LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with B++ Grade, ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

COURSE HANDOUT
Part-A

PROGRAM	: I B. Tech., I-Sem., CIVIL
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Differential Equtions
L-T-P STRUCTURE	: 5-0-0
COURSE CREDITS	: 4
COURSE INSTRUCTOR	: G.Vijaya Lakshmi
COURSE COORDINATOR	: Dr. A. Rami Reddy
PRE-REQUISITES	: Differentiation, Integration

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", 42ndEdition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1stEdition, 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.

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.	Bridge Course	8	17/10/2022 To 28/10/2022		TLM2			
2.	Introduction to the course, Course Outcomes	1	28/10/2022		TLM2			

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
3.	Introduction to UNIT I	1	31/10/2022		TLM2	CO1	T1,T2	
4.	Formation of Differential Equations	1	02/11/2022		TLM1	CO1	T1,T2	
5.	Exact DE	1	03/11/2022		TLM1	CO1	T1,T2	
6.	Non-exact DE Type I	1	04/11/2022		TLM1	CO1	T1,T2	
7.	Non-exact DE Type II	1	04/11/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type III	1	07/11/2022		TLM1	CO1	T1,T2	
9.	Non-exact DE Type IV	1	09/11/2022		TLM1	CO1	T1,T2	
10.	Orthogonal Trajectories (Cartesian)	1	10/11/2022		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (Cartesian)	1	11/11/2022		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (polar)	1	11/11/2022		TLM1	CO1	T1,T2	
13.	Orthogonal Trajectories (polar)	1	14/11/2022		TLM1	CO1	T1,T2	
14.	Problems	1	16/11/2022		TLM1	CO1	T1,T2	
15.	**TUTORIAL 1**	1	17/11/2022		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		13				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
16.	Introduction to UNIT II	1	18/11/2022		TLM2	CO2	T1,T2	
17.	Solving a homogeneous DE	1	18/11/2022		TLM1	CO2	T1,T2	
18.	Finding Particular Integral, P.I for e^{ax+b}	1	21/11/2022		TLM1	CO2	T1,T2	
19.	P.I for Cos bx or sin bx	1	23/11/2022		TLM1	CO2	T1,T2	
20.	P.I for polynomial function	1	24/11/2022		TLM1	CO2	T1,T2	
21.	P.I for $e^{ax+b}v(x)$	1	25/11/2022		TLM1	CO2	T1,T2	
22.	P.I for $e^{ax+b}v(x)$	1	25/11/2022		TLM1	CO2	T1,T2	

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
23.	P.I for $x^k v(x)$	1	28/11/2022		TLM1	CO2	T1,T2	
24.	P.I for $x^k v(x)$	1	30/11/2022		TLM1	CO2	T1,T2	
25.	Method of Variation of parameters	1	01/12/2022		TLM1	CO2	T1,T2	
26.	Method of Variation of parameters	1	02/12/2022		TLM1	CO2	T1,T2	
27.	**TUTORIAL 2**	1	02/12/2022		TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		12			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
28.	Introduction to Unit-III	1	05/12/2022		TLM2	CO3	T1,T2	
29.	Numerical Methods	1	07/12/2022		TLM1	CO3	T1,T2	
30.	Solution by Taylor's series	1	08/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Taylor's series	1	09/12/2022		TLM1	CO3	T1,T2	
32.	Picard's Method	1	09/12/2022		TLM1	CO3	T1,T2	
33.	Picard's Method	1	19/12/2022		TLM1	CO3	T1,T2	
I MID EXAMINATIONS (12-12-2022 TO 17-12-2022)								
34.	Euler's Method	1	21/12/2022		TLM1	CO3	T1,T2	
35.	Modified Euler's Method	1	22/12/2022		TLM1	CO3	T1,T2	
36.	Modified Euler's Method	1	23/12/2022		TLM1	CO3	T1,T2	
37.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
38.	Runge- Kutta Method	1	26/12/2022		TLM1	CO3	T1,T2	
39.	**TUTORIAL 3**	1	28/12/2022		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		12			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
40.	Introduction to UNIT IV	1	29/12/2022		TLM2	CO4	T1,T2	
41.	Generalized Mean Value Theorem, Taylor's series	1	30/12/2022		TLM1	CO4	T1,T2	
42.	Maclaurin's series	1	30/12/2022		TLM1	CO4	T1,T2	
43.	Functions of several variables	1	02/01/2023		TLM1	CO4	T1,T2	
44.	Jacobians(Cartesian coordinates)	1	04/01/2023		TLM1	CO4	T1,T2	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
45.	Jacobians (polar, coordinates)	1	05/01/2023		TLM1	CO4	T1,T2	
46.	Jacobians (cylindrical, spherical coordinates)	1	06/01/2023		TLM1	CO4	T1,T2	
47.	Functional dependence	1	06/01/2023		TLM1	CO4	T1,T2	
48.	Maxima and Minima	1	09/01/2023		TLM1	CO4	T1,T2	
49.	Maxima and Minima of functions of two variables	1	11/01/2023		TLM1	CO4	T1,T2	
50.	Maxima and Minima of functions of two variables	1	12/01/2023		TLM1	CO4	T1,T2	
51.	**TUTORIAL 4**	1	13/01/2023		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		12			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
52.	Introduction to UNIT V	1	13/01/2023		TLM2	CO5	T1,T2	
53.	Partial Differential equations	1	16/01/2023		TLM1	CO5	T1,T2	
54.	Formation of PDE by elimination of arbitrary constants	1	18/01/2023		TLM1	CO5	T1,T2	
55.	Formation of PDE by elimination of arbitrary functions	1	19/01/2023		TLM1	CO5	T1,T2	
56.	Formation of PDE by elimination of arbitrary functions	1	20/01/2023		TLM1	CO5	T1,T2	
57.	Formation of PDE by elimination of arbitrary functions	1	20/01/2023		TLM1	CO5	T1,T2	
58.	Solving of PDE	1	23/01/2023		TLM1	CO5	T1,T2	
59.	Solving of PDE	1	25/01/2023		TLM1	CO5	T1,T2	
60.	Lagrange's Method	1	26/01/2023		TLM1	CO5	T1,T2	
61.	Lagrange's Method	1	27/01/2023		TLM1	CO5	T1,T2	
62.	**TUTORIAL 5**	1	01/02/2023		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		13			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
63.	Lagrange's Method Other models	1	02/02/2023		TLM1	CO4	T1,T2	
64.	Solving of PDE other methods	1	04/02/2023		TLM5	CO5	T1,T2	

65.	Unit-1-Class Test	1	06/02/2023		TLM3	CO1	T1,T2	
66.	Unit-2-Class Test	1	07/02/2023		TLM3	CO2	T1,T2	
67.	Unit-3-Class Test	1	08/02/2023		TLM3	CO3	T1,T2	
68.	Unit-4-Class Test	1	09/02/2023		TLM3	CO4	T1,T2	
69.	Unit-5-Class Test	1	11/02/2023		TLM3	CO5	T1,T2	
No. of classes		9			No. of classes taken:			
II MID EXAMINATIONS (13-02-2023 TO 18-02-2023)								

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 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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms

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

G.Vijaya Lakshmi	**Dr. A. RAMI REDDY**	**Dr. A. RAMI REDDY**	**Dr. A. RAMI REDDY**
Course Instructor	Course Coordinator	Module Coordinator	HOD

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF FRESHMAN ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr.S.Vijaya Dasaradha
Course Name & Code : Applied Chemistry & 20FE05
L-T-P Structure : 3-0-0   **Credits:** 03
Program/Sem/Sec : B.Tech/I-sem/CIVIL   **A.Y. :** 2022-23

PREREQUISITE: Nil

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 water, fuel technologies, electrochemistry, corrosion and advanced materials used in technologies.

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

CO1	Identify the troubles due to hardness of water and its maintenance in industrial applica (Understand-L2)
CO2	Identify issues related to conventional fuels, biofuels and photo-voltaic cells in energy produ (Understand-L2)
CO3	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications. (Apply-L3)
CO4	Apply principles of corrosion for design and effective maintenance of various equipments. (Apply-L3)
CO5	Analyse the suitability of engineering materials like polymers, lubricants, nano materials and composites in technological applications. (Understand-L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs):

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2		2	1					2
CO2	3	2	2	1		2	2					2
CO3	3	2	2	1		2	1					2
CO4	3	3	2	1		2	1					2
CO5	3	2	2	1		1	1					2
1 = Slight (Low)			**2 = Moderate (Medium)**				**3 = Substantial (High)**					

BOS APPROVED TEXT BOOKS:

TEXT BOOKS
1. Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 3rd Edition, 2003.
2. Jain, Jain, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16th Edition, 2015.

REFERENCES
1. Shikha Agarwal, "A text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1st Edition, 2015.
2. S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12th Edition, 2010.
3. 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: Water Technology

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 Applied Chemistry, Sources of water & quality	1	17-10-2022		TLM1	
2.	Hardness & types of hardness, Units of hardness & interrelation	1	19-10-2022		TLM1	
3.	Problems on hardness-1	1	20-10-2022		TLM1	
4.	Problems on hardness-2	1	22-10-2022		TLM1	
5.	priming and foaming, Caustic embrittlement	1	26-10-2022		TLM1	
6.	Bolier corrosion	1	27-10-2022		TLM1	
7.	Scale and sludges	1	29-10-2022		TLM1	
8.	W.H.O standards of potable water, Ion exchange process	1	31-10-2022		TLM2	
9.	Reverse osmosis and electro-dialysis	1	02-11-2022		TLM1	
10.	Treatment of industrial waste water	1	03-11-2022		TLM1	
11.	Revision, Assignment & Quiz	1	05-11-2022		TLM	
No. of classes required to complete UNIT-I: 11				No. of classes taken:		

UNIT-II: Fuel Technology

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.	Characteristics of good fuel, comparative study of solid, liquid & gaseous fuels	1	07-11-2022		TLM1	
2.	GCV, LCV and coal origin	1	09-11-2022		TLM1	
3.	Proximate Analysis &	1	10-11-2022		TLM1	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	significance					
4.	Petroleum-origin, types of crude oil and refining of petroleum	1	12-11-2022		TLM2	
5.	Cracking - moving bed catalytic cracking, synthetic petrol –Fischer Tropsch's process	1	14-11-2022 & 16-11-2022		TLM2	
6.	Natural gas composition and C.N.G - advantages	1	17-11-2022		TLM1	
7.	Characteristics of bio fuels, sources of bio mass & advantages - Production of biodiesel from rape seed oil	1	19-11-2022 & 21-11-2022		TLM1	
8.	Photovoltaic cell design working, advantages and disadvantages	1	23-11-2022		TLM2	
9.	Revision	1	24-11-2022		TLM1	
10.	Assignment and Quiz	1	26-11-2022			
No. of classes required to complete UNIT-II: 12				No. of classes taken:		

UNIT-III: Electrochemistry and 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 electrochemistry	1	28-11-2022		TLM1	
2.	Types of electrodes, Calomel Electrode	1	30-11-2022		TLM2	
3.	Glass Electrode	1	01-12-2022		TLM2	
4.	Calculation of EMF of Cell	1	03-12-2022		TLM1	
5.	Applications of Electro chemical Series, Applications of Nernst Equation-1	1	05-12-2022 & 07-12-2022		TLM1	
6.	Applications of Nernst Equation-2	1	08-12-2022		TLM1	
7.	Lead-acid Battery	1	10-12-2022		TLM2	
8.	Lithium ion Battery	1	17-12-2022		TLM2	
9.	H_2– O_2 Fuel Cell, Mg-Cu reserve battery	1	19-12-2022		TLM2	
10.	Revision, Assignment & Quiz	1	21-12-2022		TLM1	
No. of classes required to complete UNIT-III: 11				No. of classes taken:		

UNIT-IV: IV   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.	Types of dry corrosion-oxidative corrosion, Pilling Bed worth rule	1	22-12-2022		TLM1	
2.	corrosion by other gases and liquid metal corrosion	1	24-12-2022		TLM1	
3.	Wet corrosion, mechanism	1	26-12-2022		TLM1	
4.	Concentration Cell Corrosion	1	28-12-2022		TLM2	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
5.	Passivity and Galvanic series	1	29-12-2022		TLM1	
6.	Nature of metal that influences rate of corrosion	1	31-12-2022		TLM1	
7.	Nature of environment	1	02-01-2023		TLM1	
8.	Cathodic Protection	2	04-01-2023 & 05-01-2023		TLM2	
9.	electro plating and metal cladding	1	07-01-2023		TLM2	
10.	Revision, Assignment & Quiz	1	09-01-2023		TLM1	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: 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.	Differences between thermoplasts and thermosets, Types of polymerization with examples	1	11-01-2023 & 12-01-2023		TLM1	
2.	Preparation properties and engineering applications of PVC, Teflon, BUNA-S and Polyurethane.	2	18-01-2023 & 19-01-2023		TLM2	
3.	Preparation properties and engineering applications of BUNA-S and Polyurethane	1	21-01-2023		TLM2	
4.	Characteristics of a good lubricant and properties of lubricants; Application of properties of lubricants	1	23-01-2023 & 25-01-2023		TLM1	
5.	Nano Materials Introduction, definition, extraordinary changes observed at nano size of materials and reasons	1	28-01-2023		TLM2	
6.	Types of nano-materials, Gas-Phase synthesis & Applications	2	30-01-2023 & 01-02-2023		TLM2	
7.	Composites, advantageous characteristics of composites, Constituents	1	02-02-2023		TLM1	
8.	Fibre reinforced composites (GFRP, CFRP), Reasons for failure of composites	2	04-02-2023 & 06-02-2023		TLM1	
9.	Revision, Assignment , Quiz	1	08-02-2023		TLM1	
10.	Semester revision	2	09-02-2023 & 11-02-2023			
No. of classes required to complete UNIT-V: 16				No. of classes taken:		

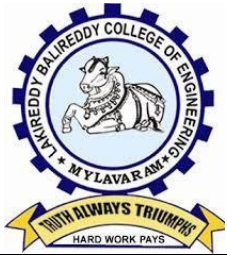| Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (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.S,Vijaya Dasaradha	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A. Rami Reddy
Signature				

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: C.RAJAMALLU
Course Name & Code : SURVEYING & 20CE01   **Regulation**: R20
L-T-P Structure :03-0-0   **Credits:** 03
Program/Sem/Sec : B.Tech/I-Sem/   **A.Y.:** 2022-23

PREREQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course aims to teach the basic principles of surveying and various methods for measuring linear and angular measurements. The coverage of the course enables the students to differentiate the available surveying equipments suitable for a specific purpose.

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

CO1	Understand the basic principles involved in linear and angular measurements, functioning of total station, levelling measurements and characteristic properties of simple curves.
CO2	Develop the longitudinal, lateral and contour profiles of a given area using fundamental principles of levelling
CO3	Calculate the area and volume of required boundaries.
CO4	Determine the distance and elevations of an object using tacheometer and EDM principles.

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

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

TEXTBOOKS:

T1 R. Agor "A Text Book of Surveying and Leveling", Khanna Publishers, New Delhi, 1998.
T2 Punmia B.C., "Surveying Vol I and II", Laxmi Publications 9th, 10th Edition, 1987.

REFERENCE BOOKS:

R1 R. Subramanya "Surveying and Leveling"- Oxford Publication
R2 Arora K R, "Surveying Vol 1, 2 & 3", Standard Book House, Delhi, 2004
R3 N.N Basak, "Surveying and Leveling", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1994
R4 Kanetkar T.P and S.V. Kulkarni, "Surveying and Leveling- Part I and II", Vidyarthi Prakasan, Pune, 1997.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION- LINEAR AND ANGULAR MEASUREMENTS

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	24/10/2022	24/10/2022	TLM1	
2.	Introduction to Unit-I	1	26/10/2022	26/10/2022	TLM1	
3.	Classification of surveys	1	27/10/2022	27/10/2022	TLM1	
4.	Errors and corrections – problems	1	28/10/2022	28/10/2022	TLM1	
5.	TUTORIAL-1	1	29/10/2022-3/11/2022	29/10/2022-3/11/2022	**TLM3**	
6.	Compass- Survey-Introduction	1	4/11/2022	4/11/2022	TLM2	
7.	Types- bearings-problems	1	5/11/2022	5/11/2022	TLM2	
8.	Local attraction-problems-	1	7/11/2022	7/11/2022	TLM2	
9.	Plane table-over view	1	9/11/2022	9/11/2022	TLM2	
10.	Plane table-over view	1			TLM2	
No. of classes required to complete UNIT-I:10				**No. of classes taken:10**		

UNIT-II: LEVELLING &CONTOURING

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.	Concept and Terminology	1	11/11/2022	11/11/2022	TLM1	
2.	Temporary and Permanent Adjustments	1	12/11/2022	12/11/2022	TLM1	
3.	Height of instrument method	1	14/11/2022	14/11/2022	TLM1	
4.	Rise and Fall method	1	16/11/2022	16/11/2022	TLM1	
5.	Problems	2	17/11/2022-19/11/2022	17/11/2022-19/11/2022	TLM1	
6.	Area Consisting of Regular Boundaries.	1	21/11/2022	21/11/2022	TLM1	
7.	TUTORIAL-1	1	23/11/2022	23/11/2022	**TLM3**	
8.	Characteristics and applications of contours	1	24/11/2022	24/11/2022	TLM2	
9.	Plotting contours by grid method	1	25/11/2022	25/11/2022	TLM2	
10.	Plotting contours by grid method	1	26/11/2022	26/11/2022	TLM2	
No. of classes required to complete UNIT-II:11				**No. of classes taken:11**		

UNIT-III: COMPUTATION OF AREAS and VOLUMES

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-Area from Field	1	30/11/2022	30/11/2022	TLM1	
2.	Computation of Areas along irregular boundaries	1	1/12/2022	1/12/2022	TLM1	
3.	Area Consisting of RegularBoundaries.	1	2/12/2022	2/12/2022	TLM1	
4.	Problems	2	3/12/2022-5/12/2022	3/12/2022-5/12/2022	TLM1	
5.	TUTORIAL-1	2	7/12/2022-9/12/2022	7/12/2022-9/12/2022	**TLM3**	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
6.	Embankments and Cutting for aLevel Section and Two Level Sections Without TransverseSlopes	1	10/12/2022	10/12/2022	TLM2	
7.	MID-I	1	12/12/2022-17/12/2022	12/12/2022-17/12/2022		
	Determination of the Capacity of Reservoir	1	19/12/2022	19/12/2022	TLM2	
8.	Volume of Barrow Pits.	1	14/12/2022	14/12/2022	TLM2	
9.	Problems	2	21/12/2022-22/12/2022	21/12/2022-22/12/2022	TLM1	
10.	Problems	2	24/12/2022-27/12/2022	24/12/2022-27/12/2022	TLM1	
11.	TUTORIAL-1I	2	29/12/2022-30/12/2022	29/12/2022-30/12/2022	**TLM3**	

No. of classes required to complete UNIT-III:16   **No. of classes taken:16**

UNIT-IV: : THEODOLITE and TACHEOMETRIC SURVEYING

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.	Theodolite, description, Applications	1	31/12/2022	31/12/2022	TLM1	
2.	Measurement of Horizontal Angles & Measurement of Vertical Angles	3	2/01/2023-4/01/2023	2/01/2023-4/01/2023	TLM1	
3.	Problems	1	5/01/2023	5/01/2023	TLM1	
4.	Problems	1	6/01/2023	6/01/2023	TLM1	
5.	Tutorial-I	1	7/01/2023	7/01/2023	**TLM3**	
6.	Stadia and Tangential Methods of Tachometry	1	9/01/2023	9/01/2023	TLM2	
7.	Distance and Elevation Formulae for Staff Vertical Position.	1	11/01/2023	11/01/2023	TLM2	
8.	Problems	2	12/01/2023-14/01/2023	12/01/2023-14/01/2023	TLM2	
9.	Tutorial-II	2	16/01/2023-18/01/2023	16/01/2023-18/01/2023	**TLM3**	

No. of classes required to complete UNIT-IV:13   **No. of classes taken:13**

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
1.	Introduction- types of curves	1	19/01/2023	19/01/2023	TLM1	
2.	Elements of a simple circular curve	1	20/01/2023	20/01/2023	TLM1	
3.	Degree of curve relationship between radius and degree of curve	1	21/01/2023	21/01/2023	TLM1	
4.	Problems	1	23/01/2023-25/01/2023	23/01/2023-25/01/2023	TLM1	
5.	Problems	1	27/01/2023-28/01/2023	27/01/2023-28/01/2023	TLM1	
6.	Tutorial-I	1	30/01/2023	30/01/2023	**TLM3**	
7.	Calculation of various elements of curve	1	01/02/2023	01/02/2023	TLM2	

8.	Total station-introduction	1	02/02/2023	02/02/2023	TLM2
9.	Importance of total station-uses	1	04/02/2023	04/02/2023	TLM2
10.	Global positioning system.	1	05/02/2023	05/02/2023	TLM2
11	Problems		06/02/2023-07/02/2023	06/02/2023-07/02/2023	TLM1
12.	Tutorial-II	1	09/02/2023-10/02/2023	09/02/2023-10/02/2023	**TLM3**
No. of classes required to complete UNIT-V:12				**No. of classes taken:12**	

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**C.Rajamallu**	**C.Rajamallu**	J Rangaiah	**Dr.V.Rama Krishna**
Signature				

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Dr. J. Venkateswara Rao
Course Name & Code : Building Materials and Construction & 20CE02
L-T-P Structure : 3-0-0   **Credits:** 3
Program/Sem/Sec : B.Tech., CE., I-Sem.,   **A.Y.:** 2022-23

PREREQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

CO1	Understand the preparation process and the composition of construction materials such as Stones, bricks and timber.
CO2	Describe the sources, constituents and storage of lime and cement for their appropriate usage as building materials based on their specific attributes.
CO3	Identify the different components in a building and their specific purpose in the building.
CO4	Classify the various types of mortars, masonry components and finishings used in the buildings.
CO5	Identify the uses, good and faulty characteristics of different building materials

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

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

TEXTBOOKS:

T1 Rangwala "Engineering Materials (Material science)" Charotar Publishing House Pvt. ltd., Edition-2012

T2 B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain-"Building Construction"- Laxmi Publications (P) Ltd.

REFERENCE BOOKS:

R1 S.K. Duggal "Building Materials"- - New age International Publisher, Fourth edition-2012

R2 R.K. Rajput "Engineering Materials (Including construction materials)"-, S.Chand Publications.

R3 P.C Varghese "Building Construction" Prentice-Hall of India Private Ltd.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: STONES AND BRICKS

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.	Interaction with Students	1	17-10-2022		TLM1	
2.	Interaction with Students	1	17-10-2022		TLM1	
3.	Introduction To Rocks and Classification	1	18-10-2022		TLM1	
4.	Characteristics of Good building stones	1	20-10-2022		TLM1	
5.	Common Building stones and their compositions and Properties	1	22-10-2022		TLM1	
6.	Common Building stones Properties and uses	1	27-10-2022		TLM1	
7.	Dressing of stones	1	29-10-2022		TLM1	
8.	Bricks Introduction and composition of brick earth	1	31-10-2022		TLM1	
9.	Review on Stones	1	31-10-2022		TLM1	
10.	Review on Stones	1	01-11-2022		TLM1	
11.	Review on Stones	1	03-11-2022		TLM1	
12.	Stages in brick Manufacturing and Burning in Kilns	1	05-11-2022		TLM1	
13.	Burning in Clamp and Kilns	1	07-11-2022		TLM1,2	
14.	Classification and good qualities of bricks		07-11-2022		TLM1,2	
15.	Fly ash and Hollow bricks manufacturing	1	08-11-2022		TLM1,2	
16.	Fly ash and Hollow bricks and uses	1	10-11-2022		TLM1,2	
17.	Review on Bricks	1	12-11-2022		TLM1	
18.	Review on Bricks	1	14-11-2022		TLM1	
19.	Group Discussion Stones	1	14-11-2022		TLM6	
20.	Group Discussion Bricks	1	15-11-2022		TLM6	

No. of classes required to complete UNIT-I: 12   **No. of classes taken:**

UNIT-II: LIME AND CEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction-limestone	1	17-11-2022		TLM1,2	
22.	Limestone cycle-sources of lime	1	19-11-2022		TLM1,2	
23.	Constituent of lime & Manufacturing	1	21-11-2022		TLM1,2	
24.	Properties of lime-uses	1	21-11-2022		TLM1,2	
25.	Precaution in handling of lime-storage of lime	1	22-11-2022		TLM1,2	
26.	Introduction to cement and Comparison between cement and lime	1	24-11-2022		TLM1,2	
27.	Constituents of cement-functions of ingredients of cement	1	26-11-2022		TLM1,2	
28.	Outline of manufacture of Portland	1	28-11-2022		TLM1,2	
29.	Classification-properties of cements	1	28-11-2022		TLM1,2	
30.	Classification-properties of cements	1	29-11-2022		TLM1,2	
31.	Outline of manufacture of Portland cement	1	01-12-2022		TLM1,2	
32.	Field test and storage of cement	1	03-12-2022		TLM3	

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.	Group discussion on Unit-1	1	05-12-2022		TLM6	
34.	Group discussion on Unit-1	1	05-12-2022		TLM6	
35.	Group discussion on Unit-2	1	06-12-2022		TLM6	

No. of classes required to complete UNIT-II: 15   **No. of classes taken:**

UNIT-III: MORTAR AND MASNORY

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
36.	Introduction to Mortar-Requirements	1	08-12-2022		TLM1	
37.	Good qualities of Mortars and types	1	10-12-2022		TLM1	
38.	Mid I Exams	1	12-12-2022		-	
39.	Mid I Exams	1	12-12-2022		-	
40.	Mid I Exams	1	13-12-2022		-	
41.	Mid I Exams	1	15-12-2022		-	
42.	MID I exam return of scripts & discussion	1	17-12-2022		-	
43.	Review on Mortar	1	19-12-2022		TLM1,2	
44.	Introduction to Masonry-Types	1	19-12-2022		TLM1	
45.	Terminology in stone masonry	1	20-12-2022		TLM1	
46.	Types of stone masonry and joints	1	22-12-2022		TLM1,2	
47.	Terminology in Brick masonry & tools for brick laying	1	24-12-2022		TLM1	
48.	Group discussion on Unit-3	1	26-12-2022		TLM6	
49.	Different bonds in bricks-	1	26-12-2022		TLM1,2	
50.	Different bonds in bricks & Defects in bonds	1	27-12-2022		TLM1,2	
51.	Group discussion on Unit-3	1	29-12-2022		TLM6	
52.	Importance of Cavity and Partition walls.	1	31-12-2022		TLM1	
53.	Review on Masonry	1	02-01-2023		TLM1	

No. of classes required to complete UNIT-III: 11   **No. of classes taken:**

UNIT-IV: BUILDING 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
54.	Components of a building – Substructure and superstructure	1	02-01-2023		TLM1,2	
55.	Foundation-functions of foundations	1	03-01-2023		TLM1,2	
56.	Different types of foundations	1	05-01-2023		TLM1,2	
57.	Group discussion on Unit-4	1	07-01-2023		TLM6	
58.	Basic details of Lintels, Arches,	1	09-01-2023		TLM1,2	
59.	Staircases	1	09-01-2023		TLM1,2	
60.	Types of floors	1	10-01-2023		TLM1,2	
61.	Types of floors	1	12-01-2023		TLM1,2	
62.	Types of roofs	1	19-01-2023		TLM1	
63.	Group discussion on Unit-4	1	21-01-2023		TLM6	
64.	Types of roofs	1	23-01-2023		TLM1,2	
65.	Review on Unit-4		23-01-2023		TLM1	

No. of classes required to complete UNIT-IV: 6   **No. of classes taken:**

UNIT-V: TIMBER AND FNISHINGS IN BUIDINGS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
66.	Classification of timber	1	24-01-2023		TLM1,2	
67.	Seasoning of timber	1	28-01-2023		TLM1,2	
68.	Group discussion on Unit-5	1	30-01-2023		TLM1,2	
69.	important types of timber and their uses	1	31-01-2023		TLM1,2	
70.	Ply wood and its uses	1	02-02-2023		TLM1,2	
71.	Group discussion on Unit-5		04-02-2023			
72.	Constituents of paints and types	1	06-02-2023		TLM1,2	
73.	Functions of paints-types of paints	1	06-02-2023		TLM1,2	
74.	Introduction ,causes, effects of dampness, Materials used for D.P.C	1	07-02-2023		TLM1,2	
75.	Methods of DPC	1	07-02-2023		TLM1,2	
No. of classes required to complete UNIT-V: 7				**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
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. J.Venkateswara Rao	Dr. J.Venkateswara Rao	Mr.B.Rama Krishna	Dr. V.Rama Krishna
Signature				

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF FRESHMAN ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : Mr.S.Vijaya Dasaradha
Course Name & Code : Applied Chemistry Lab & 20FE52
L-T-P Structure : 0-0-3   **Credits:** 1.5
Program/Sem/Sec : B.Tech/I-sem/CIVIL   **A.Y. :** 2022-23

 Pre requisites: Nil

Course Educational Objective: This course enables the students to analyze water samples and perform different types of volumetric titrations. It provides them with an overview of preparation of polymers and properties of fuels.

Course Outcomes: At the end of the course, the students will be able to
CO1: Assess quality of water based on the given procedures (Understand-L2)
CO2: Distinguish different types of titrations in volumetric analysis after performing experiments listed in the syllabus (Understand-L2)
CO3: Acquire practical knowledge related to preparation of polymers (Understand-L2)
CO4: Exhibit skills in performing experiments based on theoretical fundamentals. (Apply-L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs):
   1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

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

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 Applied chemistry lab	3	22-10-2022		TLM2	CO4	
2.	Introduction and Glassware explanation	3	29-10-2022		TLM2	CO4	
3.	Preparation of Bakelite.	3	05-11-2022		TLM4	CO2,CO4	
4.	Determination of pH of the given sample solution/soil using pH meter.	3	12-11-2022		TLM4	CO3,CO4	
5.	Determination of amount of Na_2CO_3 using standard HCl solution.	3	19-11-2022		TLM4	CO4	
6.	Determination of alkalinity of water sample.	3	26-11-2022		TLM4	CO3,CO4	
7.	Determination of total Hardness of water using EDTA method.	3	03-12-2022		TLM4	CO1,CO4	
8.	Determination of permanent hardness of using EDTA method.	3	10-12-2022		TLM4	CO1,CO4	
9.	Estimation of Mohr's salt using standard $KMnO_4$.	3	17-12-2022		TLM4	CO1,CO4	
10.	Estimation of Mohr's salt using standard $K_2Cr_2O_7$.	3	24-12-2022		TLM4	CO2,CO4	
11.	Preparation of nylon fibres.	3	31-12-2022		TLM4	CO2,CO4	
12.	Determination of Turbidity of the given sample water.	3	07-01-2023		TLM4	CO3,CO4	
13.	Review/Revision of expt.	3	21-01-2023		TLM4	CO4	
14.	Additional Expt.	3	28-01-2023		TLM4	CO2,CO4	
15.	Internal Lab Exam	3	04-02-2023		TLM4	CO2,CO4	
16.	Internal Lab Exam	3	11-02-2023		TLM4	CO2,CO4	

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 are followed as given below.

(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:
1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamental, 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.S.Vijaya Dasaradha	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A. Rami Reddy
Signature				

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor   : P.KEERTHI
Course Name & Code   : CEDT LAB-20CE52
L-T-P Structure   : 0-0-3   Credits : 1.5
Program/Sem/Sec   : B.Tech., CE., I-Sem.,   A.Y : 2022-23

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course aims to teach fundamental free hand civil engineering drafting techniques using conventional drawing tools. The student is asked to develop and draw simple geometrical constructions used in engineering drawing. The student is then exposed to ArchiCAD fundamentals and is asked to develop and draw few civil engineering elements.

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

CO 1	Draw simple objects based on principles of geometry.
CO 2	Sketch the projections of an object based on the angles of projection.
CO 3	Draft simple objects using ArchiCAD software
CO4	Develop, draw and edit simple objects related to civil engineering applications using ArchiCAD.

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	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	2	-	-	-	-	1	-	-	-	-	-	-
CO4	2	2	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).

TEXT BOOKS/ REFERENCE BOOKS:

1. N. D. Bhatt, "Engineering Drawing", 51st Revised and Enlarged Edition, Charotar Publishers, 2012.
2. Lecture material prepared by department faculty
3. Video material based on topics covered

CIVIL ENGINEERING DRAFTING TECHNIQUES LAB

LIST OF EXPERIMENTS

COURSE: I SEMESTER   **A.Y: 2022-23**

S.I.No	Name of the Experiment
	Introduction to Engineering Graphics
	Basic Principles of Engineering Drafting
1 (a)	Basic tools of Drawing
(b)	Instruments used in conventional Drawing
2	Geometrical construction of Bisection of line, draw perpendicular of line, draw parallel lines,divide a line, divide a circle, bisect an angle, trisecting an angle, finding centre of an arc.
3	Constructing equilateral triangles, polygons inscribed in circle, draw tangents, length of arc, circle and lines in contact.
	Curves used in engineering practice
4 (a)	Ellipse
(b)	Parabola
	Projections
5	First and Third angle Projections
6	Front view, Top view, Side view of some simple Objectives
7	Front view, Top view, Side view of some simple Objectives
8	Archicad Fundamentals
	Archicad Fundamentals
9	Introduction to ArchiCAD
10	Basic tools (Line, Circle, Poly line, Dimensional tools, text, Fill etc
11	Design Tools
12	Drawing some simple objects
	Repetition

Lab-In charge

A.Y: 2022-23

CEDT Lab Schedule

S.No	Name of the Experiment	Tentative Date of Completion	Actual Date of Completion
	Cycle-I Introduction to Engineering Graphics		
	Basic Principles of Engineering Drafting	19-10-22	
1 (a)	Basic tools of Drawing	26-10-22	
(b)	Instruments used in conventional Drawing	02-11-22	
2	Geometrical construction of Bisection of line, draw perpendicular of line, draw parallel lines,divide a line, divide a circle, bisect an angle, trisecting an angle, finding centre of an arc.	09-11-22	
3	Constructing equilateral triangles, polygons inscribed in circle, draw tangents, length of arc,circle and lines in contact.	16-11-22	
	Curves used in engineering practice		
4 (a)	Ellipse	23-11-22	
(b)	Parabola	30-11-22	
	Projections		
5	First and Third angle Projections	07-12-22	
6	Front view, Top view, Side view of some simple Objectives	21-12-22	
7	Front view, Top view, Side view of some simple Objectives	28-12-22	
8	ArchiCAD Fundamentals	04-01-23	
	Cycle-II Archicad Fundamentals		
9	Introduction to ArchiCAD	11-01-23	
10	Basic tools (Line, Circle, Poly line, Dimensional tools, text, Fill etc	18-01-23	
11	Design Tools	25-01-23	
12	Drawing some simple objects	01-02-23	
	Repetition	08-02-23	

Lab-In charge

CIVIL ENGINEERING DRAFTING TECHINIQUES LAB

COURSE: I SEMESTER   **A.Y: 2022-23**

LAB TIMETABLE

Day	FN	AN
Monday		
Tuesday		
Wednesday	I Semester Batch-A	
Thursday		
Friday		
Saturday		

Batch – A: 22761A0101 to 22761A0137

Lab-In charge

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day to Day work	A1= 05
Record Writing	A2= 05
Internal Lab Examination	A3= 05
Cumulative Internal Examination (CIE) : A1+A2+A3	**15**
Semester End Examination (SEE)	**35**
Total Marks = CIE + SEE	**50**

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

PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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PO 10	**Communication**: Communicate effectively on complex engineering activities with theengineering 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.
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PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor   Course Coordinator   ModuleCoordinator   HOD
(M.Satyanarayana)   (M.Satyanarayana)   (B. Rama Krishna)   (Dr. V.Ramakrishna)

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: C.Rajamallu
Course Name & Code : **20CE51 - SURVEYING LAB**   **Regulation**: R20
L-T-P Structure : **0-0-2**   **Credits:** 1
Program/Sem/Sec : B.Tech-Civil-I-Sem   **A.Y.:** 2022-23

PREREQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course teaches the basic principles of surveying, various methods of linear and angular measuring instruments through hands-on practice sessions and enables the students to use surveying equipments.

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

CO1	: Compute linear and angular measurements in the field using chain and compass
CO2	Plot a given area using plane table in the field.
CO3	determine the elevations of different points on the ground using principles of leveling

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			2						1		1		
CO2			1											1	
CO3	2				1			1							

1 - Low	2 –Medium	3 - High

TEXTBOOKS:

T1   R. Agor "A Text Book of Surveying and Leveling", Khanna Publishers, New Delhi, 1998.

T2   Punmia B.C., "Surveying Vol I and II", Laxmi Publications 9th, 10th Edition, 1987.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Chaining of a line using chain/Tape and recording of details along the chain line	**2**	**1/11/2022**	**1/11/2022**	TLM4	
2.	Measurement of a given area using Cross staff survey.	2	8/11/2022	8/11/2022	TLM4	
3.	Determination of Obstacle length.	2	15/11/2022	15/11/2022	TLM4	
4.	To perform compass traversing and calculate the errors in balancing the traverse.	2	22/11/2022	22/11/2022	TLM4	
5.	To measure the distance between two inaccessible points.	2	29/11/2022	29/11/2022	TLM4	
6.	Radiation method of plane table survey.	2	6/12/2022	6/12/2022	TLM4	
7.	Intersection method of plane table survey	2	20/12/2022	20/12/2022	TLM4	
8.	Determination of elevations of given points using Rise and fall Method & HI method.	2	27/12/2022	27/12/2022	TLM4	
9.	Determination of elevation difference between two points using Reciprocal levelling method.	2	3/12/2022	3/12/2022	TLM4	
10.	Determination of elevations and plotting of longitudinal Sectioning and Cross Section of a given area.	2	24/01/2023	24/01/2023	TLM4	
11.	Plotting the contours of a given area using method of blocks.	2	31/01/2023	31/01/2023	TLM4	
No. of classes required to complete:22				**No. of classes taken:22**		

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	Expt. no's	Marks
Day to Day work = **A**	1,2,3,4,5,6,7,8…	A=05
Record = **B**	1,2,3,4,5,6,7,8	B=05
Internal Test = **C**	1,2,3,4,5,6,7,8	C = 05

Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: A + B + C + D = 50	1,2,3,4,5,6,7,8	50

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	C.Rajamallu	C.Rajamallu	J Rangaiah	Dr.V.Rama Krishna
Signature				

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DEPARTMENTOFMECHANICALENGINEERING

COURSEHANDOUT

PROGRAM   **:** B.Tech. I-Sem, CE-A-Section

ACADEMIC YEAR   **:** 2022-2023

COURSE NAME & CODE   **: EngineeringWorkshop, 20ME51**

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

COURSE CREDITS   **:** 1.5

COURSE INSTRUCTOR   **:** A. Dhanunjay Kumar/ S. Srinivasa Reddy

COURSE COORDINATOR : Seelam SrinivasaReddy

PRE REQUISITE: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

COURSE OBJECTIVE:

   The objective of this course is to get familiarized with various trades used in Engineering Workshop and learn the safety pre-cautions to be followed in the workshops, while working with the different tools.

COURSE OUTCOMES (CO)

CO1	Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
CO2	Fabricate and model various basic prototypes in the trade of fitting such as Straight fit, V-fit.
CO3	Produce various basic prototypes in the trade of Tin smithy such as Rectangular tray, and open Cylinder.
CO4	Perform various basic House Wiring techniques.

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

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

REFERENCE:

R1	LabManual

COURSE DELIVERY PLAN (LESSON PLAN): Section-B (BATCH-AI)

S. No.	Experiment to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Reference	HOD Sign Weekly
1.	Induction Programme	3	21-10-2022	21-10-2022	TLM8	-	
2.	Demonstration	3	28-10-2022	28-10-2022	TLM8	R1	
3.	Experiment-1	3	09-11-2022	09-11-2022	TLM8	R1	
4.	Experiment-2	3	11-11-2022	11-11-2022	TLM8	R1	
5.	Experiment-3	3	18-11-2022	18-11-2022	TLM8	R1	
6.	Experiment-4	3	25-11-2022	25-11-2022	TLM8	R1	
7.	Experiment-5	3	02-12-2022	02-12-2022	TLM8	R1	
8.	Repetition (cycle-1)	3	09-12-2022	09-12-2022			
	I-Mid Examinations						
8.	Experiment-6	3	23-12-2022	23-12-2022	TLM8	R1	
9.	Experiment-7	3	30-12-2022	30-12-2022	TLM8	R1	
10.	Experiment-8	3	06-01-2023	06-01-2023	TLM8	R1	
11.	Repetition lab	3	20-01-2023	20-01-2023	TLM8		
12.	LabInternal	3	27-01-2023	27-01-2023	TLM6		

Teaching Learning Methods

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
Induction Programme	26-09-2022	15-10-2022	
I Phase of Instructions-1	17-10-2022	10-12-2022	8W
I Mid Examinations	12-12-2022	17-12-2022	1W
II Phase of Instructions	19-12-2022	11-02-2023	8W
II Mid Examinations	13-02-2023	18-02-2023	1W
Preparation and Practical's	20-02-2023	25-02-2023	1W
Semester End Examinations	27-02-2023	11-03-2023	2W

Part-C

EVALUATIONPROCESS:

Parameter		Marks
Day–to–Day Work	Observation	A1=2.5Marks
	Record	A2=2.5Marks
Internal Test		B=5Marks
Viva–Voce During Regular Lab Sessions		C=05Marks
Cumulative Internal Examination		A1+A2+B+C=15Marks
Semester End Examinations		D=35Marks
Total Marks : A1+A2+B+C+D		50Marks

LIST OF EXPERIMENTS:

Exp. No.	Name of the Experiment	Related CO
1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
2.	Carpentry-2(C2)-Dove tail Joint	CO1
3.	Fitting-1(F1)-T-Joint	CO2
4.	Fitting-2(F2)-V-Joint	CO2
5.	Plumbing-1(P1)-Pipe Threading practice	CO3
6.	Plumbing-2(P2)-Pipe Layout	CO3
7.	House Wiring-1(E1)–Series and Parallel connection	CO4
8.	HouseWiring-2(E2)–Fluorescent Lamp and Calling Bell Circuit	CO4

NOTIFICATION OF CYCLE:

cycle	Exp. No.	Name of the Experiment	Related CO
Cycle 1	1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
	2.	Carpentry-2(C2)-Dove tail Joint	CO1
	3.	Fitting-1(F1)-T-Joint	CO2
	4.	Fitting-2(F2)-V-Joint	CO2
	5.	Plumbing-1(P1)-Pipe Threading practice	CO3
Cycle 2	6.	Plumbing-2(P2)-PipeLayout	CO3
	7.	House Wiring-1(E1)–Series and Parallel Connection	CO4
	8.	House Wiring-2(E2)–Fluorescent Lamp and Calling bell Circuit	CO4

PROGRAMME EDUCATIONAL OBJECTIVES:

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 multi disciplinary activities.

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

PROGRAM OUT COMES (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 analyses 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 multi disciplinary 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 instruction

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 multi disciplinary 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.

PROGRAMME SPECIFIC OUTCOMES (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 manufacture ability of products.
3. To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructors	Course Coordinator	Module Coordinator	HOD
A.Dhanunjay Kumar/ S.SrinivasReddy	S.SrinivasReddy	J.SubbaReddy	Dr.S.PichiReddy