



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 MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. D.Chaitanya

Course Name & Code : PC-I, 20FE01

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

Credits: 02

Program/Sem/Sec : MECH-A –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, Meanings of Words/Phrases in the context; Writing: Memo Drafting.

### Unit–III

#### Working Together- ‘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. Abdul Kalam’; 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, New Delhi, 2008.
- R4** Baradwaj Kumkum, “Professional Communication”, I. K. International Publishing

**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 22-10-2022		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	29-10-2022		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns  Word order in sentences, "Wh" questions	01	01-11-2022		TLM2	
7.	Writing: Paragraph writing, Paragraph analysis	02	02-11-2022 05-11-2022		TLM2 TLM6	
<b>No. of classes required to complete UNIT-I: 09</b>				<b>No. of classes taken:</b>		

**UNIT-II:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	02	08-11-2022 09-11-2022		TLM2	
9.	Identifying sequence of ideas	01	12-11-2022		TLM2	
10.	Cohesive devices: linkers /signposts/transition signals	02	15-11-2022 16-11-2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	02	19-11-2022 22-11-2022		TLM2	

12.	Essay Writing - Memo drafting	02	23-11-2022 26-11-2022		TLM2 TLM6	
<b>No. of classes required to complete UNIT-II: 09</b>				<b>No. of classes taken:</b>		

**UNIT-III:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	The Future of Work	02	30-11-2022 03-12-2022		TLM2 TLM6	
14.	Making basic inferences, Strategies to uses text clues for comprehension	01	06-12-2022		TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	07-12-2022 10-12-2022		TLM2	
16.	Summarizing rephrasing what is read	01	27-12-2022		TLM2	
17.	avoiding redundancies and repetitions - Abstract Writing	02	28-12-2022 31-12-2022		TLM2 TLM6	
<b>No. of classes required to complete UNIT-III: 08</b>				<b>No. of classes taken:</b>		

**UNIT-IV:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	APJ Abdul Kalam	02	03-01-2023 04-01-2023		TLM2 TLM2	
19.	Direct-Indirect speech	02	07-01-2023 10-01-2023		TLM2	
20.	Articles and their omission	02	11-01-2023 17-01-2023		TLM2	
21.	E-mail drafting	02	18-01-2023 21-01-2023		TLM2 TLM6	
<b>No. of classes required to complete UNIT-IV: 08</b>				<b>No. of classes taken:</b>		

**UNIT-V:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	C.V.Raman	02	24-01-2023 25-01-2023		TLM2	
23.	Subject – Verb agreement	02	28-01-2023 31-01-2023		TLM2	
24.	Prepositions	01	01-02-2023 04-02-2023		TLM2	
25.	Formal Letter Writing	02	07-02-2023 08-02-2023		TLM2 TLM6	
26.	vocabulary	01	11-02-2023			
<b>No. of classes required to complete UNIT-V: 09</b>				<b>No. of classes taken:</b>		

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

**PART-C**

**EVALUATION PROCESS (R17 Regulation):**

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

PART-D

**PROGRAMME OUTCOMES (POs):**

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Mrs.D.chaithanya	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
<b>Signature</b>				



<b>PROGRAM</b>	: I B. Tech., I-Sem., Mech
<b>ACADEMIC YEAR</b>	: 2022-23
<b>COURSE NAME &amp; CODE</b>	: Differential Equations
<b>L-T-P STRUCTURE</b>	: 4-1-0
<b>COURSE CREDITS</b>	: 4
<b>COURSE INSTRUCTOR</b>	: Dr. K.Bhanu Lakshmi
<b>COURSE COORDINATOR</b>	: Dr. A. Rami Reddy
<b>PRE-REQUISITES</b>	: 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", 42<sup>nd</sup> Edition, Khanna Publishers, New Delhi, 2012.

**T2** Dr. B. V. Ramana, "Higher Engineering Mathematics", 1<sup>st</sup> Edition, TMH, New Delhi, 2010.

**BOS APPROVED REFERENCE BOOKS:**

**R1** M. D. Greenberg, "Advanced Engineering Mathematics", 2<sup>nd</sup> Edition, TMH Publications, New Delhi, 2011.

**R2** Erwin Kreyszig, "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, John Wiley & sons, New Delhi, 2011.

**R3** W.E. Boyce and R. C. Diprima, "Elementary Differential Equations", 7<sup>th</sup> Edition, John Wiley & sons, New Delhi, 2011.

**R4** S. S. Sastry, "Introductory Methods of Numerical Analysis" 5<sup>th</sup> 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
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1.	Bridge Course	5	18/10/2022 to 22/10/2022					
2.	Introduction to the course	1	25/10/2022		TLM2			
3.	Course Outcomes	1	26/10/2022		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
4.	Introduction to UNIT I	1	27/10/2022		TLM2	CO1	T1,T2	
5.	Formation of Differential Equations	1	28/10/2022		TLM1	CO1	T1,T2	
6.	Variable Separable method	1	29/10/2022					
7.	Exact DE	1	01/11/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type I	1	02/11/2022		TLM1	CO1	T1,T2	
9.	Non-exact DE Type II	1	03/11/2022		TLM1	CO1	T1,T2	
10.	Non-exact DE Type III	1	04/11/2022		TLM1	CO1	T1,T2	
11.	Non-exact DE Type IV	1	05/11/2022		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (Cartesian)	1	08/11/2022		TLM1	CO1	T1,T2	
13.	Orthogonal Trajectories (Cartesian)	1	09/11/2022		TLM1	CO1	T1,T2	
14.	Orthogonal Trajectories (polar)	1	10/11/2022		TLM1	CO1	T1,T2	
15.	Orthogonal Trajectories (polar)	1	12/11/2022		TLM1	CO1	T1,T2	
16.	<b>TUTORIAL 1</b>	1	11/11/2022		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
17.	Introduction to UNIT II	1	15/11/2022		TLM2	CO2	T1,T2	
18.	Solving a homogeneous DE	1	16/11/2022		TLM1	CO2	T1,T2	
19.	Finding Particular Integral, P.I for $e^{ax+b}$	1	17/11/2022		TLM1	CO2	T1,T2	
20.	P.I for Cos bx or sin bx	1	18/11/2022		TLM1	CO2	T1,T2	
21.	P.I for polynomial function	1	19/11/2022		TLM1	CO2	T1,T2	
22.	P.I for polynomial function	1	22/11/2022		TLM1	CO2	T1,T2	
23.	P.I for $e^{ax+b} v(x)$	1	23/11/2022		TLM1	CO2	T1,T2	
24.	P.I for $e^{ax+b} v(x)$	1	24/11/2022		TLM1	CO2	T1,T2	
25.	P.I for $x^k v(x)$	1	25/11/2022		TLM1	CO2	T1,T2	
26.	P.I for $x^k v(x)$	1	26/11/2022		TLM1	CO2	T1,T2	
27.	Method of Variation of parameters	1	29/11/2022		TLM1	CO2	T1,T2	
28.	Method of Variation of parameters	1	30/11/2022		TLM1	CO2	T1,T2	
29.	<b>TUTORIAL 2</b>	1	02/12/2022		TLM3	CO2	T1,T2	



No. of classes required to complete UNIT-II	13	No. of classes taken:
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**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
30.	Introduction to Unit-III	1	01/12/2022		TLM2	CO3	T1,T2	
31.	Numerical Methods	1	03/12/2022		TLM1	CO3	T1,T2	
32.	Solution by Taylor's series	1	06/12/2022		TLM1	CO3	T1,T2	
33.	Solution by Taylor's series	1	07/12/2022		TLM1	CO3	T1,T2	
34.	Picard's Method	1	08/12/2022		TLM1	CO3	T1,T2	
35.	Picard's Method	1	09/12/2022		TLM1	CO3	T1,T2	
36.	<b>Assignment</b>	1	10/12/2022				T1,T2	

**I MID EXAMINATIONS (12-12-2022 TO 17-12-2022)**

37.	Euler's Method	1	20/12/2022		TLM1	CO3	T1,T2	
38.	Modified Euler's Method	1	21/12/2022		TLM1	CO3	T1,T2	
39.	Modified Euler's Method	1	22/12/2022		TLM1	CO3	T1,T2	
40.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
41.	Runge- Kutta Method	1	24/12/2022		TLM1	CO3	T1,T2	
42.	<b>TUTORIAL 3</b>	1	30/12/2022		TLM3	CO3	T1,T2	

No. of classes required to complete UNIT-III	13	No. of classes taken:
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**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
43.	Introduction to UNIT IV	1	27/12/2022		TLM2	CO4	T1,T2	
44.	Generalized Mean Value Theorem, Taylor's series	1	28/12/2022		TLM1	CO4	T1,T2	
45.	Maclaurin's series	1	29/12/2022		TLM1	CO4	T1,T2	
46.	Functions of several variables	1	30/12/2023		TLM1	CO4	T1,T2	
47.	Functions of several variables	1	31/12/2023		TLM1	CO4	T1,T2	
48.	Jacobians( Cartesian coordinates)	1	03/01/2023		TLM1	CO4	T1,T2	
49.	Jacobians (polar, coordinates)	1	04/01/2023		TLM1	CO4	T1,T2	
50.	Jacobians (cylindrical, spherical coordinates)	1	05/01/2023		TLM1	CO4	T1,T2	
51.	Functional dependence	1	06/01/2023		TLM1	CO4	T1,T2	
52.	Functional dependence	1	07/01/2023		TLM1	CO4	T1,T2	
53.	Maxima and Minima	1	10/01/2023		TLM1	CO4	T1,T2	
54.	Maxima and Minima of functions of two variables	1	11/01/2023		TLM1	CO4	T1,T2	

55.	Maxima and Minima of functions of two variables	1	17/01/2023		TLM1	CO4	T1,T2	
56.	<b>TUTORIAL 4</b>	1	20/01/2023		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
57.	Introduction to UNIT V	1	18/01/2023		TLM2	CO5	T1,T2	
58.	Partial Differential equations	1	19/01/2023		TLM1	CO5	T1,T2	
59.	Formation of PDE by elimination of arbitrary constants	1	21/01/2023		TLM1	CO5	T1,T2	
60.	Formation of PDE by elimination of arbitrary functions	1	24/01/2023		TLM1	CO5	T1,T2	
61.	Formation of PDE by elimination of arbitrary functions	1	25/01/2023		TLM1	CO5	T1,T2	
62.	Formation of PDE by elimination of arbitrary functions	1	26/01/2023		TLM1	CO5	T1,T2	
63.	Solving of PDE	1	27/01/2023		TLM1	CO5	T1,T2	
64.	Solving of PDE	1	28/01/2023		TLM1	CO5	T1,T2	
65.	Lagrange's Method	1	31/01/2023		TLM1	CO5	T1,T2	
66.	Lagrange's Method	1	01/02/2023		TLM1	CO5	T1,T2	
67.	Lagrange's Method	1	02/02/2023		TLM1	CO5	T1,T2	
68.	<b>TUTORIAL 5</b>	1	03/02/2023		TLM3	CO5	T1,T2	
69.	<b>Assignment</b>	1	04/09/2023			CO3, CO4, CO5	T1,T2	
70.	<b>Revision</b>	1	09/09/2023			CO3, CO4, CO5	T1,T2	
71.	<b>Revision</b>	1	10/09/2023			CO1, CO2	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
72.	Lagrange's Method Other models	1	12/01/2023		TLM1	CO4	T1,T2	
73.	Solving of PDE other methods	2	07/02/2023, 08/02/2023		TLM5	CO5	T1,T2	
No. of classes		3			No. of classes taken:			

#### II MID EXAMINATIONS (13-02-2023 TO 18-02-2023)

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

#### PART-C

**EVALUATION PROCESS (R20 Regulation):**

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

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

Dr.K.Bhanu Lakshmi	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** : Dr. Lakshmi V R Babu Syamala

**Course Name & Code** : Applied Chemistry & 20FE05

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

**Program/Sem/Sec** : B.Tech/I-sem/ME

**Credits:** 03

**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 applications. (Understand-L2)
CO2	Identify issues related to conventional fuels, biofuels and photo-voltaic cells in energy production. (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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COs												
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
<b>1 = Slight (Low)                      2 = Moderate (Medium)                      3 = Substantial (High)</b>												

**BOS APPROVED TEXT BOOKS:**

## TEXT BOOKS

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

## REFERENCES

1. Shikha Agarwal, "A text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1<sup>st</sup> Edition, 2015.
2. S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12<sup>th</sup> Edition, 2010.
3. Y. Bharathi Kumari, Jyotsna Cherukuri, "A Text book of Engineering Chemistry", VGS Publications, Vijayawada, 1<sup>st</sup> 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
27.	Introduction to Applied Chemistry, Sources of water & quality	1	18-10-2022		TLM1	
28.	Hardness & types of hardness, Units of hardness & interrelation	1	19-10-2022		TLM1	
29.	Problems on hardness-1	1	20-10-2022		TLM1	
30.	Problems on hardness-2	1	22-10-2022		TLM1	
31.	Scale and sludges, Caustic embrittlement	1	25-10-2022		TLM1	
32.	priming and foaming, Bolier corrosion	1	26-10-2022		TLM1	
33.	W.H.O standards of potable water, Ion exchange process	1	27-10-2022		TLM1	
34.	Reverse osmosis and electro-dialysis	1	29-10-2022		TLM2	
35.	Treatment of industrial waste water	1	1-11-2022		TLM1	
36.	Revision	1	2-11-2022		TLM1	
37.	Assignment & Quiz		3-11-2022		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	5-11-2022		TLM1	
2.	GCV, LCV and coal origin	1	9-11-2022		TLM1	
3.	Proximate Analysis & significance	1	10-11-2022		TLM1	

4.	Petroleum-origin, types of crude oil and refining of petroleum	1	15-11-2022		TLM2	
5.	Cracking - moving bed catalytic cracking, synthetic petrol –Fischer Tropsch's process	1	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		TLM1	
8.	Photovoltaic cell design working, advantages and disadvantages	1	22-11-2022		TLM2	
9.	Revision	1	23-11-2022		TLM1	
10.	Assignment and Quiz	1	24-11-2022			
No. of classes required to complete UNIT-II: 10				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	26-11-2022		TLM1	
2.	Types of electrodes, Calomel Electrode	1	29-11-2022		TLM2	
3.	Glass Electrode	1	30-11-2022		TLM2	
4.	Calculation of EMF of Cell	1	1-12-2022		TLM1	
5.	Applications of Electro chemical Series, Applications of Nernst Equation-1	1	3-12-2022		TLM1	
6.	Applications of Nernst Equation-2	1	6-12-2022		TLM1	
7.	Lead-acid Battery	1	7-12-2022		TLM2	
8.	Lithium ion Battery	1	8-12-2022		TLM2	
9.	H <sub>2</sub> - O <sub>2</sub> Fuel Cell, Mg-Cu reserve battery	1	20-12-2022		TLM2	
10.	Revision, Assignment & Quiz	1	21-12-2022		TLM1	
No. of classes required to complete UNIT-III: 10				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	27-12-2022		TLM1	
4.	Concentration Cell Corrosion	1	28-12-2022		TLM2	

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	3-1-2023		TLM1	
8.	Cathodic Protection	2	4 and 5-1-2023		TLM2	
9.	electro plating and metal cladding	1	10-1-2023		TLM2	
10.	Revision, Assignment & Quiz	1	11-1-2023		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	12-1-2023		TLM1	
2.	Preparation properties and engineering applications of PVC, Teflon, BUNA-S and Polyurethane.	2	17 and 18-1-2023		TLM2	
3.	Preparation properties and engineering applications of BUNA-S and Polyurethane	1	19-1-2023		TLM2	
4.	Characteristics of a good lubricant and properties of lubricants; Application of properties of lubricants	1	21-1-2023		TLM1	
5.	Nano Materials Introduction, definition, extraordinary changes observed at nano size of materials and reasons	1	24-1-2023		TLM2	
6.	Types of nano-materials, Gas-Phase synthesis & Applications	2	25 and 29-1-2023		TLM2	
7.	Composites, advantageous characteristics of composites, Constituents	1	31-1-2023		TLM1	
8.	Fibre reinforced composites (GFRP, CFRP), Reasons for failure of composites	2	1 and 2-2-2023		TLM1	
9.	Revision, Assignment , Quiz	1	4-2-2023		TLM1	
10.	Semester revision	2	7, 8 and 9-2-2023			
No. of classes required to complete UNIT-V: 12				No. of classes taken:		

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

### **PART-C**

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

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



## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr. Lakshmi V R Babu Syamala	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A. Rami Reddy
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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## DEPARTMENT OF MECHANICAL ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr M B S Sreekara Reddy, Associate Professor  
Mr. K Lakshmi Prasad, Assistant Professor (A)  
Mrs. Kamala Priya Bysani, Assistant Professor (A)  
Mr. A Nageswara Rao, Assistant Professor (A)

**Course Name & Code** : Engineering Graphics – 20ME01

**L-T-P Structure** : 3-0-4 **Credits: 4**

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

**PREREQUISITE** : Engineering Physics, Mathematics

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To recognize the Bureau of Indian Standards of Engineering Drawing and develop an ability to get familiarized with orthographic projections and isometric views of solid objects.

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

<b>CO1</b>	Identify the geometrical objects considering BIS standards. <b>(Remember-L1)</b>
<b>CO2</b>	Comprehend the basics of orthographic projections and deduce orthographic projections of a point and a line at different orientations. <b>(Understand-L2)</b>
<b>CO3</b>	Represent graphically the geometrical planes at different positions and orientations. <b>(Understand-L2)</b>
<b>CO4</b>	Analyze and draw solid objects at different positions and orientations. <b>(Apply- L3)</b>
<b>CO5</b>	Visualize isometric and orthographic views of geometrical objects and convert one form to another. <b>(Understand-L2)</b>

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

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

#### **TEXTBOOKS:**

**T1** N. D. Bhatt, Engineering Drawing, 51th Revised and Enlarged Edition, Charotar publishers, 2012

#### **REFERENCE BOOKS:**

- R1** Narayana K L, Kannaiah P, Textbook on Engineering Drawing, 2nd Edition, SciTech publishers.
- R2** R.K.Dhawan, Engineering Drawing, S.Chand Company LTD.
- R3** Venugopal, Engineering Drawing and Graphics, New Age publishers
- R4** Dhananjay A. Jolhe, Engineering Drawing, Tata McGraw Hill Publishers
- R5** N.S.Parthasarathy, Vela Murali, Engineering Drawing, Oxford Higher Education

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: INTRODUCTION TO ENGINEERING GRAPHICS, LETTERING, LINES AND DIMENSIONING, CONICS, CYCLOIDS, INVOLUTES

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.	<b>UNIT I: INTRODUCTION:</b> Introduction to Engineering Drawing, COs, CEOs, POs and PEOs	2	17-10-2022		TLM2	
2.	Principles of Engineering Graphics and their significance, Drawing Instruments and their use- Conventions in Drawing	2	17-10-2022		TLM2	
3.	Lettering and Dimensioning – BIS conventions	1	19-10-2022		TLM1	
4.	Practice	2	19-10-2022		TLM3	
5.	Geometrical Constructions	1	26-10-2022		TLM1	
6.	Practice	2	26-10-2022		TLM3	
7.	Engineering Curves: Conic Sections- Construction of ellipse	2	31-10-2022		TLM1	
8.	Practice	2	31-10-2022		TLM3	
9.	Construction of Parabola	1	02-11-2022		TLM1	
10.	practice	2	02-11-2022		TLM3	
11.	Construction of Hyperbola & cycloids	2	07-11-2022		TLM1	
12.	Practice	2	07-11-2022		TLM3	
13.	Epicycloid and hypocycloid, Involutés	1	09-11-2022		TLM1	
14.	Practice	2	09-11-2022		TLM3	
<b>No. of classes required to complete UNIT-I: 24 (Lecture:10 Practice:14)</b>				<b>No. of classes taken: (including Practice)</b>		

#### UNIT-II: ORTHOGRAPHIC PROJECTIONS OF POINTS AND LINES

S. No.	Topics to be covered	No. of Classes required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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<b>UNIT II: ORTHOGRAPHIC PROJECTIONS</b>						
15.	Introduction to Orthographic Projections, First and third angle projection methods, Projections of Points	2	14-11-2022		TLM 1	
16.	Practice	2	14-11-2022		TLM 3	
17.	Projections of straight lines: Inclined to one plane	1	16-11-2022		TLM 1	
18.	Practice	2	16-11-2022		TLM 3	
19.	Projections of lines when inclined to both the planes	2	21-11-2022		TLM 1	
20.	Practice	2	21-11-2022		TLM 3	
21.	True lengths and traces	1	23-11-2022		TLM 1	
22.	Practice	2	23-11-2022		TLM 3	
<b>No. of classes required to complete UNIT-II: 14 (Lecture:6 Practice:8)</b>				<b>No. of classes taken: (including Practice)</b>		

### UNIT-III: PROJECTIONS OF PLANES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
<b>UNIT III: PROJECTIONS OF PLANES:</b>						
23.	Introduction, planes parallel to one of the reference planes.	2	28-11-2022		TLM1	
24.	Practice	2	28-11-2022		TLM 3	
25.	Inclined to one reference plane and perpendicular to other	1	30-11-2022		TLM 1	
26.	Practice	2	30-11-2022		TLM 3	
27.	Projection of oblique planes	2	05-12-2022		TLM 1	
28.	Practice	2	05-12-2022		TLM 3	
29.	Projection of oblique planes	1	07-12-2022		TLM 1	
30.	Practice	2	07-12-2022		TLM 3	
<b>No. of classes required to complete UNIT-III: 14 (Lecture:8 Practice:6)</b>			<b>No. of classes taken: (including Practice)</b>			

**UNIT-IV: PROJECTIONS OF SOLIDS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	Projection of solids: Introduction, Solids in simple positions	2	19-12-2022		TLM 1	
32.	Practice	2	19-12-2022		TLM 3	
33.	Projection of solids: Axis inclined to one plane and parallel to other plane	1	21-12-2022		TLM 1	
34.	Practice	2	21-12-2022		TLM 3	
35.	Projection of solids: Axis inclined to both planes	2	26-12-2022		TLM 1	
36.	Practice	2	26-12-2022		TLM 3	
37.	Projection of solids: Axis inclined to both planes	1	28-12-2022		TLM 1	
38.	Practice	2	28-12-2022		TLM 3	
<b>No. of classes required to complete UNIT-IV: 14 (Lecture:6 Practice:8)</b>				<b>No. of classes taken: (including Practice)</b>		

**UNIT-V: ISOMETRIC VIEWS: TRANSFORMATION OF PROJECTIONS FROM ORTHOGRAPHIC PROJECTIONS TO ISOMETRIC VIEW and VICE VERSA**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	<b>UNIT V: ISOMETRIC VIEWS</b> - Introduction to Isometric Views	2	02-01-2023		TLM 2	
40.	Practice	2	02-01-2023		TLM 3	
41.	Theory of isometric projection, isometric views, isometric axes, scale, lines & planes	1	04-01-2023		TLM 2	
42.	Practice	2	04-01-2023		TLM 3	
43.	Isometric view of prism, pyramid, cylinder & cone, non-isometric lines-methods to generate an isometric drawing	2	09-01-2023		TLM 1	
44.	Practice	2	09-01-2023		TLM3	
45.	Isometric view of prism, pyramid, cylinder & cone, non-isometric lines-methods to generate an isometric drawing	1	11-01-2023		TLM1	

46.	Practice	2	11-01-2023		TLM3	
47.	Conversion of Orthographic Projections to Isometric Views of objects	1	18-01-2023		TLM1	
48.	Practice	2	18-01-2023		TLM 3	
49.	Conversion of Orthographic Projections to Isometric Views of objects	2	23-01-2023		TLM 1	
50.	Practice	2	23-01-2023		TLM 3	
51.	Conversion of Isometric Views to Orthographic Projections of objects	1	25-01-2023		TLM 1	
52.	Practice	2	25-01-2023		TLM 3	
53.	Conversion of Isometric Views to Orthographic Projections of objects	2	30-01-2023		TLM 1	
54.	Practice	2	30-01-2023		TLM 3	
55.	Revision of CO 1	1	01-02-2023		TLM 2	
56.	Practice	2	01-02-2023		TLM 3	
57.	Revision of CO 2 & CO3	2	06-02-2023		TLM 2	
58.	Practice	2	06-02-2023		TLM 3	
59.	Revision of CO 4	1	08-02-2023		TLM 2	
60.	Practice	2	08-02-2023		TLM 3	
<b>No. of classes required to complete UNIT-V: 28 (Lecture:12 Practice:16) Revision:10</b>					<b>No. of classes taken:</b>	

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

**Engineering Graduates will be able to:**

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

<b>PSO 1</b>	To apply the principles of thermal sciences to design and develop various thermal systems.
<b>PSO 2</b>	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
<b>PSO 3</b>	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.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Dr M B S S Reddy	Dr M B S S Reddy	Mr. J. Subba Reddy	Dr. S. Pichi Reddy
<b>Signature</b>				



# 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 ELECTRICAL & ELECTRONICS ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr. J.V.PAVAN CHAND

**Course Name & Code** : BASIC ELECTRICAL & ELECTRONICS ENGINEERING – 20EE02

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech/MECH-I/A

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

**PREREQUISITE:** Physics

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** This course enables student to illustrate the basics of applied electricity and electronics.

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

<b>CO1</b>	Apply network reduction techniques to simplify electrical circuits. <b>(Apply - L3)</b>
<b>CO2</b>	Illustrate the working principle of DC machines and transformers. <b>(Understand - L2)</b>
<b>CO3</b>	Understand V-I characteristics of semiconductor devices. <b>(Understand - L2)</b>
<b>CO4</b>	Illustrate the configuration of transistors and their applications. <b>(Understand - L2)</b>

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

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

**TEXTBOOKS:**

- T1** A.Sudhakar and Shyammoan S Palli, “Electrical Circuits” Tata McGraw-Hill, 3<sup>rd</sup> Edition.2017
- T2** M.S.Sukhija, T.K.Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford University Press, 2016 Edition.

**REFERENCE BOOKS:**

- R1** Kothari and Nagarath, “Basic Electrical Engineering”, TMH Publications, 3<sup>rd</sup> Edition.2013
- R2** G.S.N.Raju, “Electronic Devices and Circuits”, I.K.International.2006

#### PART-B



**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: ELECTRICAL CIRCUIT FUNDAMENTALS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Basic definitions	1	17-10-2022		TLM1	
2.	Types of elements	1	18-10-2022		TLM1	
3.	Ohm's Law	1	19-10-2022		TLM1	
4.	Kirchhoff's Laws	1	20-10-2022		TLM1	
5.	Kirchhoff's Laws	1	22-10-2022		TLM1	
6.	series, parallel Reduction	1	25-10-2022		TLM1	
7.	Star-Delta Reduction	1	26-10-2022		TLM1	
8.	Source Transformation Technique	1	27-10-2022		TLM1	
9.	Mesh analysis	1	29-10-2022		TLM1	
10.	Mesh Analysis	1	31-10-2022		TLM1	
11.	Nodal Analysis	1	01-11-2022		TLM1	
12.	Nodal Analysis	1	02-11-2022		TLM1	
13.	Problems	1	03-11-2022		TLM1	
14.	Problems	1	05-11-2022		TLM1	
15.	Revision	1	07-11-2022		TLM2	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:</b>		

**UNIT-II: DC NETWORK THEOREMS & AC FUNDAMENTALS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Superposition Theorem	1	08-11-2022		TLM1	
17.	Superposition Theorem	1	09-11-2022		TLM1	
18.	Thevenin's Theorem	1	10-11-2022		TLM1	
19.	Norton's Theorem	1	12-11-2022		TLM1	
20.	Thevenin's Theorem	1	14-11-2022		TLM1	
21.	Maximum Power Transfer Theorem	1	15-11-2022		TLM1	
22.	Peak, R.M.S, average and instantaneous values, Form factor and Peak factor for periodic waveforms	1	16-11-2022		TLM1	
23.	Phase and Phase difference	1	17-11-2022		TLM1	
24.	Reactance, Impedance, Susceptance and Admittance	1	19-11-2022		TLM1	
25.	Real, Reactive and apparent Powers, Power Factor	1	21-11-2022		TLM1	
26.	Resonance	1	22-11-2022		TLM1	
27.	Problems	1	23-11-2022		TLM1	
28.	Problems	1	24-11-2022		TLM1	
29.	Problems	1	26-11-2022		TLM1	
30.	Revision	1	28-11-2022		TLM2	
<b>No. of classes required to complete UNIT-II: 15</b>				<b>No. of classes taken:</b>		

**UNIT-III: DC MACHINE FUNDAMENTALS AND SINGLE-PHASE TRANSFORMERS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	DC generator principle	1	29-11-2022		TLM1	
32.	construction details	1	30-11-2022		TLM1	
33.	EMF equation	1	01-12-2022		TLM1	
34.	Types of generators	1	03-12-2022		TLM1	
35.	DC motor principle	1	05-12-2022		TLM1	
36.	Back emf	1	06-12-2022		TLM1	

37.	Types of motors	1	07-12-2022		TLM1	
38.	Problems	1	08-12-2022		TLM1	
39.	Transformer basics	1	10-12-2022		TLM1	
40.	Principle of operation of 1-Phase transformers	1	19-12-2022		TLM1	
41.	Construction	1	20-12-2022		TLM1	
42.	EMF equation	1	21-12-2022		TLM1	
43.	EMF equation	1	22-12-2022		TLM1	
44.	Problems	1	24-12-2022		TLM1	
45.	Problems & Revision	1	26-12-2022		TLM2	
<b>No. of classes required to complete UNIT-III: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-IV: P-N JUNCTION DIODE AND ZENER DIODE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
46.	Introduction	1	27-12-2022		TLM1	
47.	P-N junction diode	1	28-12-2022		TLM1	
48.	Operation	1	29-12-2022		TLM1	
49.	V-I characteristics of PN junction	1	31-12-2022		TLM1	
50.	Rectifiers	1	02-01-2023		TLM1	
51.	Half wave rectifier	1	03-01-2023		TLM1	
52.	Full wave rectifier	1	04-01-2023		TLM1	
53.	Bridge type	1	05-01-2023		TLM1	
54.	Zener diode	1	07-01-2023		TLM1	
55.	Zener diode Characteristics	1	09-01-2023		TLM1	
56.	Voltage regulator	1	10-01-2023		TLM1	
57.	Problems	1	11-01-2023		TLM1	
58.	Problems	1	12-01-2023		TLM1	
59.	Problems	1	18-01-2023		TLM1	
60.	Revision	1	19-01-2023		TLM2	
<b>No. of classes required to complete UNIT-IV: 15</b>				<b>No. of classes taken:</b>		

#### UNIT-V: TRANSISTORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
61.	Introduction	1	21-01-2023		TLM1	
62.	Construction	1	23-01-2023		TLM1	
63.	Principle of operation, Symbol	1	24-01-2023		TLM1	
64.	CB configuration	1	25-01-2023		TLM1	
65.	CE configuration	1	28-01-2023		TLM1	
66.	JFET - Operation	1	30-01-2023		TLM1	
67.	JFET - Characteristics	1	31-01-2023		TLM1	
68.	MOSFET - Operation	1	01-02-2023		TLM1	
69.	MOSFET - Characteristics	1	02-02-2023		TLM1	
70.	application of transistor as an amplifier	1	04-02-2023		TLM1	
71.	Problems	1	06-02-2023		TLM1	
72.	Problems	1	07-02-2023		TLM1	
73.	Problems	1	08-02-2023		TLM1	
74.	Problems	1	09-02-2023		TLM1	

75.	Revision	1	11-02-2023		TLM2	
<b>No. of classes required to complete UNIT-V: 15</b>				<b>No. of classes taken:</b>		
<b>Teaching Learning Methods</b>						
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Demonstration (Lab/Field Visit)			
<b>TLM2</b>	PPT	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)			
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Group Discussion/Project			

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
<b>PO 6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
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<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

<b>PSO a</b>	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
<b>PSO b</b>	Design and analyze electrical machines, modern drive and lighting systems
<b>PSO c</b>	Specify, design, implement and test analog and embedded signal processing electronic systems
<b>PSO d</b>	Design controllers for electrical and electronic systems to improve their performance.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.J.V.PAVAN CHAND	Mr.J.V.PAVAN CHAND	Dr G.NAGESWARA RAO	Dr.J.S.V.PRASAD
Signature				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF FRESHMAN ENGINEERING

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Dr. Lakshmi V R Babu Syamala  
 Course Name & Code : Applied Chemistry Lab & 20FE52  
 L-T-P Structure : 0-0-3  
 Program/Sem/Sec : B.Tech/I-sem/ME

Credits: 1.5  
 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
38.	Introduction to Applied chemistry lab; Determination of pH of the given sample solution/soil using pH meter	3	21-10-2022		TLM2	CO4	
39.	Introduction and Glassware explanation; Preparation of Bakelite	3	28-10-2022		TLM2	CO4	
40.	Determination of amount of Na <sub>2</sub> CO <sub>3</sub> using standard HCl solution	3	04-11-2022		TLM4	CO2,CO4	
41.	Estimation of Mohr's salt using standard KMnO <sub>4</sub>	3	11-11-2022		TLM4	CO3,CO4	
42.	Estimation of Mohr's salt using standard K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	3	18-11-2022		TLM4	CO4	
43.	Determination of total Hardness of water using EDTA method	3	25-11-2022		TLM4	CO3,CO4	
44.	Determination of permanent hardness of using EDTA method	3	02-12-2022		TLM4	CO1,CO4	
45.	Determination of alkalinity of water sample	3	09-12-2022		TLM4	CO1,CO4	
46.	Preparation of nylon fibres	3	23-12-2022		TLM4	CO1,CO4	
47.	Nephelometry	3	30-12-2022		TLM4	CO2,CO4	
48.	Review/Revision of expt.	3	06-01-2023		TLM4	CO2,CO4	
49.	Review/Revision of expt.	3	20-01-2023		TLM4	CO3,CO4	
50.	Additional Expt.	3	27-01-2023		TLM4	CO4	
51.	Internal Lab Exam	3	03-02-2023		TLM4	CO2,CO4	
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 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
<b>Total</b>		<b>15 Marks</b>

**PROGRAMME OUTCOMES (POs):**

**Engineering Graduates will be able to:**

- Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamental, 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.
- 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.
- 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.
- Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 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.
- 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.
- 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	Dr. Lakshmi V R Babu Syamala	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A. Rami Reddy
Signature				