 TO 17-02-2023)								

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM2	PPT	TLM6	Assignment or Quiz
TLM3	Tutorial	TLM7	Group Discussion/Project
TLM4	Demonstration (Lab/Field Visit)		

Part - C

EVALUATION PROCESS:

Evaluation Task	Units	Marks
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2,3,5	B1=18
Objective Questions-1	1,2,3,5	C1=7
Assignment– 3	3	A3=5
Assignment– 4	4	A4=5
Assignment– 5	5	A5=5
II-Mid Examination	3,4,5	B2=18
Online Quiz-2	3,4,5	C2=7
Evaluation of Assignment: $A = \text{Avg}(\text{Best of Four}(A1, A2, A3, A4, A5))$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B = 75\% \text{ of Max}(B1, B2) + 25\% \text{ of Min}(B1, B2)$	1,2,3,4,5	B=18
Evaluation of Objective Questions Marks: $C = 75\% \text{ of Max}(C1, C2) + 25\% \text{ of Min}(C1, C2)$	1,2,3,4,5	C=7
Cumulative Internal Examination : A+B+C	1,2,3,4,5	30
Semester End Examinations : D	1,2,3,4,5	70
Total Marks: A+B+C+D	1,2,3,4,5	100

D. Vijaya Kumar	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF FRESHMAN ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.K.Jamili Reddy

Course Name & Code : Engineering Chemistry&20FE06

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

Credits:03

Program/Sem/Sec : B.Tech/I sem-AI&DS-A

A.Y. : 2022-23

PREREQUISITE: Electrode potential, Cell potential of a cell/EMF of a cell, primary & secondary batteries, isotropy and anisotropy in crystals, qualitative and quantitative analysis.

COURSE EDUCATIONAL OBJECTIVES (CEOs): It enables the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions. It helps to strengthen the basic concepts of electrochemistry, corrosion, nanotechnology, polymers, liquid crystals and analytical techniques

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

CO1	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications.
CO2	Apply principles of corrosion for design and effective maintenance of various equipment.
CO3	Analyse the suitability of advanced materials like nano materials in electronics and medicine.
CO4	Identify the importance of liquid crystals, polymers in advanced technologies.
CO5	Apply the principles of analytical techniques in chemical analysis.

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

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

TEXTBOOKS:

- T1** Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 3rd Edition, 2003.

Jain, Jain, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16th Edition, 2015.

REFERENCE BOOKS:

- R1** Shikha Agarwal, "A text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1st Edition, 2015.
- R2** S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12th Edition, 2010.
- R3** Y. Bharathi Kumari, Jyotsna Cherukuri, "A Text book of Engineering Chemistry", VGS Publications, Vijayawada, 1st Edition, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: ELECTRO CHEMISTRY & BATTERIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course and Cos	1	17-10-22		TLM1	
2.	Introduction to Unit-I	1	18-10-22		TLM1	
3.	Applications of Electro chemical Series,	1	20-10-22		TLM1	
4.	Calculation of EMF of Cell,	1	21-10-22		TLM1	
5.	Practice exercises on applications of Electro chemical series,	1	25-10-22		TLM1	
6.	Glass Electrode	1	27-10-22		TLM1	
7.	Calomel Electrode, Nernst equation derivation	1	28-10-22		TLM1	
8.	Applications of Nernst Equation	1	31-10-22		TLM1	
9.	Lead-acid Battery	1	02-11-22		TLM1	
10.	Lithium-ion Battery	1	03-11-22		TLM1	
11.	H ₂ – O ₂ Fuel cell, Mg-Cu reserve battery.	1	04-11-22		TLM1	
12.	Revision of unit 1	1	07-11-22		TLM1	
13.	Assignment		08-11-22		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: SCIENCE OF CORROSION

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.	Definition, Examples, dry corrosion	1	10-11-22		TLM1	
2.	corrosion by other gases and liquid metal corrosion dry corrosion, pilling bed worth rule.	1	11-11-22		TLM1	
3.	Conditions to occur wet corrosion. Mechanism-oxygen absorption,	1	14-11-22		TLM1	
4.	Hydrogen evolution, types of wet corrosion	1	15-11-22		TLM1	
5.	Galvanic Corrosion, passivity and Galvanic series.	1	17-11-22		TLM1	
6.	Concentration Cell Corrosion	1	18-11-22		TLM1	
7.	Contd..Concentrationcell Corrosion	1	21-11-22		TLM1	
8.	Factors influencing corrosion Nature of metal.	1	22-11-22		TLM1	
9.	Factors influencing corrosion Nature of environment	1	24-11-22		TLM1	
10.	Cathodic Protection	1	25-11-22		TLM1	
11.	Electroplating, metal cladding.	1	28-11-22		TLM1	
12.	Revision	1	29-11-22		TLM1	
13.	Assignment	1	01-12-22		TLM1	
No. of classes required to complete UNIT-II: 13				No. of classes taken:		

UNIT-III: CHEMISTRY OF ENGINEERING MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, types of nano-materials,	1	02-12--22		TLM1	
2.	Gas-Phase Synthesis of nanomaterials,	1	05-12-22		TLM1	
3.	Applications of nanomaterials.	1	06-12-22		TLM1	
4.	Materials in Electronic devices	1	08-12-22		TLM1	
5.	Contd.. Materials in Electronic devices	1	09-12-22		TLM1	
6.	Discussion on MID-I marks evaluation		19-12-22		TLM1	
7.	Characteristics of Molecular motors and	1	20-12-22		TLM1	

	machines					
8.	Rotaxanes and Catenanes as artificial molecular machines	1	22-12-22		TLM1	
9.	Contd..rotaxanes and Catenanes as artificial molecular machines	1	23-12-22		TLM1	
10.	Automated light powered molecular motor	1	26-12-22		TLM1	
11.	Revision	1	27-12-22		TLM1	
12.	Assignment	1	28-12-22		TLM1	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: LIQUID CRYSTALS & POLYMERS

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.	Classification of liquid crystals, Thermotropic liquid crystals.	1	29-12-22		TLM1	
2.	Lyotropic liquid crystals.	1	30-12-22		TLM1	
3.	Applications of liquid crystals.	1	02-01-23		TLM1	
4.	Introduction and types of polymers,	1	03-01-23		TLM1	
5.	Plastics	1	05-01-23		TLM1	
6.	Rubbers	1	06-01-23		TLM1	
7.	Conducting polymers.	1	16-01-23		TLM1	
8.	Bio-degradable polymers	1	17-01-23		TLM1	
9.	Revision	1	19-01-23		TLM1	
10.	Assignment	1	20-01-23		TLM1	
No. of classes required to complete UNIT-IV: 10				No. of classes taken:		

UNIT-V: ANALYTICAL TECHNIQUES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Types of analysis	1	23-01-23		TLM1	
2.	Principle of conductometric titrations. strong acid vs strong base titration	1	24-01-23		TLM1	
3.	Strong acid vs weak base titrations, Strong base vs weak acid.	1	27-01-23		TLM1	
4.	Weak acid vs weak base titrations.	1	30-01-23		TLM1	

5.	Principle of potentiometry Acid-base titration	1	31-01-23		TLM1	
6.	Oxidation - Reduction titration.	1	02-02-23		TLM1	
7.	Determination of iron by using thiocyanate reagent.	1	03-02-23		TLM1	
8.	Revision	1	06-02-23		TLM1	
9.	Assignment	1	07-02-23		TLM1	
No. of classes required to complete UNIT-V: 09				No. of classes taken:		

Topics beyond the syllabus:

Sl.No	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HoD Sign
1.	Batteries used in mobile phones of popular companies.	1	09-02-2023		TLM1	
2.	Industrial applications of electroplating	1	10-02-2023		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):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.K.Jamili Reddy	Dr.V.Parvathi	Dr.V.Parvathi	Dr.A.Rami Reddy
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.

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

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

Part-A

PROGRAM	: B.Tech. I-Sem., Sec-A
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: COMPUTATIONAL PROGRAMMING – 20AD01
L-T-P STRUCTURE	: 3-0-0
COURSE CREDITS	: 3
COURSE INSTRUCTOR	: Mr. K.Venkatesh.
COURSE COORDINATOR	: Mr. K.Venkatesh..

PRE-REQUISITE:

Course Educational Objective:

The objective of this course is to provide a sound understanding of the fundamentals of C programming language and how to apply them effectively. The course is designed to acquaint the learners with the concepts such as algorithms, Looping statements, functions, pointers and files. After learning the rudiments of program writing, learners will be able to design efficient programs for solving real time problems.

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

CO1: Understand the syntax and semantics of programming language constructs. (**Understand - L2**)

CO2: Understand the text processing using strings and arrays. (**Understand - L2**)

CO3: Apply user defined functions to solve a given problem. (**Apply - L3**)

CO4: Analyze the storage representation using the derived data types such as structures and unions
(**Analyze - L3**)

CO5: Create permanent storage to data processed in a program using files (**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	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-	3	-	-
CO4	2	3	2	-	-	-	-	-	-	-	-	-	3	-	-
CO5	2	3	2	1	1	-	-	-	-	-	-	-	3	-	-

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

BOS APPROVED TEXT BOOKS:

- 1 Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018

BOS APPROVED REFERENCE BOOKS:

1. Herbert Schildt, C: The Complete Reference, McGraw Hill Education, 4th Edition, 2017
2. E Balagurusamy, Computer Programming, McGraw Hill Education, 8th Edition, 2019
3. Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 8th Edition, 2015
4. Stephen G.Kochan, Programming in C, Pearson Education, 4th Edition, 2015
5. Pradeep Dey, Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition, 2013

Part-B**COURSE DELIVERY PLAN (LESSON PLAN): Section-A****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.	Discussion of CEO's and CO's, Introduction to programming.	1	17-10-2022		TLM1	CO1	-	
2.	Problem Specification. Algorithm / pseudo code	1	18-10-2022		TLM1	CO1	-	
3.	Flowchart, examples.	1	19-10-2022		TLM1	CO1	T1, R1	
4.	Structure of C program	1	21-10-2022		TLM1	CO1	T1	
5.	Identifiers, basic data types and sizes	1	22-10-2022		TLM1	CO1	T1, R1	
6.	Constants, variables,	1	25-+10-2022		TLM1	CO1	T1, R1	
7.	Input-output statements A sample C program	1	26-10-2022		TLM1	CO1	T1, R1	
8.	Operators: arithmetic, relational and logical operators,	1	28-10-2022		TLM1	CO1	T1, R1	
9.	Increment and decrement operators, conditional operator	1	29-10-2022		TLM1	CO1	T1, R1	
10.	Bit-wise operators, assignment operators,	1	31-10-2022		TLM1	CO1	T1, R1	
11.	Expressions, conditional expressions	1	01-11-2022		TLM1	CO1	T1, R1	
12.	Type conversion and Type casting	1	02-11-2022		TLM1	CO1	T1, R1	
13.	Precedence of operators and order of evaluation, Storage classes	1	04-11-2022		TLM1	CO1	T1 ,R1	
14.	Conditional statements: if, if else, else if ladder	1	05-11-2022		TLM1	CO1	T1, R1	
15.	switch statements, continue, goto	1	07-11-2022		TLM1	CO1	T1 ,R1	
16.	Loops: while, do-while.	1	08-11-2022		TLM1	CO1	T1 ,R1	

17.	for statements, break.	1	09-11-2022		TLM1	CO1	T1 ,R1	
18.	programming examples.	1	11-11-2022		TLM1	CO1	T1 ,R1	
19.	Assignment/Quiz-1		12-11-2022		TLM1	CO1	T1 ,R1	
No. of classes required to complete UNIT-I				19	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
20.	Declaration of Arrays, Accessing the Elements of an Arrays	1	14-11-2022		TLM1	CO2	T1,R1	
21.	Storing Values in Arrays, Operations on Arrays	1	15-11-2022		TLM1	CO2	T1,R1	
22.	Passing Arrays to Functions, Two-Dimensional Arrays	1	16-11-2022		TLM1	CO2	T1,R1	
23.	Operations on Two-Dimensional Arrays, Multidimensional Arrays	1	18-11-2022		TLM1	CO2	T1,R1	
24.	Sparse Matrices, Applications of Arrays	1	19-11-2022		TLM1	CO2	T1,R1	
25.	Character Strings: Suppressing Input, String Taxonomy	1	21-11-2022		TLM1	CO2	T1,R1	
26.	Operations on Strings, Miscellaneous String	1	22-11-2022		TLM1	CO2	T1,R1	
27.	Character Functions,	1	23-11-2022		TLM1	CO2	T1,R1	
28.	Arrays of Strings	2	25-11-2022		TLM1	CO2	T1,R1	
			26-11-2022					
29.	Assignment/Quiz-2	1	28-11-2022		TLM1	CO2	T1,R1	
No. of classes required to complete UNIT-II		10			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
30.	Functions: basics, Function Declaration /Function	2	29-11-2022		TLM1	CO3	T1,R1	
			30-11-2022					
31.	Prototype Function Definition, Function Call	2	02-12-2022		TLM1	CO3	T1,R1	
			03-12-2022					

32.	Return Statement, Passing Parameters to Functions	2	05-12-2022		TLM1	CO3	T1,R1		
			06-12-2022						
33.	Built-in Functions	1	07-12-2022		TLM1	CO3	T1,R1		
34.	Recursive Functions, Types of Recursion	1	09-12-2022		TLM1	CO3	T1,R1		
35.	Recursion versus Iteration	1	10-12-2022		TLM1	CO3	T1,R1		
36.	Introduction to Pointers, Declaring Pointer Variables, Pointer Expressions	1	19-12-2022		TLM1	CO3	T1,R1		
37.	Pointer Arithmetic, Null Pointers, Generic Pointers	1	20-12-2022		TLM1	CO3	T1,R1		
38.	Passing Arguments to Function Using Pointers	1	21-12-2022		TLM1	CO3	T1,R1		
39.	Pointers and Arrays	1	23-12-2022		TLM1	CO3	T1,R1		
40.	Arrays of Pointers, Pointers to Pointers	1	24-12-2022		TLM1	CO3	T1,R1		
41.	Dynamic Memory Allocation.	1	23-12-2022		TLM1	CO3	T1,R1		
42.	Assignment/Quiz-3	1	24-12-2022		TLM1	CO3	T1,R1		
No. of classes required to complete UNIT-III		13			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
43.	Derived types- structures- declaration, definition and initialization of structures, accessing structures,	2	26-12-2022		TLM1	CO4	T1,R1	
			27-12-2022					
44.	Nested structures, array of structures,	1	28-12-2022		TLM1	CO4	T1,R1	
45.	Structures and functions	2	30-12-2022		TLM1	CO4	T1,R1	

46.	Pointer to structure, Self-referential structures	1	31-12-2022		TLM1	CO4	T1,R1	
47.	Unions, typedef	1	02-01-2023		TLM1	CO4	T1,R1	
48.	Enumerated Data Type	1	03-01-2023		TLM1	CO4	T1,R1	
49.	Assignment/Quiz-4	1	04-01-2023		TLM1	CO4	T1,R1	
No. of classes required to complete UNIT-IV		09			No. of classes taken:			

UNIT-V : FILES

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
50.	Introduction to Files	1	06-01-2023		TLM1	CO5	T1,R1	
51.	Using Files in C	1	07-01-2023		TLM1	CO5	T1,R1	
52.	Reading and Writing Data to Files	2	09-01-2023		TLM1	CO5	T1,R1	
			10-01-2023					
53.	Error Handling	2	11-01-2023		TLM1	CO5	T1,R1	
			18-01-2023					
54.	Functions for Selecting a Record Randomly.	2	20-01-2023		TLM1	CO5	T1,R1	
			21-01-2023					
55.	programming examples	2	23-01-2023		TLM1	CO5	T1,R1	
			24-01-2023					
56.	Time and Space Complexity	1	25-01-2023		TLM1	CO5	T1,R1	
			27-01-2023					
57.	Big O Notation, Omega Notation	1	28-01-2023		TLM1	CO5	T1,R1	
			30-01-2023					
58.	Theta Notation	1	31-01-2023		TLM1	CO5	T1,R1	
59.	Searching Algorithms-Linear search	2	01-02-2023		TLM1	CO5	T1,R1	
			03-02-2023					
60.	Binary Search.	1	04-02-2023		TLM1	CO5	T1,R1	
61.	Assignment/Quiz-5	1	06-02-2023		TLM1	CO5	T1,R1	
No. of classes required to complete UNIT-V		16			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
62.	Memory Leak	1	07-02-2022		TLM1	-	-	
63.	Dangling Pointer	1	08-02-2022		TLM1			
64.	Interview Questions	2	10-02-2023 11-02-2023		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):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. K.VENKATESH	Mr. K.VENKATESH	Dr. O. Rama Devi	Dr. O. Rama Devi
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 OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

PROGRAM	: B.Tech, I-Sem(A-Sec)
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Digital Logic Design – 21CS02
L-T-P STRUCTURE	: 3-0-0
COURSE CREDITS	3
COURSE INSTRUCTOR	: B.RAJENDRA PRASAD
COURSE COORDINATOR	: B.RAJENDRA PRASAD

PRE-REQUISITE: Basic Mathematics

COURSE OBJECTIVE:

The objective of the course is to learn the basic building blocks of the logic circuits of the computer system

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

CO1	Explain the digital number systems, Boolean algebra theorems, properties, and canonical forms for digital logic circuit design. (Understand-L2)
CO2	Apply Boolean algebra concepts and K-Maps for minimization of Boolean expressions. (Apply -L3)
CO3	Construct the combinational circuits using Adders, Sub tractors, Decoders, Multiplexers and Magnitude Comparators. (Apply-L3)
CO4	Demonstrate the sequential circuits using Flip-flops, Shift registers, and Counters & Memory unit. (Understand-L2)
CO5	Construct programmable logic devices (PROM, PAL, and PLA). (Apply-L3)

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

		PROGRAM OUTCOMES												PROGRAM SPECIFIC OUTCOMES		
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	
COURSE OUTCOMES	CO1	3	3	1	-	-	-	-	-	-	-	-	-	1	2	-
	CO2	3	3	3	1	-	-	-	-	-	-	-	-	-	2	-
	CO3	3	3	3	1	-	-	-	-	-	-	-	-	-	2	-
	CO4	3	3	3	1	-	-	-	-	-	-	-	-	-	2	-
	CO5	2	3	3	1	-	-	-	-	-	-	-	-	-	2	-

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

BOS APPROVED TEXT BOOKS:**T1** Morris mano, Michael D Ciletti ,”Digital Design” , 4/e,, PEA**BOS APPROVED REFERENCE BOOKS:****R1** Leach, Malvino, saha,”Digital Logic design”, TMH.**R2** R.P.jain,”Modern Digital Electronics”, TMH.**R3** A.Anand Kumar,”Switching Theory and logic Design”, Prentice-hall Of India pvt..**R4** A.P Godse,G.A Godse,”Digital Logic Design”, T-Publishers,**PART- B****COURSE DELIVERY PLAN (LESSON PLAN):****UNIT – 1: NUMBER 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
1.	Discussion of Cos and Pos	1	17-10-2022		TLM1	CO1	T1	
2.	Introduction to Digital Systems	1	18-10-2022		TLM1	CO1	T1	
3.	Number Systems	1	20-10-2022		TLM1	CO1	T1	
4.	Number base Conversion,Decimal,Octal and HexadecimalNumbers	1	21-10-2022		TLM1	CO1	T1, R3	
5.	Complements(1’s)	1	22-10-2022		TLM1	CO1	T1, R3	
6.	Complements(2’s)	1	25-10-2022		TLM1	CO1	T1, R3	
7.	Signed and unsigned binary number subtraction	1	27-10-2022		TLM1	CO1	T1, R3	
8.	Binary coded decimal	1	28-10-2022		TLM1	CO1	T1	
9.	Digital Logic Gates	1	29-10-2022		TLM1	CO1	T1	
10.	Error Detection and Correction	1	31-10-2022		TLM1	CO1	T1	
11.	TUTORIAL – 1	1	01-11-2022		TLM3	CO1	---	
12.	Assignment / Quiz – 1	1	03-11-2022		TLM6	CO1	---	
No. of classes required to complete UNIT-I:		13	No. of classes taken:					

UNIT – 2: BOOLEAN ALGEBRA

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.	Simplification Of Boolean Expressions	1	04-11-2022		TLM1	CO2	T1	
14.	Introduction to Karnaugh Maps	1	05-11-2022 07-11-2022		TLM1	CO2	T1	
15.	One Variable, Two variable, Three Variable maps	1	08-11-2022 10-11-2022		TLM1	CO2	T1	
16.	Four Variable Map	1	11-11-2022		TLM1	CO2	T1	
17.	Problems on K-Maps	1	12-11-2022 14-11-2022		TLM1	CO2	T1, R3	
18.	Five Variable K-Map and Examples	1	15-11-2022		TLM1	CO2	T1, R3	
19.	Six Variable K-Maps Examples	1	17-11-2022		TLM1	CO2	T1, R3	
20.	Minimal Expressions for incomplete Boolean functions	1	18-11-2022		TLM1	CO2	T1, R3	
21.	Minimal Expressions for incomplete Boolean functions	1	19-11-2022 21-11-2022		TLM1	CO2	T1, R3	
22.	Quine-McCluskey Method	1	22-11-2022		TLM1	CO2	T1, R2	
23.	Prime implicants and Essential Prime Implicants	1	24-11-2022 25-11-2022		TLM1	CO2	T1	
24.	TUTORIAL – 2	1	26-11-2022		TLM3	CO2	---	
25.	Assignment / Quiz – 2	1	28-11-2022		TLM6	CO2	---	

UNIT – 3: ARITHMETIC CIRCUITS

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
26.	Introduction to Combinational Logic, Design Procedure, Analysis Procedure	2	29-11-2022 30-11-2022		TLM1	CO3	T1, R3	
27.	Adders, Sub tractors	2	01-12-2022 02-12-2022 03-12-2022		TLM1	CO3	T1, R3	
28.	Code Conversion	2	05-12-2022		TLM1	CO3	T1	
29.	Multilevel NAND circuits, Multilevel NOR circuits	2	06-12-2022 08-12-2022		TLM1	CO3	T1, R3	
30.	Intoduction to Combinational Logic with MSI And LSI	2	09-12-2022 10-12-2022		TLM1	CO3	T1, R3	
31.	Binary Parallel Addder, Decimal Addder	1	17-12-2022		TLM1	CO3	T1	
32.	Magnitude Comparator	2	19-12-2022 20-12-22		TLM1	CO3	T1	
33.	Decoders	1	22-12-2022 23-12-22		TLM1	CO3	T1	
34.	Multiplexers	1	26-12-2022 29-12-2022		TLM1	CO3	T1	
35.	TUTORIAL –3	1	31-12-2022		TLM3	CO3	---	
36.	Assignment / Quiz – 3	1	02-01-2023		TLM6	CO3	---	
No. of classes required to complete UNIT-III:		17	No. of classes taken:					

UNIT – 4: SEQUENTIAL LOGIC CIRCUITS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
37.	Introduction to Sequential Logic, Flip Flops	1	03-01-2023		TLM1	CO4	T1	
38.	Triggering of Flip-Flops,	1	05-01-2023		TLM1	CO4	T1	
39.	Analysis of Clocked Sequential Circuits	1	06-01-2023		TLM1	CO4	T1	
40.	State Reduction and Assignment	1	07-01-2023		TLM1	CO4	T1	
41.	Flip-Flop Excitation tables	1	09-01-2023		TLM1	CO4	T1	
42.	Design of Counters, Introduction to Registers, Shift registers	1	10-01-2023		TLM1	CO4	T1	
43.	Ripple Counters	1	19-01-2023		TLM1	CO4	T1	
44.	Synchronous Counters	1	20-01-2023		TLM1	CO4	T1	
45.	Timing sequences And Memory unit	1	21-01-2023		TLM1	CO4	T1	
46.	TUTORIAL – 4	1	23-01-2023		TLM3	CO4	---	
47.	Assignment / Quiz– 4	1	24-01-2023		TLM6	CO4	---	
No. of classes required to complete UNIT-IV		11	No. of classes taken:					

UNIT – 5: MEMORY UNIT

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
48.	Read – Only Memory (ROM)	1	28-01-2023		TLM1	CO5	T1,R3	
49.	Problems On ROM	1	30-01-2023		TLM1	CO5	T1,R3	
50.	Programmable Read Only memory	1	31-01-2023		TLM1	CO5	T1,R3	

51.	Problems on PROM	1	02-02-2023		TLM1	CO5	T1,R3	
52.	Programmable Logic Device (PLD),Problems on PLD	1	03-02-2023		TLM1	CO5	T1,R3	
53.	Programmable Logic Array	1	04-02-2023		TLM1	CO5	T1,R3	
54.	Programmable Array Logic (PAL).	1	07-02-2022		TLM1	CO5	T1,R3	
55.	Problems on PLA and PAL	1	09-02-2023		TLM1	CO5	T1,R3	
56.	Programmable Logic Array Examples	1	10-02-2023		TLM1	CO5	T1,R3	
57.	TUTORIAL – 5	1	11-02-2023		TLM3	CO5	T1,R3	
58.	Assignment / Quiz – 5	1	11-02-2023		TLM6	CO5	T1,R3	
No. of classes required to complete UNIT-V		11	No. of classes taken:					

Contents beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
59.	PROM related problems	1	11-02-2023		TLM1	CO5		
60.	How magnitude comparators are different from Decoders	1	11-02-2023		TLM1	CO3		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.B.Rajendra Prasad	Mr.B.Rajendra Prasad	Dr. O.Rama Devi	Dr. O.Rama Devi
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 OF FRESHMAN ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.K.Jamili Reddy

Course Name & Code : Engineering Chemistry Lab&20FE53

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

Credits:1.5

Program/Sem/Sec : B.Tech/ I sem/AI&DS-A

A.Y. : 2022-23

Pre requisites: Nil

Course Educational Objective: This course enables the students to analyze water sample for alkalinity. perform and distinguish different types of volumetric titrations. get hands-on experience with preparation of polymers. use analytical techniques like conductometry, potentiometry and colorimetry.

Course Outcomes: After completion of the course, the students will be able to,

CO1: Assess alkalinity of water based on the procedure given.

CO2: Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus.

CO3: Acquire practical knowledge related to preparation of polymers.

CO4: Exhibit skills in performing experiments based on theoretical fundamentals.

POs \ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		1		2	2					
CO2	2	1										
CO3	2		1									
CO4	3	2	1									
1 = Slight (Low) 2 = Moderate (Medium) 3 = Substantial (High)												

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 Lab Manual

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Experiment	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	HOD Sign Weekly
1.	Introduction to Engineering chemistry lab	3	20-10-2022		TLM1	C04	
2.	Safety measures in the chemistry lab.	3	27-10-2022		TLM1	C04	
3.	Introduction to Volumetric analysis.	3	03-11-2022		TLM1	C04	
4.	Types of titrations and practices to handle apparatus.	3	10-11-2022		TLM1	C02,C04	
5.	Preparation of Bakelite. Preparation of Nylon 6:6.	3	17-11-2022		TLM4	C03,C04	
6.	Determination of pH of the given sample solution using pH meter.	3	24-11-2022		TLM4	C04	
7.	Determination of amount of HCl using standard Na_2CO_3 solution.	3	01-12-2022		TLM4	C02,C04	
8.	Determination of alkalinity of water sample.	3	08-12-2022		TLM4	C01,C04	
9.	Estimation of $\text{Mg}^{+2}/\text{Zn}^{+2}/\text{Ca}^{+2}$ in given solution by using standard EDTA solution.	3	22-12-2022		TLM4	C02,C04	
10.	Estimation of Mohr's salt by using potassium permanganate.	3	29-12-2022		TLM4	C02,C04	
11.	Estimation of Mohr's salt by using potassium dichromate.	3	05-01-2023		TLM4	C02,C04	
12.	Estimation of amount of HCl conductometrically using standard NaOH solution.	3	19-01-2023		TLM4	C02, C04	
13.	Estimation of amount of HCl conductometrically using NH_4OH	3	02-02-2023		TLM4	C02, C04	

	solution.						
14.	Internal lab exam	3	09-02-2023				
Total							

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:

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows.

(a) Continuous Internal Evaluation (CIE):

- ✓ The continuous internal evaluation for laboratory course is based on the following parameters:

Parameter		Marks
Day – to – Day Work	Observation	05 Marks
	Record	05 Marks
Internal Test		05 Marks
Total		15 Marks

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.K.Jamili Reddy	Dr.V.Parvathi	Dr.V.Parvathi	Dr.A.Rami Reddy
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.

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

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

PROGRAM	: B.Tech. I-Sem. Sec-A
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Computational Programming Lab– 20AD51
L-T-P STRUCTURE	: 0-0-3
COURSE CREDITS	: 1.5
COURSE INSTRUCTOR	: Mr.K. VENKATESH
COURSE COORDINATOR	: Mr.K VENKATESH

PRE-REQUISITE: NIL

Course Educational Objective:

The objective of the course is to practice and develop computer programs to solve the computational problems by using the basic elements of C Programming such as Data Types, Expressions, Control Statements and Various I/O Functions. After practicing the rudiments of program writing, learners will be able to design and test efficient programs for solving real world problems.

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

CO1: Apply control structures of C in solving computational problems. (**Apply - L3**)

CO2: Implement functions and use modular programming in problem solving. (**Apply - L3**)

CO3: create user defined data types and perform file operations. (**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	2	3	1	-	-	-	-	-	1	1		2	3	-	-
CO2	2	3	1	-	-	-	-	-	1	1		2	3	-	-
CO3	2	3	1	-	-	-	-	-	1	1		2	3	-	-

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

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

TEXT BOOK

1.ReemaThareja, Programming in C, Oxford University Press, AICTE Edition, 2018

REFERENCE BOOKS

1. Herbert Schildt, C: The Complete Reference, McGraw Hall Education, 4th Edition, 2017
2. E Balagurusamy, Computer Programming, McGraw Hill Education, 8th Edition, 2019
3. Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 8th Edition, 2015
4. Stephen G.Kochan, Programming in C, Pearson Education, 4th Edition, 2015
5. PradeepDey,Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition, 2013

CP LAB SCHEDULE (LESSON PLAN): Section-A

Expt. No	Experiments to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction to Lab experiments	3	26-10-2021		TLM1	
2	Introduction to Raptor Tool.	3	02-11-2021		TLM4	
3	Problem solving using Raptor Tool.	3	09-11-2021		TLM4	
4	Programs on Basics of C-Program	3	16-11-2022		TLM4	
5	Programs on Mathematical Operations using Operators.	3	23-11-2022		TLM4	
6	Programs on Decision Making using Control Structures	3	30-11-2022		TLM4	
7	Programs on Pattern Printing using Loops & nesting of Loops	3	07-12-2022		TLM4	
8	Programs on Data representation using Arrays (One and Two dimensional)	3	21-12-2022		TLM4	
9	Programs on Modular Programming using Functions.	3	04-01-2023		TLM4	
10	Programs on Memory management using Pointers	3	11-01-2023		TLM4	
11	Programs on Data storage using user defined data types.	3	18-01-2023		TLM4	
12	Programs on Permanent Data storage using Files	3	25-01-2023		TLM4	
13	Program for Library Information System using files with the following modules: a. Student Registration b. Book Entry c. Search book d. Issue book e. Return book	3	01-02-2023		TLM4	
14	Program for Examination System using files with the following modules: a. Student Registration b. Subject Entry c. Marks Posting d. Student wise Grades Calculation e. Result Declaration	3	08-02-2023		TLM4	

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

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. K VENKATESH	Mr. K VENKATESH	Dr. O. Rama Devi	Dr. O. Rama Devi
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 OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

PROGRAM	: B.Tech. I-Sem.(B-Sec)
ACADEMIC YEAR	: 2021-22
COURSE NAME & CODE	: Digital Logic Design Lab– 20CS52
L-T-P STRUCTURE	: 0-0-2
COURSE CREDITS	: 1
COURSE INSTRUCTOR	: B. Rajendra Prasad
COURSE COORDINATOR	: B. Rajendra Prasad

1. **Pre-requisite** :Basics of Number System

2. **Course Educational Objective**: The objective of the course of this course is to learn about the use of basic gates, decoders and Multiplexers, flip-flops, Counters and Shift registers, and PLDs.

3. **Course Outcomes**: At the end of this course, the student will be able to:

CO 1	Implement basic logic gates and special logic gates using NAND and NOR gates. (Apply- L3)
CO 2	Design combinational circuits like half-adders,full-adders, decoders, encoders, multiplexers .(Apply - L3)
CO 3	Design sequential digital circuits like flip-flops, Shift registers, and Counters. (Apply- L3)
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

4. Course Articulation Matrix:

		PROGRAM OUTCOMES												PROGRAM SPECIFIC OUTCOMES	
		PO 1	P O2	P O3	P O4	PO 5	P O6	P O7	P O8	P O9	P O 10	P O 11	P O 12	PSO1	PS O2
COURSE OUTCOMES	CO 1	2	1	3	1	3	-	-	-	-	-	-	-	1	-
	Co2	1	2	3	1	3	-	-	-	-	-	-	-	1	-
	CO 3	1	2	3	1	3	-	-	-	-	-	-	-	1	-
	CO 4	-	-	-	-	-	-	-	2	2	2	-	-	-	-

PART-B

5. List of Experiments

S No	Program to be executed	Lab Cycle
CYCLE -1		
1	a) Basic Gates Function Verification using truth tables. i. AND Gate using 7408 IC ii. OR Gate using 7432 IC iii. NOT Gate using 7404 IC	Cycle 1
	b) Universal Gates Functional Verification i. NAND Gate using 7400 IC ii. NOR Gate using 7402 IC	
	c) Special Gates Functional verification i. XOR Gate using 7486 IC ii. XNOR Gate using XOR followed by NOT Gate	
2	Realization of following gates using universal gates and its functional verification. AND, OR, XOR, NOT	
3	a) Design Half-adder and Full-adder circuits and verify its functionality. b) Verify the functionality of four bit ripple carry adder for signed and unsigned integers with the verification of overflow condition.	
4	Design a four bit comparator and verify its functionality (using logic gates or IC's)	
5	Design a BCD to Excess-3 code converter and verify its functionality by using gates.	
6	Design a BCD to Gray code converter and verify its functionality by using gates.	
7	Design and verify the functionality of Decoders and multiplexers of different inputs.	
CYCLE II		
8	Verify the functionality of following Flip-Flops. a) SR Flip-Flop b) JK Flip-Flop c) D Flip-Flop d) T Flip-Flop	Cycle 2
9	a) Design a UP-Counter using JK/T Flip-Flop. b) Design a MOD-3 Counter.	
10	Design a Bi-directional Counter using JK/T Flip-Flop.	

6. Course Delivery Plan:

S No	Program to be executed	Tentative dates	Actual Dates	DM
1	a) Basic Gates Function Verification using truth tables. iv. AND Gate using 7408 IC v. OR Gate using 7432 IC vi. NOT Gate using 7404 IC	29-10-2021		5
	b) Universal Gates Functional Verification iii. NAND Gate using 7400 IC iv. NOR Gate using 7402 IC	12-11-2021		5
	c) Special Gates Functional verification iii. XOR Gate using 7486 IC iv. XNOR Gate using XOR followed by NOT Gate	19-11-2021		5
2	Realization of following gates using universal gates and its functional verification. AND, OR, XOR, NOT	26-11-2022		5
3	c) Design Half-adder and Full-adder circuits and verify its functionality. d) Verify the functionality of four bit ripple carry adder for signed and unsigned integers with the verification of overflow condition.	31-11-2022		1,5
4	Design a four bit comparator and verify its functionality (using logic gates or IC's)	03-12-2022		5
5	Design a BCD to Excess-3 code converter and verify its functionality by using gates.	10-12-2022		1,5
6	Design a BCD to Gray code converter and verify its functionality by using gates.	24-12-2022		1,5
7	Design and verify the functionality of Decoders and multiplexers of different inputs.	07-01-2023		5
CYCLE-2				
8	Verify the functionality of following Flip-Flops. a) SR Flip-Flop, b) JK Flip-Flop c) D Flip-Flop, d) T Flip-Flop	21-01-2023		1,5
9	a) Design a UP-Counter using JK/T Flip-Flop. b) Design a MOD-3 Counter.	28-01-2023		5
10	Design a Bi-directional Counter using JK/T Flip-Flop.	04-02-2023		5

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 Regulations):

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows

(a) Continuous Internal Evaluation (CIE): The Continuous Internal Evaluation (CIE) is based on the following parameters:

Parameter	Marks
Day to Day work	05
Record	05
Internal Test	05
Total	15

(b) Semester End Examinations (SEE): The Semester End examinations (SEE) for laboratory courses shall be jointly conducted by internal and external examiners with 3 hours duration and evaluated for 35 marks. The performance of the student shall be evaluated as per the parameters indicated below:

Parameter	Marks
Procedure/Algorithm	05
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	05
Viva voce	05
Total	35

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

	Course Instructor	Course Coordinator	Module Coordinator	HOD
Signature				
Name of the Faculty	B.Rajendra Prasad	B.Rajendra Prasad	Dr. O. Rama Devi	Dr. O. Rama Devi



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.

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

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PROGRAM	: B.Tech. I-Sem.
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: IT Workshop– 20IT51
SECTION	: A
L-T-P STRUCTURE	: 0-0-3
COURSE CREDITS	: 1.5
COURSE INSTRUCTOR	: V. Chandra Kumar
COURSE COORDINATOR	: V. Chandra Kumar

1. **Pre-requisite** : NIL

2. **Course Educational Objective**: The objective of the course is to impart knowledge about the components of PC, Assembling PC, Installation of OS, softwares like MS-Office, LaTeX and concepts related to Networking, Internet as well as antivirus.

3. **Course Outcomes**: At the end of this course, the student will be able to:

CO 1	Identify the basic hardware components, keyboard shortcuts, assembling and disassembling of the system (PC).(Understand- L2)
CO 2	Demonstrate Operating System installation, apply various commands of Linux operating system, and networking.(Apply - L3)
CO 3	Create web pages using HTML, documents using applications like LaTeX, Google forms and use application software packages: MS-Word, MS-Excel, MS-Power Point to create documents and presentation.(Apply- L3)
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

4. Course Articulation Matrix:

		PROGRAM OUTCOMES												PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
COURSE OUTCOMES	CO1			1		2				1			2	3	
	CO2	1		2	2	3					3		2	3	
	CO3	1		2		3					3		2	3	
	CO4					2	1		1		2				

5. List of Experiments

S No	Program to be executed	Lab Cycle
CYCLE -1		
1	Task: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.	Cycle 1
2	Task: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. In addition, students need to go through the video, which shows the process of assembling a PC. A video would be given as part of the course content.	
3	<p>Task 1: Every student should individually install MS windows and Linux/ Ubuntu OS on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.</p> <p>Task 2: Linux Operating System commands:</p> <ul style="list-style-type: none"> • General command syntax • Basic help commands • Basic File system commands • Date and Time • Basic Filters and Text processing • Basic File compression commands • Miscellaneous: apt-get, vi editor 	
4	Networking Commands: ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route.	
5	Internet Services: <ul style="list-style-type: none"> • Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, extensions/ plugins • Malicious Software: Virus, Worm, Logic Bomb, Trojan Horse • Anti-virus installation, configuring a firewall, blocking pop-ups 	

	<ul style="list-style-type: none"> Mail creation and usage, Creating a Digital Profile on LinkedIn 	
CYCLE II		
6	<p>Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage</p> <p>Every student should develop your home page using HTML Consisting of your photo, name, address and education details as table and your skill set as a list.</p>	Cycle 2
7	Demonstration and Practice on Text Editors like Notepad, Sublime Text, Atom, Brackets, Visual code, etc.	
8	Demonstration and practice on Microsoft Word, PowerPoint, Microsoft Excel.	
9	Demonstration and practice on LaTeX and produce professional pdf documents.	
10	Creating online documents using Google docs- Create and share Bio-data form.	

6. Course Delivery Plan:

S No	Program to be executed	Tentative dates	Actual Dates	DM
1	Discussion of CO'S and CEO'S	17-10-2022		5
2	Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.	17-10-2022		5
3	Task: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. In addition, students need to go through the video, which shows the process of assembling a PC. A video would be given as part of the course content.	31-10-2022		5
4	<p>Task 1: Every student should individually install MS windows and Linux/ Ubuntu OS on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.</p> <p>Task 2: Linux Operating System commands:</p> <ul style="list-style-type: none"> General command syntax Basic help commands Basic File system commands Date and Time Basic Filters and Text processing Basic File compression commands Miscellaneous: apt-get, vi editor 	07-11-2022		5
5	Networking Commands: ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route.	14-11-2022		5
6	Internet Services: <ul style="list-style-type: none"> Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, 	21-11-2022		5

	<ul style="list-style-type: none"> • extensions/ plugins • Malicious Software: Virus, Worm, logic Bomb, Trojan Horse • Anti-virus installation, configuring a firewall, blocking pop-ups • Mail creation and usage, Creating a Digital Profile on Linked In 			
7	<p>Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage</p> <p>Every student should develop your home page using HTML Consisting of your photo, name, address and education details as table and your skill set as a list.</p>	28-11-2022		5
CYCLE-2				
8	Demonstration and Practice on Text Editors like Notepad, Sublime Text, Atom, Brackets, Visual code, etc.	05-12-2022		5
9	Demonstration and practice on Microsoft Word, PowerPoint, Microsoft Excel.	19-12-2022		5
10	Demonstration and practice on LaTeX and produce professional pdf documents.	26-12-2022		5
11	Creating online documents using Google docs- Create and share Bio-data form.	02-01-2023		5
12	Creating online documents using Google Sheets and Forms.	30-01-2023		5
13	Internal Lab	06-01-2023		5

Delivery Methods (DM):

1. Chalk & Talk
2. ICT Tools
3. Tutorial
4. Assignment/Test/Quiz
5. Laboratory/Field Visit
6. Web based learning.

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for Employment and Higherstudies in Artificial Intelligence and Data science with ethical values.

	Course Instructor	Course Coordinator	Module Coordinator	HOD
Name of the Faculty	V. Chandra Kumar	V. Chandra Kumar	Dr. O. Rama Devi	Dr. O. Rama Devi
Signature				