



# 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.V.Parvathi  
Course Name & Code : Engineering Chemistry Lab & 20FE53  
L-T-P Structure : 0-0-3 Credits:1.5  
Program/Sem/Sec : B.Tech/I-Sem/IT-A A.Y.: 2022-23

Pre-requisites: Nil

**Course Educational Objectives:** 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 analytical techniques.

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

**CO1:** Assess alkalinity of water based on the procedure given. (L2)

**CO2:** Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus.(L2)

**CO3:** Acquire practical knowledge related to preparation of polymers.(L2)

**CO4:** Exhibit skills in performing experiments based on theoretical fundamentals. (L2)

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

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									
<b>1 = Slight (Low)                      2 = Moderate (Medium)                      3 = Substantial (High)</b>												

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

**REFERENCE: BOS Approved Lab Manual**

## Part-B

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

S.No.	Experiment	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction to Engineering Chemistry lab	3	18-10-2022		TLM1	CO4	
2.	Safety measures in chemistry lab	3	25-10-2022		TLM1	CO4	
3.	Introduction to volumetric analysis.	3	1-11-2022		TLM1	CO4	
4.	Preparation of Bakelite(Demo)	3	8-11-2022		TLM1	CO4	
5.	Determination of pH of the given sample solution/soil using pH meter.	3	15-11-2022		TLM4	CO2,CO4	
6.	Types of titrations and examples	3	22-11-2022		TLM4	CO3,CO4	
7.	Preparation of nylon fibers. (Demo)	3	29-11-2022		TLM4	CO4	
8.	Practise to handle apparatus and chemicals in lab.	3	6-12-2022		TLM4	CO3,CO4	
9.	Determination of amount of HCl using standard Na <sub>2</sub> CO <sub>3</sub> solution	3	20-12-2022		TLM4	CO2,CO4	
10.	Determination of Mg <sup>+2</sup> using standard EDTA solution.	3	27-12-2022		TLM4	CO2,CO4	
11.	Estimation of Mohr's salt using potassium permanganate.	3	03-01-2022		TLM4	CO2,CO4	
12.	Estimation of Mohr's salt using potassium dichromate.	3	10-01-2023		TLM4	CO2,CO4	
13.	Determination of alkalinity of water sample.	3	17-01-2023		TLM4	CO1,CO4	
14.	Estimation of amount of HCl conductometrically using standard NaOH solution.	3	24-01-2023		TLM4	CO2,CO4	
15.	Estimation of amount of HCl conductometrically using standard NH <sub>4</sub> OH solution.	3	31-01-23		TLM4	CO2,CO4	
16.	Lab internal examination.	3	07-02-2023		TLM4		
<b>Total Experiments</b>		<b>10</b>					

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

### Part - C

#### EVALUATION PROCESS:

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

#### (a) Continuous Internal Evaluation (CIE):

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

Parameter		Marks
Day - to - Day Work	Observation	05 Marks
	Record	05 Marks
Internal Test		05 Marks
<b>Total</b>		<b>15 Marks</b>

#### PROGRAMME OUTCOMES (POs):

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

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

assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr.V.Parvathi</b>	<b>Dr.V.Parvathi</b>	<b>Dr.V.Parvathi</b>	<b>Dr.A.Rami Reddy</b>
<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 FRESHMAN ENGINEERING

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Dr.V.Parvathi  
Course Name & Code : Engineering Chemistry Lab & 20FE53  
L-T-P Structure : 0-0-3 Credits:1.5  
Program/Sem/Sec : B.Tech/I-Sem/IT-B A.Y.: 2022-23

Pre-requisites: Nil

**Course Educational Objectives:** 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 analytical techniques.

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

**CO1:** Assess alkalinity of water based on the procedure given. (L2)

**CO2:** Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus.(L2)

**CO3:** Acquire practical knowledge related to preparation of polymers.(L2)

**CO4:** Exhibit skills in performing experiments based on theoretical fundamentals. (L2)

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

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									
<b>1 = Slight (Low)                      2 = Moderate (Medium)                      3 = Substantial (High)</b>												

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

**REFERENCE: BOS Approved Lab Manual**

## Part-B

### COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Experiment	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction to Engineering Chemistry lab	3	19-10-2022		TLM1	CO4	
2.	Safety measures in chemistry lab	3	26-10-2022		TLM1	CO4	
3.	Introduction to volumetric analysis.	3	02-11-2022		TLM1	CO4	
4.	Types of titrations and examples.	3	09-11-2022		TLM1	CO4	
5.	Practise to handle apparatus and chemicals in lab	3	16-11-2022		TLM4	CO2,CO4	
6.	Preparation of Bakelite	3	23-11-2022		TLM4	CO3,CO4	
7.	Determination of pH of the given sample solution/soil using pH meter.	3	30-11-2022		TLM4	CO4	
8.	Preparation of nylon fibers.	3	07-12-2022		TLM4	CO3,CO4	
9.	Determination of amount of HCl using standard Na <sub>2</sub> CO <sub>3</sub> solution	3	21-12-2022		TLM4	CO2,CO4	
10.	Determination of Mg <sup>+2</sup> using standard EDTA solution.	3	28-12-2022		TLM4	CO2,CO4	
11.	Estimation of Mohr's salt using potassium permanganate.	3	04-01-2022		TLM4	CO2,CO4	
12.	Estimation of Mohr's salt using potassium dichromate.	3	11-01-2023		TLM4	CO2,CO4	
13.	Determination of alkalinity of water sample.	3	18-01-2023		TLM4	CO1,CO4	
14.	Estimation of amount of HCl conductometrically using standard NaOH solution.	3	25-01-2023		TLM4	CO2,CO4	
15.	Estimation of amount of HCl conductometrically using standard NH <sub>4</sub> OH solution.	3	01-02-23		TLM4	CO2,CO4	
16.	Lab internal examination.	3	08-02-2023		TLM4		
<b>Total Experiments</b>		10					

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

### Part - C

#### EVALUATION PROCESS:

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

#### (a) Continuous Internal Evaluation (CIE):

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

Parameter		Marks
Day - to - Day Work	Observation	05 Marks
	Record	05 Marks
Internal Test		05 Marks
<b>Total</b>		<b>15 Marks</b>

#### PROGRAMME OUTCOMES (POs):

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

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

assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr.V.Parvathi</b>	<b>Dr.V.Parvathi</b>	<b>Dr.V.Parvathi</b>	<b>Dr.A.Rami Reddy</b>
<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 FRESHMAN ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr.V.Parvathi

**Course Name & Code** : Engineering Chemistry&20FE06

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

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

**Credits:03**

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

**Pre-requisites:** Nil

**Course Educational Objectives:** It enables the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions. It helps to strengthen the basic concepts of electrochemistry, corrosion, nanotechnology, polymers, liquid crystals and analytical techniques.

**COURSE OUTCOMES (COs):** After completion of the course, students will be able to

C01	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications (L3)
C02	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications (L3)
C03	Analyze the suitability of advanced materials like nano-materials in electronics and medicine (L4)
C04	Identify the importance of liquid crystals, polymers in advanced technologies (L2)
C05	Apply the principles of analytical techniques in chemical analysis (L3)

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

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	1	-	2	2	-	-	-	-	2
C02	3	2	2	1	-	2	1	-	-	-	-	2
C03	3	2	2	1	-	1	1	-	-	-	-	2
C04	3	2	2	1	-	1	1	-	-	-	-	2
C05	3	2	1	1	-	1	1	-	-	-	-	2
<p style="text-align: center;">1 = Slight (Low)                      2 = Moderate (Medium)                      3 = Substantial (High)</p>												

**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** Shikha Agarwal, "A Text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1<sup>st</sup> Edition, 2015
- T2** Jain, Jain, "A textbook of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16<sup>th</sup> Edition, 2015.

**BOS APPROVED REFERENCE BOOKS:**

- R1** Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, Delhi, 3<sup>rd</sup> Edition, 2003.
- R2** S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12<sup>th</sup> Edition, 2010
- R3** Prasanta Rath, B. Rama Devi, Ch. Venkata Ramana Reddy, SubhenduChakroborty, "Engineering Chemistry", Cengage Learning India, 1<sup>st</sup> Edition, 2019.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: ELECTRO CHEMISTRY & BATTERIES**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Bridge course	1	17-10-22		TLM1	
2	Bridge course	1	18-10-22		TLM1	
3	Bridge course	1	20-10-22		TLM1	
4	Introduction to Course and COs	1	22-10-22		TLM1	
5	Prerequisites for Unit-I	1	25-10-22		TLM3	
6	Applications of Electro-chemical Series	1	27-10-22		TLM1	
7	Calculation of EMF of Cell	1	29-10-22		TLM1	
8	Practice exercises on applications of Electro chemical series	1	31-10-22		TLM2	
9	Glass Electrode, Calomel Electrode	1	01-11-22		TLM2	
10	Applications of Nernst Equation	1	03-11-22		TLM1	
11	Applications of Nernst Equation	1	07-11-22		TLM2	
12	Lead-acid Battery	1	08-11-22		TLM2	
13	Lithium-ion Battery	1	10-11-22		TLM1	
14	H <sub>2</sub> – O <sub>2</sub> Fuel cell, Mg-Cu Reserve Battery	1	12-11-22		TLM1	
15	Revision of Unit 1, Assignment & Quiz	1	14-11-22		TLM1	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:15</b>		

**UNIT-II: SCIENCE OF CORROSION**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Definition, Examples, Dry corrosion	1	15-11-22		TLM1	
2	Corrosion by other gases and liquid metal corrosion	1	17-11-22		TLM1	
3	Contd.. Dry corrosion, pilling bed worth rule, Conditions for wet corrosion	1	19-11-22		TLM1	
4	Mechanism- oxygen absorption, hydrogen evolution, types of wet corrosion	1	21-11-22		TLM1	
5	Galvanic Corrosion, passivity and Galvanic series	1	22-11-22		TLM1	
6	Concentration Cell Corrosion	1	24-11-22		TLM1	
7	Concentration Cell Corrosion examples contd..	1	26-11-22		TLM1	
8	Nature of metal,	1	28-11-22		TLM1	
9	Nature of environment	1	29-11-22		TLM1	
10	Cathodic Protection	1	01-12-22		TLM1	
11	Electroplating, metal cladding.	1	03-12-22		TLM1	
12	Revision of Unit II, Assignment & Quiz	1	05-12-22		TLM1	
<b>No. of classes required to complete UNIT-II: 12</b>				<b>No. of classes taken:</b>		

**UNIT-III: CHEMISTRY OF ENGINEERING MATERIALS**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction, types of nano-materials, ,	1	06-12-22		TLM1	
2	Gas-Phase Synthesis of nanomaterials	1	08-12-22		TLM1	
3	Applications of nano materials	1	10-12-22		TLM2	
4	Materials in Electronic devices.	1	19-12-22		TLM1	
5	Contd.. Materials in Electronic devices	1	20-12-22		TLM2	
6	Contd.. Materials in Electronic devices	1	22-12-22		TLM2	
7	Characteristics of Molecular motors and machines	1	24-12-22		TLM1	
8	Characteristics of Molecular motors and	1	26-12-22		TLM2	

	machines contd....					
9	Rotaxanes as artificial molecular machines	1	27-12-22		TLM2	
10	Catenanes as artificial molecular machines	1	29-12-22		TLM2	
11	Automated light powered molecular motars	1	31-12-22		TLM2	
12	Revision of Unit III, Assignment & Quiz	1	02-01-23		TLM2	
<b>No. of classes required to complete UNIT-III: 12</b>				<b>No. of classes taken:</b>		

#### UNIT-IV :LIQUID CRYSTALS & POLYMERS

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Classification of liquid crystals	1	03-01-23		TLM1	
2	Mechanism of working liquid crystals & their applications	1	05-01-23		TLM1	
3	Introduction and types of polymerizations,	1	07-01-23		TLM1	
4	Preparation, properties and engineering applications of P.M.M.A, Teflon	1	09-01-23		TLM2	
5	Preparation properties and engineering applications of Polycarbonate,.	1	10-01-23		TLM1	
6	Structure of raw rubber and vulcanized rubber	1	12-01-23		TLM1	
7	Preparation properties and engineering applications of Polyurethane, Buna-S	1	17-01-23		TLM1	
8	Conducting polymers	1	19-01-23		TLM1	
9	Biodegradable polymers	1	21-01-23		TLM1	
10	Revision of Unit IV, Assignment & Quiz	1	23-01-23		TLM1	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-V :ANALYTICAL TECHNIQUES

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Types of analysis	1	24-01-23		TLM1	
2		1	28-01-23		TLM1	
3	Principle of conductometric titrations, Strong acid vs strong base titrations	1	30-01-23		TLM1	

4	Strong acid vs weak base titrations, Strong base vs weak acid titrations	1	31-01-23		TLM1	
5	Weak acid vs weak base titrations	1	02-02-23		TLM1	
6	Principle of potentiometry Acid-base titration	1	04-02-23		TLM1	
7	Redox titration	1	06-02-23		TLM1	
8	Colorimetry, Principle and determination of iron by using thiocyanate as a reagent	1	07-02-23		TLM1	
9	Revision of Unit V <b>Assignment &amp; Quiz</b>	1	09-02-23		TLM1	
<b>No. of classes required to complete UNIT-V: 9</b>				<b>No. of classes taken:</b>		

<b>CONTENTS BEYOND SYLLABUS</b>						
1	Batteries used in mobile phones of popular companies Polymers in industrial applications	1	11-02-23		TLM1	

<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):**

<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>

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.

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



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF FRESHMAN ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr.V.Parvathi

**Course Name & Code** : Engineering Chemistry&20FE06

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

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

**Credits:03**

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

**Pre-requisites:** Nil

**Course Educational Objectives:** It enables the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions. It helps to strengthen the basic concepts of electrochemistry, corrosion, nanotechnology, polymers, liquid crystals and analytical techniques.

**COURSE OUTCOMES (COs):** After completion of the course, students will be able to

C01	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications (L3)
C02	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications (L3)
C03	Analyze the suitability of advanced materials like nano-materials in electronics and medicine (L4)
C04	Identify the importance of liquid crystals, polymers in advanced technologies (L2)
C05	Apply the principles of analytical techniques in chemical analysis (L3)

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

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	2	1	-	2	2	-	-	-	-	2
C02	3	2	2	1	-	2	1	-	-	-	-	2
C03	3	2	2	1	-	1	1	-	-	-	-	2
C04	3	2	2	1	-	1	1	-	-	-	-	2
C05	3	2	1	1	-	1	1	-	-	-	-	2
<p style="text-align: center;">1 = Slight (Low)                      2 = Moderate (Medium)                      3 = Substantial (High)</p>												

**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** Shikha Agarwal, "A Text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1<sup>st</sup> Edition, 2015
- T2** Jain, Jain, "A textbook of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16<sup>th</sup> Edition, 2015.

**BOS APPROVED REFERENCE BOOKS:**

- R1** Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, Delhi, 3<sup>rd</sup> Edition, 2003.
- R2** S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12<sup>th</sup> Edition, 2010
- R3** Prasanta Rath, B. Rama Devi, Ch. Venkata Ramana Reddy, SubhenduChakroborty, "Engineering Chemistry", Cengage Learning India, 1<sup>st</sup> Edition, 2019.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: ELECTRO CHEMISTRY & BATTERIES**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Bridge course	1	19-10-22		TLM1	
2	Bridge course	1	20-10-22		TLM1	
3	Bridge course	1	21-10-22		TLM1	
4	Introduction to Course and COs	1	22-10-22		TLM1	
5	Prerequisites for Unit-I	1	26-10-22		TLM3	
6	Applications of Electro-chemical Series	1	27-10-22		TLM1	
7	Calculation of EMF of Cell	1	28-11-22		TLM1	
8	Practice exercises on applications of Electro chemical series	1	29-11-22		TLM2	
9	Glass Electrode, Calomel Electrode	1	02-11-22		TLM2	
10	Applications of Nernst Equation	1	03-11-22		TLM1	
11	Applications of Nernst Equation	1	09-11-22		TLM2	
12	Lead-acid Battery	1	10-11-22		TLM2	
13	Lithium-ion Battery	1	11-11-22		TLM1	
14	H <sub>2</sub> – O <sub>2</sub> Fuel cell, Mg-Cu Reserve Battery	1	12-11-22		TLM1	
15	Revision of Unit 1, Assignment & Quiz	1	16-11-22		TLM1	
<b>No. of classes required to complete UNIT-I: 15</b>				<b>No. of classes taken:15</b>		

**UNIT-II: SCIENCE OF CORROSION**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Definition, Examples, Dry corrosion	1	17-11-22		TLM1	
2	Corrosion by other gases and liquid metal corrosion	1	18-11-22		TLM1	
3	Contd.. Dry corrosion, pilling bed worth rule, Conditions for wet corrosion	1	19-11-22		TLM1	
4	Mechanism- oxygen absorption, hydrogen evolution, types of wet corrosion	1	23-11-22		TLM1	
5	Galvanic Corrosion, passivity and Galvanic series	1	24-11-22		TLM1	
6	Concentration Cell Corrosion	1	25-12-22		TLM1	
7	Concentration Cell Corrosion examples contd..	1	26-12-22		TLM1	
8	Nature of metal,	1	30-12-22		TLM1	
9	Nature of environment	1	01-12-22		TLM1	
10	Cathodic Protection	1	02-12-22		TLM1	
11	Electroplating, metal cladding.	1	03-12-22		TLM1	
12	Revision of Unit II, Assignment & Quiz	1	07-12-22		TLM1	
<b>No. of classes required to complete UNIT-II: 12</b>				<b>No. of classes taken:</b>		

**UNIT-III: CHEMISTRY OF ENGINEERING MATERIALS**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction, types of nano-materials, ,	1	08-12-22		TLM1	
2	Gas-Phase Synthesis of nanomaterials	1	09-12-22		TLM1	
3	Applications of nano materials	1	10-12-22		TLM2	
4	Materials in Electronic devices.	1	21-12-22		TLM1	
5	Contd.. Materials in Electronic devices	1	22-12-22		TLM2	
6	Contd.. Materials in Electronic devices	1	23-12-22		TLM2	
7	Characteristics of Molecular motors and machines	1	24-12-22		TLM1	

8	Characteristics of Molecular motors and machines contd....	1	28-12-22		TLM2	
9	Rotaxanes as artificial molecular machines	1	29-12-22		TLM2	
10	Catenanes as artificial molecular machines	1	30-12-22		TLM2	
11	Automated light powered molecular motars	1	31-12-22		TLM2	
12	Revision of Unit III, Assignment & Quiz	1	04-01-23		TLM2	
<b>No. of classes required to complete UNIT-III: 12</b>				<b>No. of classes taken:</b>		

#### UNIT-IV :LIQUID CRYSTALS & POLYMERS

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Classification of liquid crystals	1	05-01-23		TLM1	
2	Mechanism of working liquid crystals & their applications	1	06-01-23		TLM1	
3	Introduction and types of polymerizations,	1	07-01-23		TLM1	
4	Preparation, properties and engineering applications of P.M.M.A, Teflon	1	11-01-23		TLM2	
5	Preparation properties and engineering applications of Polycarbonate,.	1	12-01-23		TLM1	
6	Structure of raw rubber and vulcanized rubber	1	18-01-23		TLM1	
7	Preparation properties and engineering applications of Polyurethane, Buna-S	1	19-01-23		TLM1	
8	Conducting polymers	1	20-01-23		TLM1	
9	Biodegradable polymers	1	21-01-23		TLM1	
10	Revision of Unit IV, Assignment & Quiz	1	25-01-23		TLM1	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-V :ANALYTICAL TECHNIQUES

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Types of analysis	1	27-01-23		TLM1	
2		1	28-01-23		TLM1	
3	Principle of conductometric titrations, Strong acid vs	1	01-02-23		TLM1	

	strong base titrations				
4	Strong acid vs weak base titrations, Strong base vs weak acid titrations	1	02-02-23		TLM1
5	Weak acid vs weak base titrations	1	03-02-23		TLM1
6	Principle of potentiometry Acid-base titration	1	04-02-23		TLM1
7	Redox titration	1	08-02-23		TLM1
8	Colorimetry, Principle and determination of iron by using thiocyanate as a reagent	1	09-02-23		TLM1
9	Revision of Unit V <b>Assignment &amp; Quiz</b>	1	10-02-23		TLM1
<b>No. of classes required to complete UNIT-V: 9</b>				<b>No. of classes taken:</b>	

<b>CONTENTS BEYOND SYLLABUS</b>					
1	Batteries used in mobile phones of popular companies Polymers in industrial applications	1	11-02-23		TLM1

<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):**

<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>

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.

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



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr. P.SRIHARI

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

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech/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
<b>CO1</b>	3	2										1			
<b>CO2</b>	3	2										1			
<b>CO3</b>	3	2										1			
<b>CO4</b>	3	2										1			
			<b>1 - Low</b>			<b>2 -Medium</b>			<b>3 - High</b>						

**TEXTBOOKS:**

- T1** A.Sudhakar and Shyammohan 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	20-10-2022		TLM1	
4.	Kirchhoff's Laws	1	21-10-2022		TLM1	
5.	Kirchhoff's Laws	1	22-10-2022		TLM1	
6.	series, parallel Reduction	1	25-10-2022		TLM1	
7.	Star-Delta Reduction	1	27-10-2022		TLM1	
8.	Source Transformation Technique	1	28-10-2022		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	03-11-2022		TLM1	
13.	Problems	1	04-11-2022		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	10-11-2022		TLM1	
18.	Thevenin's Theorem	1	11-11-2022		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	17-11-2022		TLM1	
23.	Phase and Phase difference	1	18-11-2022		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	24-11-2022		TLM1	
28.	Problems	1	25-11-2022		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	01-12-2022		TLM1	
33.	EMF equation	1	02-12-2022		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	08-12-2022		TLM1	
38.	Problems	1	09-12-2022		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	22-12-2022		TLM1	
43.	EMF equation	1	23-12-2022		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	29-12-2022		TLM1	
48.	Operation	1	30-12-2022		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	05-01-2023		TLM1	
53.	Bridge type	1	06-01-2023		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	12-01-2023		TLM1	
58.	Problems	1	19-01-2023		TLM1	
59.	Problems	1	20-01-2023		TLM1	
60.	Revision	1	21-01-2023		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	23-01-2023		TLM1	
62.	Construction	1	24-01-2023		TLM1	
63.	Principle of operation, Symbol	1	27-01-2023		TLM1	
64.	CB configuration	1	28-01-2023		TLM1	
65.	CE configuration	1	30-01-2023		TLM1	
66.	JFET - Operation	1	31-01-2023		TLM1	
67.	JFET - Characteristics	1	02-02-2023		TLM1	
68.	MOSFET - Operation	1	03-02-2023		TLM1	
69.	MOSFET - Characteristics	1	04-02-2023		TLM1	
70.	application of transistor as an amplifier	1	06-02-2023		TLM1	
71.	Problems	1	07-02-2023		TLM1	
72.	Problems	1	09-02-2023		TLM1	

73.	Problems	1	10-02-2023		TLM1	
74.	Problems & Revision	1	11-02-2023		TLM2	
<b>No. of classes required to complete UNIT-V: 14</b>				<b>No. of classes taken:</b>		

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and 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 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 P.SRIHARI	Mr.J.V.PAVAN CHAND	Dr G.NAGESWARA RAO	Dr.J.S.V.PRASAD
Signature				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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

Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Mr. P.SRIHARI

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

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

**Credits:** 3

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

**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
<b>CO1</b>	3	2										1			
<b>CO2</b>	3	2										1			
<b>CO3</b>	3	2										1			
<b>CO4</b>	3	2										1			
	1 - Low			2 -Medium						3 - High					

**TEXTBOOKS:**

- T1** A.Sudhakar and Shyammohan 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>		

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	<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
<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 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 P.SRIHARI	Mr.J.V.PAVAN CHAND	Dr G.NAGESWARA RAO	Dr.J.S.V.PRASAD
Signature				





# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (GSE, IT, ECE, EEE & ME)

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

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

## DEPARTMENT OF INFORMATION TECHNOLOGY

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Phaneendra Kanakamedala  
Course Name & Code : Programming for Problem Solving Using C Lab  
L-T-P Structure : 3-0-p Credits: 3  
Program/Sem/Sec : B.Tech., IT., I-Sem., Sections- B A.Y : 2020-21

#### **PRE-REQUISITE: NIL**

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of the course is to learn the basic elements of C Programming Structures like Data Types, Expressions, Control Statements, and Various I/O Functions and to solve simple mathematical problems using control structures. Design and implementation of various software components, which solve real world problems.

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

<b>CO 1</b>	Apply control structures of C in solving computational problems.
<b>CO 2</b>	Implement derived data types & use modular programming in problem solving
<b>CO 3</b>	Implement user defined data types and perform file operations.
<b>CO 4</b>	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

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

#### **TEXT BOOKS:**

**T1** ReemaThareja, Programming in C, Oxford University Press, 2nd Edition, 2015.

#### **REFERENCE BOOKS:**

- R1** Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 7th Edition, 2013
- R2** E Balagurusamy, Computer Programming, McGraw Hill Education, 8th Edition.
- R3** C: The Complete Reference, McGraw Hall Education, 4th Edition.
- R4** PradeepDey, Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition, 2011
- R5** Stephen G.Kochan, Programming in C, Pearson Education, 3rd Edition, 2005

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

Module NO	Date (Tentative)	Actual Date	Topics to be covered
1	20-10-2022		Introduction to Raptor Tool. draw flow charts for a) Find the distance travelled b) Find the total people attended the show c) Express the expenses in percentages d) Find different category of tickets sold e) Find average show rating
2	27-10-2022		Problem solving using Raptor Tool a) Celsius to Fahrenheit conversion b) Arithmetic operations c) Area and perimeter of circle d) Area of a triangle e) Converting Decimal No to Different Forms
3	03-11-2022		Exercise Programs on selection statements a) Biggest of three numbers b) Grade of a student c) Roots of quadratic equation d) Leap year e) Current Bill Calculation
4	10-11-2022		Exercise Programs on Loops a) Count No of Digits b) Multiplication Table c) Prime or not d) Reverse the given no e) Factorial
5	17-11-2022 24-11-2022		Exercise Programs on Loops & nesting of Loops. a) Fibonacci series b) Palindrome c) Factors d) Armstrong or not e) f) Write a C program to print the following format  <pre> 1                                     * 2 2                                 *  * 3 3 3                             *  *  * 4 4 4 4                           *  *  *  * 5 5 5 5 5                         *  *  *  *  *</pre>
6	01-12-2022		Exercise Programs on Arrays & Strings. a) Sum and average of n numbers b) Maximum and minimum in a list c) Linear search d) Binary search e) Bubble Sort

7	08-12-2022 22-12-2022		Exercise Programs on Arrays & Strings. a) Addition and subtraction of two matrices b) Multiplication of matrices c) Transpose of a matrix d) Sorting city names in alphabetical order e) Demonstration of built-in string functions
8	29-12-2022		Exercise Programs on String functions Write a C program to perform the following using and without using built in functions a) find the string length b) copy one string into another c) concatenate two strings d) check whether two strings are equal or not e) convert the given string into upper and lower case
9	05-01-2023 12-01-2023		Exercise Programs on Functions & Recursive Functions. a) Arithmetic operations using functions b) LCM and GCD of two numbers c) evaluate the expression $2.5\log x + \cos 32^\circ +  x^2 - y^2  + \sqrt{2xy}$ d) Factorial of a number with and without recursive function e) Sum of the series $1+2+3+\dots+n$ f) Fibonacci series recursion g) Towers of Hanoi recursion h) Binary Search using recursion
10	19-01-2023		Exercise Programs on & pointers a) program to swap two numbers using pointers b) perform arithmetic operations using dynamic allocation c) program to display array elements using pointers d) program to demonstrate call-by value & call-by reference e) program to display the city names using pointers
11	26-01-2023		Exercise Programs on user defined data types. a) program to print the electricity bill b) program to display the students marks memo c) program to display the employee information d) program to display the bank customers information e) program to display the total marks of each student & subject
12	02-02-2023		Exercise Programs on Files. a) Create and display a text file using getc, putc b) Create and display a text file using fgets, fputs c) Create a bank binary file using fwrite d) Reading bank file using fread e) Modify the bank of a file (deposit/withdraw) f) Count no of records in a bank file
13	09-02-2023		INTERNAL EXAM

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

## PART-C

### EVALUATION PROCESS (R17 Regulations):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

<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>	Organize, Analyze and interpret the data to extract meaningful conclusions.
<b>PSO 2</b>	Design, Implement and Evaluate a computer-based system to meet desired needs
<b>PSO 3</b>	Develop IT application services with the help of different current engineering tools.

Course Instructor	Course Coordinator	Module Coordinator	HOD
<b>Mr. K. Phaneendra</b>	<b>Dr. Seelam Nagarjuna Reddy</b>	<b>Dr. S. Naganjaneyulu</b>	<b>Dr. B. Srinivasa Rao</b>



**COURSE HANDOUT**

**Part-A**

<b>PROGRAM</b>	: I B. Tech., I-Sem., IT-B
<b>ACADEMIC YEAR</b>	: 2022-23
<b>COURSE NAME &amp; CODE</b>	: Differential Equations
<b>L-T-P STRUCTURE</b>	: 5-0-0
<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
1.	Bridge Course	8	17/10/2022 To 28/10/2022		TLM2			
2.	Introduction to the course, Course Outcomes	1	29/10/2022		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	01/11/2022		TLM1	CO1	T1,T2	
5.	Exact DE	1	02/11/2022		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	05/11/2022		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	11/11/2022		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (Cartesian)	1	12/11/2022		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (polar)	1	14/11/2022		TLM1	CO1	T1,T2	
13.	Orthogonal Trajectories (polar)	1	15/11/2022		TLM1	CO1	T1,T2	
14.	Problems	1	14/11/2022		TLM1	CO1	T1,T2	
15.	<b>TUTORIAL 1</b>	1	15/11/2022		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	16/11/2022		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	19/11/2022		TLM1	CO2	T1,T2	
19.	P.I for Cos bx or sin bx	1	21/11/2022		TLM1	CO2	T1,T2	
20.	P.I for polynomial function	1	22/11/2022		TLM1	CO2	T1,T2	
21.	P.I for $e^{ax+b}v(x)$	1	23/11/2022		TLM1	CO2	T1,T2	
22.	P.I for $e^{ax+b}v(x)$	1	25/11/2022		TLM1	CO2	T1,T2	

23.	P.I for $x^k v(x)$	1	26/11/2022		TLM1	CO2	T1,T2	
24.	P.I for $x^k v(x)$	1	28/11/2022		TLM1	CO2	T1,T2	
25.	Method of Variation of parameters	1	29/11/2022		TLM1	CO2	T1,T2	
26.	Method of Variation of parameters	1	30/11/2022		TLM1	CO2	T1,T2	
27.	<b>TUTORIAL 2</b>	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	03/12/2022		TLM2	CO3	T1,T2	
29.	Numerical Methods	1	05/12/2022		TLM1	CO3	T1,T2	
30.	Solution by Taylor's series	1	06/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Taylor's series	1	07/12/2022		TLM1	CO3	T1,T2	
32.	Picard's Method	1	09/12/2022		TLM1	CO3	T1,T2	
33.	Picard's Method	1	10/12/2022		TLM1	CO3	T1,T2	
<b>I MID EXAMINATIONS (12-12-2022 TO 17-12-2022)</b>								
34.	Euler's Method	1	19/12/2022		TLM1	CO3	T1,T2	
35.	Modified Euler's Method	1	20/12/2022		TLM1	CO3	T1,T2	
36.	Modified Euler's Method	1	21/12/2022		TLM1	CO3	T1,T2	
37.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
38.	Runge- Kutta Method	1	24/12/2022		TLM1	CO3	T1,T2	
39.	<b>TUTORIAL 3</b>	1	26/12/2022		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	27/12/2022		TLM2	CO4	T1,T2	
41.	Generalized Mean Value Theorem, Taylor's series	1	28/12/2022		TLM1	CO4	T1,T2	
42.	Maclaurin's series	1	30/12/2022		TLM1	CO4	T1,T2	
43.	Functions of several variables	1	31/12/2022		TLM1	CO4	T1,T2	
44.	Jacobians( Cartesian coordinates)	1	02/01/2023		TLM1	CO4	T1,T2	



45.	Jacobians (polar, coordinates)	1	03/01/2023		TLM1	CO4	T1,T2	
46.	Jacobians (cylindrical, spherical coordinates)	1	04/01/2023		TLM1	CO4	T1,T2	
47.	Functional dependence	1	06/01/2023		TLM1	CO4	T1,T2	
48.	Maxima and Minima	1	07/01/2023		TLM1	CO4	T1,T2	
49.	Maxima and Minima of functions of two variables	1	02/01/2023		TLM1	CO4	T1,T2	
50.	Maxima and Minima of functions of two variables	1	03/01/2023		TLM1	CO4	T1,T2	
51.	<b>TUTORIAL 4</b>	1	04/01/2023		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	06/01/2023		TLM2	CO5	T1,T2	
53.	Partial Differential equations	1	07/01/2023		TLM1	CO5	T1,T2	
54.	Formation of PDE by elimination of arbitrary constants	1	09/01/2023		TLM1	CO5	T1,T2	
55.	Formation of PDE by elimination of arbitrary functions	1	10/01/2023		TLM1	CO5	T1,T2	
56.	Formation of PDE by elimination of arbitrary functions	1	11/01/2023		TLM1	CO5	T1,T2	
57.	Formation of PDE by elimination of arbitrary functions	1	13/01/2023		TLM1	CO5	T1,T2	
58.	Solving of PDE	1	20/01/2023		TLM1	CO5	T1,T2	
59.	Solving of PDE	1	21/01/2023		TLM1	CO5	T1,T2	
60.	Solving of PDE	1	23/01/2023		TLM1	CO5	T1,T2	
61.	Lagrange's Method	1	24/01/2023		TLM1	CO5	T1,T2	
62.	Lagrange's Method	1	25/01/2023		TLM1	CO5	T1,T2	
63.	Lagrange's Method	1	27/01/2023		TLM1	CO5	T1,T2	
64.	<b>TUTORIAL 5</b>	1	28/01/2023		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
65.	Lagrange's Method Other models	1	30/01/2023		TLM1	CO4	T1,T2	
66.	Solving of PDE	1	31/01/2023		TLM5	CO5	T1,T2	

	other methods						
67.	Unit-1-Class Test	1	01/02/2023		TLM3	CO1	T1,T2
68.	Unit-2-Class Test	1	03/02/2023		TLM3	CO2	T1,T2
69.	Unit-3-Class Test	1	04/02/2023		TLM3	CO3	T1,T2
70.	Unit-4-Class Test	1	06/02/2023		TLM3	CO4	T1,T2
71.	Unit-5-Class Test	1	08/02/2023		TLM3	CO5	T1,T2
72.	Old question papers practice	1	10/02/2023		TLM3	CO1-CO5	T1,T2
73.	Old question papers practice	1	11/02/2023		TLM3	CO1-CO5	T1,T2
No. of classes		9		No. of classes taken:			
<b>II MID EXAMINATIONS (13-02-2023 TO 18-02-2023)</b>							

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

### PART-C

#### EVALUATION PROCESS (R20 Regulation):

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

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

<b>Dr.K.BhanuLakshmi</b>	<b>Dr. A. RAMI REDDY</b>	<b>Dr. A. RAMI REDDY</b>	<b>Dr. A. RAMI REDDY</b>
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.

<http://cse.lbrce.ac.in>, [cse.lbreddy@gmail.com](mailto:cse.lbreddy@gmail.com), Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF AEROSPACE ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** PHANEENDRA KANAKAMEDALA **Reg:** R20  
**Course Name & Code** : PROGRAMMING FOR PROBLEM SOLVING USING C & 20CS01  
**L-T-P Structure** : 3-0-0 **Credits:** 3  
**Program/Sem/Sec** : B.Tech.-ASE/II Sem/Sec-A **A.Y.:** 2021-22

**PREREQUISITE:** NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The Objective of the course is to make learn the basic elements of C programming, control structures, derived data types, Modular programming, user defined structures, basics of files and its I/O operations.

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

<b>CO1</b>	Familiar with syntax and semantics of the basic programming language constructs. <b>(Understand - L2)</b>
<b>CO2</b>	Construct derived data types like arrays in solving problem. <b>(Apply - L3)</b>
<b>CO3</b>	Decompose a problem into modules and reconstruct it using various ways of user-defined functions. <b>(Apply - L3)</b>
<b>CO4</b>	Use user-defined data types like structures and unions and its applications to solve problems. <b>(Apply- L3)</b>
<b>CO5</b>	Discuss various file I/O operations and its application. <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	1	1	-	-	-	-	-	-	-	-	1	-	-	-
<b>CO2</b>	3	1	1	-	-	-	-	-	-	-	-	1	-	-	-
<b>CO3</b>	3	2	1	-	-	-	-	-	-	-	-	1	-	-	-
<b>CO4</b>	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
<b>CO5</b>	3	2	3	-	-	-	-	-	-	-	-	1	2	-	-
	1 - Low			2 -Medium						3 - High					

## SYLLABUS

**UNIT – I: - Introduction to Problem solving through C-Programming:** Problem Specification, Algorithm / pseudo code, flowchart, examples.

**C-Programming:** Structure of C program, identifiers, basic data types and sizes, Constants, variables, Input-output statements, A sample c program, operators, expressions, type conversions, conditional expressions, precedence of operators and order of evaluation.

**Control statements:** if, if else, else if ladder and switch statements, while, do-while and for statements, break, continue, goto and labels.

**UNIT – II: - Arrays:** concept, declaration, definition, accessing elements, storing elements, two dimensional and multi-dimensional arrays.

**Character Arrays:** declaration, initialization, reading, writing strings, string handling functions, Pre-processor Directives, and macros.

**Applications of Arrays:** Linear search, Binary search, Bubble Sort.

**UNIT – III: - Pointers-** concepts, declaring & initialization of pointer variables, pointer expressions, pointer arithmetic, pointers and arrays, pointers and character arrays, pointers to pointers.

**Functions:** basics, category of functions, parameter passing techniques, recursive functions-comparison with Iteration, Functions with arrays, Standard library functions, dynamic memory management functions, command line arguments.

**Storage classes** - auto, register, static and extern,

**UNIT – IV: - Derived types-** structures- declaration, definition, and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef.

**UNIT – V: - Files –** concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling.

### **TEXTBOOKS:**

**T1** Reema Thareja, Programming in C, Oxford University Press, 2nd Edition, 2015

### **REFERENCE BOOKS:**

**R1** Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 7th Edition, 2013.

**R2** E Balagurusamy, Computer Programming, McGraw Hill Education, 8th Edition.

**R3** C: The Complete Reference, McGraw Hall Education, 4th Edition.

**R4** PradeepDey, Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition, 2011.

**R5** Stephen G.Kochan, Programming in C, Pearson Education, 3rd Edition, 2000.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: INTRODUCTION TO PROBLEM SOLVING THROUGH C-PROGRAMMING

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.	Course Introduction, Introduction to Computers	1	17-10-2022		TLM2	
2.	History of Computers, Computer Software	1	18-10-2022		TLM2	
3.	Program Execution Scenario, Generations of Computers.	1	19-10-2022		TLM2	
4.	Problem solving Techniques, Algorithms, Flowcharts, Examples	3	20-10-2022 22-10-2022 25-10-2022		TLM2	
5.	Structure of C program, identifiers, basic data types and sizes	1	26-10-2022		TLM2	
6.	Constants, variables, Input-output statements	2	27-10-2022 29-10-2022		TLM2	
7.	A sample c program, operators, expressions	1	31-10-2022		TLM2	
8.	Precedence of operators and order of evaluation.	1	01-11-2022		TLM2	
9.	Control statements: if, if else	1	02-11-2022		TLM2	
10.	else if ladder and switch statements	1	03-11-2022		TLM2	
11.	while, do-while	2	05-11-2022 07-11-2022		TLM2	
12.	for statements, break, continue	2	08-11-2022 09-11-2022		TLM2	
13.	goto and labels	1	10-11-2022		TLM2	
<b>No. of classes required to complete UNIT-I: 18</b>				<b>No. of classes taken:</b>		

#### UNIT-II: ARRAYS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	<b>Arrays:</b> concept, declaration, definition, accessing elements of Single Dimensional Arrays	3	12-11-2022 14-11-2022 15-11-2022		TLM2	
15.	Two dimensional and multi-dimensional arrays	3	16-11-2022 17-11-2022 19-11-2022		TLM2	
16.	<b>Character Arrays:</b> declaration, initialization, reading, writing strings, string handling functions	3	21-11-2022 22-11-2022 23-11-2022		TLM2	
17.	Pre-processor Directives, and macros	3	24-11-2022 26-11-2022 28-11-2022		TLM2	
18.	<b>Applications of Arrays:</b> Linear search, Binary search, Bubble Sort	4	29-11-2022 30-11-2022 01-12-2022 03-12-2022		TLM2	
<b>No. of classes required to complete UNIT-II: 16</b>				<b>No. of classes taken:</b>		

**UNIT-III: POINTERS AND FUNCTIONS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Pointer Concepts, declaring & initialization of pointer variables	1	05-12-2022		TLM2	
20.	Pointer expressions & arithmetic	1	06-12-2022		TLM2	
21.	Pointers and Arrays	1	07-12-2022		TLM2	
22.	Pointers and character arrays	1	08-12-2022		TLM2	
23.	Pointers to pointers	1	10-12-2022		TLM2	
24.	Function's basics, category of functions	2	19-12-2022 20-12-2022		TLM2	
25.	Parameter passing techniques in Functions	2	21-12-2022 22-12-2022		TLM2	
26.	Recursive functions-comparison with Iteration	2	24-12-2022 26-12-2022		TLM2	
27.	Functions with arrays	1	27-12-2022		TLM2	
28.	Standard library functions, dynamic memory management functions, command line arguments.	3	28-12-2022 29-12-2022 31-12-2022		TLM2	
29.	<b>Storage classes</b> - auto, register, static and extern	2	02-01-2023 03-01-2023		TLM2	
<b>No. of classes required to complete UNIT-III: 17</b>				<b>No. of classes taken:</b>		

**UNIT-IV: STRUCTURES AND UNIONS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	structures-declaration, definition, and accessing structures, Nested structures	3	04-01-2023 05-01-2023 07-01-2023		TLM2	
31.	arrays of structures	1	09-01-2023		TLM2	
32.	Structures and functions	2	10-01-2023		TLM2	
33.	Pointers to structures, self-referential structures	2	11-01-2023 12-01-2023		TLM2	
34.	Unions, typedef.	2	17-01-2023 18-01-2023		TLM2	
<b>No. of classes required to complete UNIT-IV: 10</b>				<b>No. of classes taken:</b>		

**UNIT-V: FILES**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Files – concept of a file	1	19-01-2023		TLM2	
36.	Text files and binary files	2	21-01-2023 23-01-2023		TLM2	
37.	Streams, standard I/O, Formatted I/O	3	24-01-2023 25-01-2023 28-01-2023		TLM2	
38.	File I/O operations	3	30-01-2023 31-01-2023 01-02-2023		TLM2	
39.	Error handling	2	02-02-2023 06-02-2023		TLM2	
<b>No. of classes required to complete UNIT-V: 11</b>				<b>No. of classes taken:</b>		

### Content Beyond the Syllabus:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to C++, Object Programming	2	07-02-2023 08-02-2023		TLM2	
2.	I/O Operations in C++.	2	09-02-2023 11-02-2023		TLM2	

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

### PART-C

#### EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=18
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=07
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=18
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=07
<b>Assignment Marks = Average of A1, A2, A3, A4, A5</b>	<b>A=5</b>
<b>Mid Marks = 75% of Max ((M1+Q1), (M2+Q2)) + 25% of Min ((M1+Q1), (M2+Q2))</b>	<b>M=25</b>
<b>Cumulative Internal Examination (CIE): A+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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO 11</b>	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

<b>PSO 1</b>	Organize, Analyze and Interpret the data to extract meaningful conclusions.
<b>PSO 2</b>	Design, Implement and Evaluate a computer-based system to meet desired needs.
<b>PSO 3</b>	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. K. Phaneendra		Dr. S. Naganjaneyulu	Dr. B. Srinivasa Rao
Signature				