LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING, (AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
ISO 21001 : 2018, 50001 : 2018, 14001: 2015 Certified Institution
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor: K. Raju
Course Name & Code : Communicative English & 23FE01
L-T-P Structure : **3-0-0** **Credits:** 02
Program/Sem/Sec : B. Tech, I Sem/ AIDS-A
A.Y. : 2025-26

PREREQUISITE : **NIL**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objective of introducing this course, *Communicative English*, is to facilitate effective Listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

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

CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.	L2
CO2	Apply grammatical structures to formulate sentences and correct word forms.	L3
CO3	Use discourse markers to speak clearly on a specific topic in informal discussions.	L3
CO4	Read / Listen the texts and write summaries based on global comprehension of these texts.	L2
CO5	Prepare a coherent paragraph, essay, and resume.	L3

COURSE ARTICULATION MATRIX (Correlation between COs & POs)

Course Outcomes / PO's →	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1.	-	-	-	1	-	-	-	-	3	3	-	2
CO2.	-	-	-	1	-	-	-	-	3	3	-	2
CO3.	-	-	-	1	-	-	-	-	3	3	-	2
CO4.	-	-	-	1	-	-	-	-	3	3	-	2
CO5.	-	-	-	1	-	-	-	-	3	3	-	2
1 = Slight (Low)			**2= Moderate (Medium)**					**3 = Substantial (High)**				

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	2 Weeks	04-08-2025 TO 16-08-2025		TLM1	CO1		
2.	Introduction to the course				TLM1	CO1		
3.	Course Outcomes, Program Outcomes				TLM2	CO1		

UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**Human Values: Gift of Magi**	02	19/08/25 20/08/25		TLM1 TLM 6	CO1	T1,T2	
2.	**Skimming to get main idea; Scanning for specific pieces of information**	02	22/08/25 26/08/25		TLM2 TLM5	CO1	T1,T2	
3.	**Mechanics of Writing: Capitalization, Spelling, Punctuation & Parts of Sentences**	02	29/08/25 02/09/25		TLM1 TLM6 TLM5	CO1	T1,T2	
4.	**Parts of speech**	02	03/09/25 05/09/25		TLM2 TLM6	CO1	T1,T2	
5.	**Basic Sentence Structures, Forming questions**	01	09/09/25		TLM2 TLM6	CO1	T1,T2	
6.	**Synonyms, Antonyms, Affixes, Root Words**	02	10/09/25 12/09/25		TLM2 TLM5	CO1	T1,T2	
No. of classes required to complete UNIT-I: 11						**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**Nature: The Brook by Alfred Tennyson**	02	16/09/25 17/09/25		TLM1 TLM 6	CO2	T1,T2	
2.	**Identifying Sequence of ideas, Linking ideas into a Paragraph**	02	19/09/25 23/09/25		TLM2 TLM5	CO2	T1,T2	
3.	**Structure of Paragraph – Paragraph Writing**	02	24/09/25 26/09/25		TLM1 TLM6 TLM5	CO2	T1,T2	
4.	**Cohesive Devices-linkers**	02	07/10/25 08/10/25		TLM2 TLM6	CO2	T1,T2	

5.	**Use of Articles and zero article, Prepositions**	01	10/10/25		TLM2 TLM6	CO2	T1,T2	
6.	**Homophones, Homographs, Homonyms**	01	14/10/25		TLM2 TLM6	CO2	T1,T2	
No. of classes required to complete UNIT-II: 10						**No. of classes taken:**		

UNIT-III:

S. No.	**Topics to be covered**	**No. of Classes Required**	**Tentative Date of Completion**	**Actual Date of Completion**	**Teaching Learning Methods**	**Learning Outcome COs**	**Text Book followed**	**HOD Sign Weekly**
1.	**Biography: Elon Musk**	02	15/10/25 17/10/25		TLM1 TLM 6	CO3	T1,T2	
2.	**Reading and making basic inferences – recognizing and interpreting the text clues for comprehension**	02	28/10/25 29/10/25		TLM2 TLM5	CO3	T1,T2	
3.	**Summarizing, Note-making, Paraphrasing**	02	28/10/25 29/10/25		TLM1 TLM6 TLM5	CO3	T1,T2	
4.	**Verbs- Tenses, Subject-verb agreement**	02	31/10/25 04/10/25		TLM2 TLM6	CO3	T1,T2	
5.	**Compound words, Collocations**	01	05/10/25		TLM2 TLM5	CO3	T1,T2	
No. of classes required to complete UNIT-III: 09						**No. of classes taken:**		

UNIT-IV:

S. No.	**Topics to be covered**	**No. of Classes Required**	**Tentative Date of Completion**	**Actual Date of Completion**	**Teaching Learning Methods**	**Learning Outcome COs**	**Text Book followed**	**HOD Sign Weekly**
1.	**Inspiration: The Toys of Peace- by Saki**	02	07/10/25 11/11/25		TLM1 TLM 6	CO4	T1,T2	
2.	**Study of graphic elements in text to display complicated data**	02	12/11/25 14/11/25		TLM2 TLM5	CO4	T1,T2	
3.	**Letter Writing : Official Letters, Resumes**	02	18/11/25 19/11/25		TLM1 TLM6 TLM5	CO4	T1,T2	
4.	**Reporting verbs, Direct & Indirect Speech, Active & Passive voice**	02	21/11/25 25/11/25		TLM2 TLM6	CO4	T1,T2	
5.	**Words often confused, Jargons**	01	26/11/25		TLM2 TLM5	CO4	T1,T2	

No. of classes required to complete UNIT-IV: 09			No. of classes taken:

UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**Motivation: The Power of Interpersonal Communication**	02	28/11/25 02/12/25		TLM1 TLM 6	CO5	T1,T2	
2.	**Reading Comprehension**	02	03/12/25 05/12/25		TLM2 TLM5	CO5	T1,T2	
3.	**Structured Essays on specific topics**	02	09/12/25 10/12/25		TLM1 TLM6 TLM5	CO5	T1,T2	
4.	**Editing Texts – Correcting Common errors**	01	12/12/25		TLM2 TLM6	CO5	T1,T2	
5.	**Technical Jargon**	01	16/12/25		TLM2 TLM5	CO5	T1,T2	
No. of classes required to complete UNIT-V: 08						**No. of classes taken:**		

S. No.	Topics to be covered beyond the syllabus	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Word Analogy**	01	17/12/25		TLM2 &5	
2.	**One-word substitutes**	01	19/12/25		TLM2 &5	
3.	**Technical vocabulary**	01	23/12/25		TLM2 &5	
No. of classes required to complete UNIT-V:				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III, 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):	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**K. Raju**	**Dr. R. Padma VENKAT**	**Dr. R. Padma VENKAT**	**Dr. T. Satyanarayana**
Signature				

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DIVISION OF CHEMISTRY

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.S.Vijaya Dasaradha
Course Name & Code :Chemistry&23FE02
L-T-P Structure :3-0-0 **Credits:03**
Program/Sem/Sec : IB.Tech./I-Sem/AI&DS-A **A.Y. :**2025-26

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enable the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions.
- To strengthen the basic concepts of bonding models, advanced engineering materials, electrochemistry, batteries and polymers.
- To introduce instrumental methods and their applications.

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

CO1	Understand the fundamentals of quantum mechanics and molecular orbital energydiagrams for molecules. **(Understand)**
CO2	Summarize the suitability of advanced materials like semiconductors,superconductors, super capacitors and nano materials, in advanced fields. **(Understand)**
CO3	Apply Nernst equation in calculating cell potentials and understand conductometric,potentiometric titrations, electrochemical sensors and compare batteries for differentapplications. **(Understand)**
CO4	Outline the importance of polymers and conducting polymers in advancedtechnologies. **(Understand)**
CO5	Understand the fundamentals of UV-Visible, IR spectroscopic techniques and basicprinciples of chromatographic techniques. **(Understand)**

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

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

1 = Slight (Low) **2 = Moderate (Medium)** **3 = Substantial (High)**

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference: Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer, Jr, 3rd Edition

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):AI&DS-A

UNIT-I: STRUCTURE AND BONDING MODELS

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 chemistry course, CO's &PO's& Bridge Course Fundamentals of Quantum Mechanics	2	04-08-2025 to 16-08-2025		TLM1	
2.	Schrodinger Wave Equation, Significance of Ψ and Ψ^2	1	20-08-2025		TLM1	
3.	Particle in one dimensional box	1	20-08-2025		TLM1	
4.	Molecular Orbital Theory – Bonding in Homonuclear diatomic molecules-Energy level diagrams (N_2 ,etc)	2	21-08-2025 & 23-08-2025		TLM1	
5.	Molecular Orbital Theory – Bonding in Homo- and Heteronuclear Diatomic Molecules-Energy level diagrams (CO, NO, etc.)	2	28-08-2025 & 30-08-2025		TLM1	
6.	Energy level diagrams-Summary	1	03-09-2025		TLM1	
7.	π-molecular orbitals of butadiene	1	03-09-2025		TLM1	
8.	π-molecular orbitals ofbenzene	1	04-09-2025		TLM1	
9.	Calculation of Bondorder	1	06-09-2025		TLM1	
10.	Revision and assignment	1	10-09-2025		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: MODERN 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.	Semiconductors - Introduction	1	10-09-2025		TLM1	
2.	Semiconductors - Basic concept	1	11-09-2025		TLM1	
3.	Semiconductors applications	1	13-09-2025		TLM1	
4.	Super conductors - Introduction	1	17-09-2025		TLM1	
5.	Super conductors - Basic concept&Properties	1	17-09-2025		TLM1	
6.	Super conductors - applications	1	18-09-2025		TLM1	
7.	Supercapacitors - Introduction, Basic concept	1	20-09-2025		TLM1	
8.	Supercapacitors - classifications	1	24-09-2025		TLM1	
9.	Supercapacitors - applications	1	24-09-2025		TLM1	
10.	Nano materials - Introduction	1	25-09-2025		TLM2	
11.	Nano materials - classification	2	27-09-2025 & 08-10-2025		TLM2	
12.	Nano materials - properties and applications of fullerenes	2	08-10-2025 & 09-10-2025		TLM2	
13.	Nano materials - carbon nanotubes and graphene nanoparticles	2	11-10-2025 & 15-10-2025		TLM2	
14.	Revision and assignment	3	15-10-2025 & 16,18-10-2025		TLM1	
No. of classes required to complete UNIT-II: 19				No. of classes taken:		

UNIT-III: ELECTROCHEMISTRY AND APPLICATIONS

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.	Electrochemical cell, Nernst equation	1	29-10-2025		TLM1	
2.	Cell potential calculations and numerical problems	2	29-10-2025 & 30-10-2025		TLM1	

3.	Potentiometry-potentiometric titrations (redox titrations)	1	01-11-2025		TLM1	
4.	Concept of conductivity, conductivitycell, conductometric titrations (acid-base titrations)	1	05-11-2025		TLM1	
5.	Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples	1	05-11-2025		TLM1	
6.	Primary cells – Zinc-air battery, Secondary cells – lithium-ion batteries-working of the batteries including cell reactions	2	06-11-2025 & 08-11-2025		TLM1	
7.	Fuel cells, hydrogen-oxygenfuel cell– working of the cells	1	12-11-2025		TLM1	
8.	PolymerElectrolyte Membrane Fuel cells (PEMFC)	1	12-11-2025		TLM1	
9.	Revision and assignment	2	13-11-2025 & 15-11-2025		TLM1	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: POLYMER CHEMISTRY

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 polymers, functionality of monomers	1	19-11-2025		TLM1	
2.	Chain growth and step growth polymerization, coordination polymerization, with specific examples	1	19-11-2025		TLM1	
3.	Mechanisms of polymer formation	1	20-11-2025		TLM1	
4.	Plastics –Thermo and Thermosetting plastics	1	22-11-2025		TLM1	
5.	Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres	2	26-11-2025 & 26-11-2025		TLM1	
6.	Elastomers–Buna-S, Buna-N–preparation, properties and applications	1	27-11-2025		TLM1	

7.	Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications	1	29-11-2025		TLM1	
8.	Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA)	1	03-12-2025		TLM1	
9.	Revision and assignment	2	03-12-2025 & 04-12-2025		TLM1	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: INSTRUMENTAL METHODS AND APPLICATIONS

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.	Electromagnetic spectrum	1	06-12-2025		TLM1	
2.	Absorption of radiation: Beer-Lambert's law	1	10-12-2025		TLM1	
3.	UV-Visible Spectroscopy	1	10-12-2025		TLM1	
4.	electronic transition, Instrumentation	1	11-12-2025		TLM1	
5.	IR spectroscopy, fundamental modes	1	13-12-2025		TLM1	
6.	selection rules, Instrumentation	1	17-12-2025		TLM1	
7.	Chromatography-Basic Principle	1	17-12-2025		TLM1	
8.	Classification-HPLC: Principle, Instrumentation and Applications	2	18-12-2025 & 20-12-2025		TLM1	
9.	Revision and assignment	1	24-12-2025		TLM1	
No. of classes required to complete UNIT-V: 10				No. of classes taken:		

TOPICS 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.	Applications of semiconductors, superconductors and nanomaterials in advanced technologies.	2	24-12-2025 & 27-12-2025		TLM1	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.S.Vijaya Dasaradha	**Dr.V.Parvathi**	**Dr.V.Parvathi**	**Dr.T.Satyanarayana**
Signature				

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM : I B. Tech., I-Sem., AI&DS-A
ACADEMIC YEAR : 2025-26
COURSE NAME & CODE : Linear Algebra & Calculus
L-T-P STRUCTURE : 4-1-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Mr. B. Tandava Krishna
COURSE COORDINATOR : Dr. K. Bhanu Lakshmi

PRE-REQUISITES : Basics of Matrices**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs): To equip the students with standard concepts and tools at an intermediate to advanced level Mathematics, to develop the confidence and ability among the students to handle various real-world problems and their applications.

COURSE OUTCOMES (COs)

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

CO1: Apply matrix algebra techniques to solve engineering problems – **L3**
CO2: Use Eigen values and Eigen vectors concept to find nature of quadratic form, inverse and powers of matrix – **L3**
CO3: Expand various functions using Mean value theorems – **L2**
CO4: Understand the concepts of functions of several variables which are useful in optimization – **L2**
CO5: Evaluate areas and volumes by using double and triple integrals – **L3**

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	1
CO2	3	2	-	-	-	-	-	-	-	-	-	1
CO3	3	1	-	-	-	-	-	-	-	-	-	1
CO4	3	2	-	-	-	-	-	-	-	-	-	1
CO5	3	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", 44nd Edition, Khanna Publishers, New Delhi, 2017.
T2 Erwin Kreyszig, *"Advanced Engineering Mathematics"*, 10th Edition, John Wiley & sons, New Delhi, 2018.

BOS APPROVED REFERENCE BOOKS:

R1 George B. Thomas, Maurice D. Weir and Joel Hass, "*Thomas Calculus*", 14th Edition, Pearson Publishers, 2018.
R2 R.K. Jain and S.R.K. Iyengar, "*Advanced Engineering Mathematics*", 5th Edition (9th reprint), Alpha Science International Ltd., 2021.
R3 Glyn James, "*Advanced Modern Engineering Mathematics*", 5th Edition, Pearson Publishers, 2018.
R4 Michael D.Greenberg, "*Advanced Engineering Mathematics*", 9th Edition, Pearson Publishers.

R5 H.K. Das, Er. Rajnish Verma, "*Higher Engineering Mathematics*", 3rd Edition (Reprint 2021), S. Chand Publications, 2014.

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	7	04-08-2025 To 14-08-2025		TLM1			
2.	Introduction to the course	1	18-08-2025		TLM1			
3.	Course Outcomes, Program Outcomes	1	18-08-2025		TLM2			

UNIT-I: Matrices

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
4.	Introduction to Unit I, Matrices	1	18-08-2025		TLM1	CO1	T1,T2	
5.	Rank of a matrix	1	20-08-2025		TLM1	CO1	T1,T2	
6.	Echelon form	1	22-08-2025		TLM1	CO1	T1,T2	
7.	**TUTORIAL II**	1	22-08-2025		TLM3	CO1	T1,T2	
8.	Normal form	1	23-08-2025		TLM1	CO1	T1,T2	
9.	Cauchy-Binet formulae	1	25-08-2025		TLM1	CO1	T1,T2	
10.	Inverse by Gauss-Jordan method	1	29-08-2025		TLM1	CO1	T1,T2	
11.	**TUTORIAL III**	1	29-08-2025		TLM3	CO1	T1,T2	
12.	System of Linear Equations	1	30-08-2025		TLM1	CO1	T1,T2	
13.	Homogeneous System of Equations	1	01-09-2025		TLM1	CO1	T1,T2	
14.	Homogeneous System of Equations	1	03-09-2025		TLM1	CO1	T1,T2	
15.	Non-Homogeneous System of Equations	1	06-09-2025		TLM1	CO1	T1,T2	
16.	Gauss Elimination Method	1	08-09-2025		TLM3	CO1	T1,T2	
17.	Gauss Elimination Method	1	10-09-2025		TLM1	CO1	T1,T2	
18.	Jacobi Iteration Method	1	12-09-2025		TLM1	CO1	T1,T2	
19.	**TUTORIAL III**	1	12-09-2025		TLM3	CO1	T1,T2	
20.	Gauss-Seidel Method	1	13-09-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-I		20			No. of classes taken:			

UNIT-II: Eigen Values, Eigen Vectors and Orthogonal Transformations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Introduction to Unit II	1	15-09-2025		TLM1	CO2	T1,T2	
22.	Eigen values, Eigen vectors	1	17-09-2025		TLM1	CO2	T1,T2	
23.	Eigen values, Eigen vectors	1	19-09-2025		TLM1	CO2	T1,T2	
24.	**TUTORIAL VI**	1	19-09-2025		TLM3	CO2	T1,T2	
25.	Eigen values, Eigen vectors	1	20-09-2025		TLM1	CO2	T1,T2	

26.	Properties	1	22-09-2025		TLM1	CO2	T1,T2	
27.	Properties	1	24-09-2025		TLM1	CO2	T1,T2	
28.	Cayley-Hamilton Theorem	1	26-09-2025		TLM1	CO2	T1,T2	
29.	**TUTORIAL VII**	1	26-09-2025		TLM3	CO2	T1,T2	
30.	Finding Inverse and Powers of matrix	1	27-09-2025		TLM1	CO2	T1,T2	
31.	Diagonalization of a matrix	1	06-10-2025		TLM3	CO2	T1,T2	
32.	Diagonalization of a matrix	1	08-10-2025		TLM1	CO2	T1,T2	
33.	Quadratic Forms	1	10-10-2025		TLM1	CO2	T1,T2	
34.	**TUTORIAL VIII**	1	10-10-2025		TLM3	CO2	T1,T2	
35.	Nature of Quadratic Forms	1	11-10-2025		TLM1	CO2	T1,T2	
36.	Reduction of Quadratic form to Canonical form	1	13-10-2025		TLM1	CO2	T1,T2	
37.	Reduction of Quadratic form to Canonical form	1	15-10-2025		TLM1	CO2	T1,T2	
38.	Orthogonal Transformation	1	17-10-2025		TLM1	CO2	T1,T2	
39.	**TUTORIAL IX**	1	17-10-2025		TLM3	CO2	T1,T2	
40.	Orthogonal Transformation	1	18-10-2025		TLM1	CO2	T1,T2	
No. of classes required to complete UNIT-II		17			No. of classes taken:			

I MID EXAMINATIONS (20-10-2025 TO 25-10-2025)

UNIT-III: Calculus

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
41.	Introduction to Unit III	1	27-10-2025		TLM1	CO3	T1,T2	
42.	Mean Value theorem	1	29-10-2025		TLM1	CO3	T1,T2	
43.	Rolle's theorem	1	31-10-2025		TLM1	CO3	T1,T2	
44.	**TUTORIAL X**	1	31-10-2025		TLM3	CO3	T1,T2	
45.	Rolle's theorem	1	01-11-2025		TLM1	CO3	T1,T2	
46.	Lagrange's mean value theorem	1	03-11-2025		TLM1	CO3	T1,T2	
47.	Lagrange's mean value theorem	1	05-11-2025		TLM1	CO3	T1,T2	
48.	Cauchy's mean value theorem	1	07-11-2025		TLM1	CO3	T1,T2	
49.	**TUTORIAL XI**	1	07-11-2025		TLM3	CO3	T1,T2	
50.	Cauchy's mean value theorem	1	08-11-2025		TLM1	CO3	T1,T2	
51.	Taylor's theorem	1	10-11-2025		TLM1	CO3	T1,T2	
52.	Taylor's theorem	1	12-11-2025		TLM1	CO3	T1,T2	
53.	Maclaurin's theorem	1	14-11-2025		TLM1	CO3	T1,T2	
54.	**TUTORIAL XII**	1	14-11-2025		TLM3	CO3	T1,T2	
55.	Maclaurin's theorem	1	15-11-2025		TLM1	CO3	T1,T2	
56.	Problems and applications	1	17-11-2025		TLM1	CO3	T1,T2	
57.	Problems and applications	1	19-11-2025		TLM1	CO3	T1,T2	

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

UNIT-IV: Partial differentiation and Applications (Multi variable Calculus)

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
58.	Introduction to Unit IV	1	21-11-2025		TLM1	CO4	T1,T2	
59.	**TUTORIAL XIII**	1	21-11-2025		TLM3	CO4	T1,T2	
60.	Functions of several variables, Continuity and Differentiability	1	22-11-2025		TLM1	CO4	T1,T2	
61.	Partial Derivatives	1	24-11-2025		TLM1	CO4	T1,T2	
62.	Total derivatives, Chain rule	1	26-11-2025		TLM1	CO4	T1,T2	
63.	Directional Derivative	1	28-11-2025		TLM1	CO4	T1,T2	
64.	**TUTORIAL XIV**	1	28-11-2025		TLM3	CO4	T1,T2	
65.	Taylor's Series expansion	1	29-11-2025		TLM1	CO4	T1,T2	
66.	Maclaurin's series expansion	1	01-12-2025		TLM1	CO4	T1,T2	
67.	Jacobian	1	03-12-2025		TLM1	CO4	T1,T2	
68.	Jacobian	1	05-12-2025		TLM1	CO4	T1,T2	
69.	**TUTORIAL XV**	1	05-12-2025		TLM3	CO4	T1,T2	
70.	Functional Dependence	1	06-12-2025		TLM1	CO4	T1,T2	
71.	Maxima and Minima	1	08-12-2025		TLM1	CO4	T1,T2	
72.	Lagrange Multiplier Method	1	10-12-2025		TLM1	CO4	T1,T2	
73.	Lagrange Multiplier Method	1	12-12-2025		TLM1	CO4	T1,T2	
74.	**TUTORIAL XV**I	1	12-12-2025		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		14			No. of classes taken:			

UNIT-V: Multiple Integrals (Multi variable Calculus)

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
75.	Introduction to Unit-V	1	13-12-2025		TLM1	CO5	T1,T2	
76.	Double Integrals - Cartesian coordinates	1	15-12-2025		TLM1	CO5	T1,T2	
77.	Double Integrals - Cartesian coordinates	1	17-12-2025		TLM1	CO5	T1,T2	
78.	Triple Integrals - Cartesian coordinates	1	19-12-2025		TLM1	CO5	T1,T2	
79.	**TUTORIAL XVII**	1	19-12-2025		TLM3	CO4	T1,T2	
80.	Triple Integrals - Spherical coordinates	1	20-12-2025		TLM1	CO5	T1,T2	
81.	Change of order of Integration	1	22-12-2025		TLM1	CO5	T1,T2	

82.	Change of order of Integration	1	24-12-2025		TLM1	CO5	T1,T2	
83.	Change of variables	1	26-12-2025		TLM1	CO5	T1,T2	
84.	**TUTORIAL XVII**	1	26-12-2025		TLM3	CO5	T1,T2	
85.	Finding area by double Integral	1	27-12-2025		TLM1	CO5	T1,T2	
No. of classes required to complete UNIT-V		14			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
86.	Other applications of double integral	1	27-12-2025		TLM2	CO5	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (29-12-2025 TO 31-12-2025)								

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III, 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):	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

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

B.TANDAVA KRISHNA	**DR. K. BHANU LAKSHMI**	**Dr. A. RAMI REDDY**	**Dr. T. SATYANARAYANA**
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (Under Tier - I) & ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor **:** M.Manoj Kumar

Course Name & Code **:** Basic Civil and Mechanical Engineering & 23CM01

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

Program/Sem/Sec : B.Tech., I-I-Sem., AI&DS-A **A.Y.:** 2025-26

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

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

CO1:	Describe various sub-divisions of Civil Engineering and to appreciate their role in societal development. **(Understand)**
CO2:	Outline the concepts of surveying and obtain the theoretical measurement of distances, angles and levels through surveying. **(Understand)**
CO3:	Classify the various materials used in construction and highway engineering and identify their appropriate usage as per the needs. **(Understand)**
CO4:	Illustrate the fundamental principles involved in transportation network system, their individual components and their engineering importance. **(Understand)**
CO5:	Explain the quality parameters of various water sources and functions of selected water storage and conveyance structures. **(Understand)**

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

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

Textbooks:

1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Basics of Civil Engineering

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction CO's & PO's, Subject	1	18-08-2025		**TLM2**	
2.	**Basics of Civil Engineering:** Role of Civil Engineers in Society	1	19-08-2025		**TLM2**	
3.	Various Disciplines of Civil Engineering- Structural Engineering-	1	21-08-2025		**TLM2**	
4.	Geo-technical Engineering-Transportation Engineering	1	23-08-2025		**TLM2**	
5.	Hydraulics and Water Resources Engineering Environmental Engineering	1	25-08-2025		**TLM2**	
6.	Building Construction and Planning-	1	26-08-2025		**TLM2**	
7.	Construction Materials-Cement -types	1	28-08-2025		**TLM2**	
8.	Aggregate types- Bricks-classifications	1	30-08-2025		**TLM2**	
9.	Steel-properties - types	1	01-09-2025		**TLM2**	
10.	Cement concrete- Applications	1	02-09-2025		**TLM2**	
11.	Introduction to Prefabricated construction Techniques, Over view-Prefabricated construction	1	04-09-2025		**TLM2**	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Surveying

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Objectives of Surveying, Horizontal Measurements	1	06-09-2025		**TLM2**	
2.	Angular Measurements, Compass survey	1	08-09-2025		**TLM2**	
3.	Introduction to Bearings,	1	09-09-2025		**TLM2**	
4.	Simple problems on bearings	1	11-09-2025		**TLM2**	
5.	Levelling introduction-	1	13-09-2025		**TLM2**	
6.	Practice problems	1	15-09-2025		**TLM2**	
7.	Levelling instruments used for levelling	1	16-09-2025		**TLM1**	
8.	Practice problems	1	18-09-2025		**TLM1**	
9.	Practice problems	1	20-09-2025		**TLM2**	
10.	Contour mapping	1	22-09-2025		**TLM2**	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Transportation Engineering & Water Resources and Environmental Engineering

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Transportation Engineering Importance of Transportation in Nation's economic development	1	23-09-2025		**TLM2**	
2.	Types of Highway Pavements	1	25-09-2025		**TLM2**	
3.	Basics of Harbour, Tunnel	1	27-09-2025		**TLM2**	
4.	Basics of Airport,	1	06-10-2025		**TLM2**	
5.	Railway Engineering	1	07-10-2025		**TLM2**	
6.	Water Resources and Environmental Engineering Introduction	1	09-10-2025		**TLM2**	
7.	Sources of water, Quality of water-Specifications	1	11-10-2025		**TLM2**	
8.	Introduction to Hydrology	1	13-10-2025		**TLM2**	
9.	Rainwater Harvesting-Water Storage and Conveyance Structures	1	14-10-2025		**TLM2**	
10.	Simple introduction to Dams and Reservoirs	1	16-10-2025		**TLM2**	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Head of the Department**
Name of the Faculty	**M. Manoj Kumar**	**B. Ramakrishna**	**Dr. K.V.Ramana**
Signature			

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
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ISO 21001:2018, 50001:2018, 14001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada.
L.B.REDDY NAGAR, MYLAVARAM. NTR District, AP, India. 521230.
hodads@lbrce.ac.in , ads@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. P. Bhagath
Course Name & Code : Introduction to Programming (23CS01)
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech./I/A A.Y.: 2025-26

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVE (CEO)

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects

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

CO1:	Understand basics of computers, concept of algorithms and flowcharts.	Understand – Level 2
CO2:	Understand the features of C programming language.	Understand – Level 2
CO3:	Interpret the problem and develop an algorithm to solve it.	Apply – Level 3
CO4:	Implement various algorithms using the C programming language.	Apply – Level 3
CO5:	Develop skills required for problem-solving and optimizing the code.	Apply – Level 3

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

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

TEXTBOOKS:

T1: The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall, 1988dition, 2015

T2: Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

REFERENCE BOOKS:

R1: Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.

R2: Programming in C, ReemaThareja, Oxford, 2016, 2nd edition

R3: C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT – I: Introduction to Programming and Problem Solving

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.	Discussion of CEO's and CO's	1	18-08-2025		**TLM1**	
2.	History of Computers	1	19-08-2025		**TLM1**	
3.	Basic organization of a computer: ALU, input-output units.	2	20-08-2025 20-08-2025		**TLM1**	
4.	Memory, program counter	1	22-08-2025		**TLM1**	
5.	Introduction to Programming Languages,	1	25-08-2025		**TLM1**	
6.	Basics of a Computer Program-Algorithms	1	26-08-2025		**TLM1**	
7.	Flowcharts (Using Dia Tool), pseudo code.	1	29-08-2025		**TLM1**	
8.	Introduction to Compilation and Execution	1	01-09-2025		**TLM1**	
9.	Primitive Data Types	2	02-09-2025 03-09-2025		**TLM1**	
10.	Variables, and Constants, Basic Input and Output operations	2	03-09-2025 08-09-2025		**TLM1**	
11.	Type Conversion, and Casting	2	09-09-2025 10-09-2025		**TLM1**	
12.	**Problem solving techniques:** Algorithmic approach, characteristics of algorithm	2	10-09-2025 12-09-2025		**TLM1**	
13.	Problem solving strategies: Top-down approach, Bottom-up approach	2	15-09-2025 16-09-2025		**TLM1**	
14	Time and space complexities of algorithms.	1	17-09-2025		**TLM1**	
No. of classes required to complete UNIT – I: 20				**No. of classes taken:**		

UNIT – II: Control Structures

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Simple sequential programs Conditional Statements	2	17-09-2025 19-09-2025		**TLM1**	
16.	if, if-else	1	22-09-2025		**TLM1**	
17.	switch	2	23-09-2025 24-09-2025		**TLM1**	
18.	Example programs on Decision Making and Branching	2	24-09-2025 26-09-2025		**TLM1**	
19.	Loops: while , Example programs	2	06-10-2025 07-10-2025		**TLM1**	
20.	do-while, Example programs	2	08-10-2025 08-10-2025		**TLM1**	
21.	for, Example programs	2	10-10-2025 13-10-2025		**TLM1**	
22.	Break and Continue	1	14-10-2025		**TLM1**	
23.	Example programs on Loops	1	15-10-2025		**TLM1**	
24.	Revision	2	15-10-2025 17-10-2025		**TLM1**	

No. of classes required to complete UNIT – II: 17	No. of classes taken:

UNIT – III: Arrays and Strings

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Arrays Introduction, Declaration	1	27-10-2025		TLM1	
26.	Array indexing, Accessing elements	1	28-10-2025		TLM1	
27.	memory model	1	29-10-2025		TLM1	
28.	programs with array of integers	2	29-10-2025 31-10-2025		TLM1	
29.	Introduction to two dimensional arrays	1	03-11-2025		TLM1	
30.	2D Array indexing, Accessing elements	1	04-11-2025		TLM1	
31.	programs with 2D arrays	1	05-11-2025		TLM1	
32.	Introduction to Strings	1	05-11-2025		TLM1	
33.	Reading and Writing Operations on Strings	1	07-11-2025		TLM1	
34.	String Handling Functions	2	10-11-2025 11-11-2025		TLM1	
35.	Example Programs using Strings	1	12-11-2025		TLM1	
No. of classes required to complete UNIT – III: 13				No. of classes taken:		

UNIT – IV: Pointers & User Defined Data types

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
36.	Introduction to Pointers	1	12-11-2025		TLM1	
37.	dereferencing and address operators	1	14-11-2025		TLM1	
38.	pointer and address arithmetic	1	17-11-2025		TLM1	
39.	array manipulation using pointers	2	18-11-2025 19-11-2025		TLM1	
40.	User-defined data types	1	19-11-2025		TLM1	
41.	Structures , Definition and Initialization	2	21-11-2025 24-11-2025		TLM1	
42.	Example programs	2	25-11-2025 26-11-2025		TLM1	
43.	Unions	2	26-11-2025 28-11-2025		TLM1	
44.	Example programs	1	01-12-2025		TLM1	
45.	Revision	1	02-12-2025		TLM1	
No. of classes required to complete UNIT – IV: 14				No. of classes taken:		

UNIT – V: Functions & File Handling

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 to Functions	1	03-12-2025		TLM1	
47.	Function Declaration and Definition	2	03-12-2025 05-12-2025		TLM1	
48.	Function call Return Types	1	08-12-2025		TLM1	
49.	Arguments	1	09-12-2025		TLM1	
50.	modifying parameters inside functions using pointers	2	10-12-2025 10-12-2025		TLM1	
51.	arrays as parameters	2	12-12-2025 15-12-2025		TLM1	
52.	Scope and Lifetime of Variables	1	16-12-2025		TLM1	

53.	Introduction to Files	1	17-12-2025		**TLM1**	
54.	Basics of File Handling	2	17-12-2025 19-12-2025		**TLM1**	
55.	Operations on Files	2	22-12-2025 23-12-2025		**TLM1**	
No. of classes required to complete UNIT – V: 15				**No. of classes taken:**		

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
56.	Application Development using C	2	24-12-2025		**TLM1**	
57.	Introduction to Data Structures	1	26-12-2025		**TLM1**	

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

PART-C

EVALUATION PROCESS (R20 Regulation)

Evaluation Task	Marks
Assignment – I (Units-I, II)	A1 = 5
I – Descriptive Examination (Units-I, II)	M1 = 15
I – Quiz Examination (Units-I, II)	Q1 = 10
Assignment – II (Unit-III, IV & V)	A2 = 5
II – Descriptive Examination (UNIT-III, IV & V)	M2 = 15
II – Quiz Examination (UNIT-III, 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)

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineeringproblems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**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.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of dataand synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilitiesrelevant to the professional engineering practice
PO7	**Environment and sustainability**: Understand the impact of the professional engineeringsolutions in societal and environmental contexts, and demonstrate the knowledge of, andneed for sustainable development.
PO8	**Ethic**s: Apply ethical principles and commit to professional ethics andresponsibilities andnorms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.
PO10	**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.
PO11	**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.
PO12	**Life-long learning**: Recognize the need for and have the preparation and ability to engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. P. Bhagath**	**Dr. M. Srinivasa Rao**	**Dr. D. Srinivasa Rao**	**Dr. P. Bhagath**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. K. Vinaya Sree Bai

Course Name & Code : IT WORKSHOP Lab & 23IT51

L-T-P Structure : 0-0-2 **Credits: 1**

Program/Sem/Sec : B.Tech. – AI&DS/I/A **A.Y.:** 2025-26

PREREQUISITE : **NIL**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning.
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

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

CO1	Identify the components of a PC and troubleshooting the malfunctioning of PC. **(Apply-L3)**
CO2	Develop presentation/documentation using Office tools and LaTeX. **(Apply-L3)**
CO3	Build dialogs and documents using ChatGPT. **(Apply-L3)**
CO4	Improve individual / teamwork skills, communication and report writing skills with ethical values

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

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

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

1 - Low **2 –**Medium **3 –** High

REFERENCE BOOKS:

R1	Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
R2	The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech,2013, 3rd edition.
R3	Introduction to Information Technology, ITL Education Solutions limited, PearsonEducation,2012, 2nd edition.
R4	PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft).

R5	LaTeX Companion, Leslie Lamport, PHI/Pearson.
R6	IT Essentials PC Hardware and Software Companion Guide, David An fins on and KenQuamme. –CISCO Press, Pearson Education, 3rd edition.
R7	IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
PC Hardware & Software Installation						
1.	Task-1	3	23-8-2025		**DM5**	
2.	Task-2	3	23-8-2025		**DM5**	
3.	Task-3	3	30-8-2025		**DM5**	
4.	Task-4	3	30-8-2025		**DM5**	
5.	Task-5	3	6-9-2025		**DM5**	
Internet & World Wide Web						
6.	Task-1	3	6-9-2025		**DM5**	
7.	Task-2	3	20-9-2025		**DM5**	
8.	Task-3	3	20-9-2025		**DM5**	
9.	Task-4	3	20-9-2025		**DM5**	
Latex and WORD						
10.	Task-1	3	27-9-2025		**DM5**	
11.	Task-2	3	27-9-2025		**DM5**	
12.	Task-3	3	27-9-2025		**DM5**	
13.	Task-4	3	4-10-2025		**DM5**	
EXCEL						
14.	Task-1	3	11-10-2025		**DM5**	
15.	Task-2	3	18-10-2025		**DM5**	
LOOKUP/VLOOKUP						
16.	Task-1	3	1-11-2025		**DM5**	
POWER POINT						
17.	Task-1	3	15-11-2025		**DM5**	
18.	Task-2	3	22-11-2025		**DM5**	
19.	Task-3	3	29-11-2025		**DM5**	
AI TOOLS – ChatGPT						
20.	Task-1	3	6-12-2025		**DM5**	
21.	Task-2	3	20-12-2025		**DM5**	
22.	Task-3	3	20-12-2025		**DM5**	
23.	Internal exam	3	27-12-2025		**DM5**	

Teaching Learning Methods

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

PART-C

EVALUATION PROCESS (R23 Regulations): According to Academic Regulations of R23 Distribution and Weightage of Marks for Laboratory Courses is as follows

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

Parameter	Marks
Day to Day work	15
Record	15
Internal Test	
Total	**30**

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

Parameter	Marks
Procedure/Algorithm	20
Experimentation/Program execution	30
Result/Inference	
Viva voce	20
Total	**70**

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools.
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ms. K. Vinaya Sree Bai**	**Mr. P. Veera Swamy**	**Dr. D. Venkata Subbaiah**	**Dr. P. Bhagath**
Signature				

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Phone: 08659-222933, Fax: 08659-222931

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor: K. Raju
Course Name & Code : CE LAB, 23FE51
L-T-P Structure : **0-0-2** **Credits:** 01
Program/Sem/Sec : B. Tech / 1st/ ALDS-A
A.Y. : 2025-26

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

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

CO1	Understand the different aspect of the English language proficiency with emphasis on LSRW skills.	L2
CO2	Apply Communication Skills through various language learning activities	L3
CO3	Identifying the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking, comprehension.	L2
CO4	Exhibit professionalism in participating in debates and group discussions.	L3

COURSE ARTICULATION MATRIX
(Correlation between COs & POs)

Course Outcomes / PO's →	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.	-	-	-	2	-	-	-	-	3	3	-	2
CO2.	-	-	-	2	-	-	-	-	3	3	-	2
CO3.	-	-	-	2	-	-	-	-	3	3	-	2
CO4.	-	-	-	2	-	-	-	-	3	3	-	2
1 = Slight (Low)				**2= Moderate (Medium)**						**3 = Substantial (High)**		

List of Activities:

1. Vowels & Consonants

2. Neutralization / Accent rules

3. Communication Skills: JAM

4. Conversational Practice: Roleplay

5. E-mail Writing

6. Resume writing, Cover letter, SOP

7. Group Discussions - methods & Practice

8. Debates – Methods and practice

9. PPT Presentations & Poster Presentations

10. Interview Skills: Mock Interviews

Suggested Software:

1.Walden Infotech
2.Young India Films

Reference Books:

Raman Meenakshi, Sangeeta-Sharma, *Technical Communication,* Oxford Press 2018.
Taylor Grant: *English Conversation Practice,* Tata McGraw-Hill Education India, 2016.
Hewing's, Martin, Cambridge Academic English (B2), CUP, 2012.
J. Sethi & P.V. Dhamija: *A Course in Phonetics and Spoken English, (*2nd Ed.,*)Kindle, 2013.*

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to syllabus	03	21/08/25		TLM4	
2.	Vowels & Consonants	06	28/08/25 04/09/25		TLM1 TLM5	
3.	Neutralization	03	11/09/25		TLM1, TLM5	
4.	Accent rules	03	18/09/25		TLM1, TLM5	
5.	JAM-I (Short and Structured Talks) Self Introduction & Introducing others	06	25/09/25 09/10/25		TLM4	
6.	Role Play-I (Formal and	06	16/10/25		TLM4	

	Informal)		30/10/25			
7.	e-mail Writing,	03	06/11/25		TLM1, TLM5	
8.	Resume writing, Cover letter, SOP	03	13/11/25		TLM1, TLM5	
9.	Group Discussion: methods & Practice	03	20/11/25		TLM4, TLM6	
10.	Debate: methods & Practice	03	27/11/25		TLM4, TLM6	
11.	PPT Presentation	06	04/12/25		TLM2, TLM4	
12.	Poster Presentation	03	11/12/25		TLM2, TLM4	
13.	Mock Interviews	03	18/12/25		TLM1, TLM6	
14.	Lab Internal Exam	03	08/12/25			
No. of classes required to complete Syllabus:				**No. of classes taken:**		

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

Laboratory Examination:

Evaluation Task	**Marks**
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty		**Dr. R. Padma Venkat**	**Dr. R. Padma Venkat**	**Dr. T.Satyanarayana**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with "A" Grade &NBAfor ASE, CE, CSE, ECE, EEE & IT (Under Tier - I)

An ISO 21001:2018, 14001:2015, 50001:2018 Certified Institution

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

L.B. Reddy Nagar, Mylavaram, NTR Dist., Andhra Pradesh-521 230.

Phone: 08659-222933, **Fax**: 08659-222931

DIVISION OF CHEMISTRY

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. S. Vijaya Dasaradha & Dr. Y. Subba Reddy
Course Name & Code **:** Chemistry Lab&23FE52
L-T-P Structure **:0-0-3** **Credits:1.5**
Program/Sem/Sec : I B.Tech./I-Sem/AI&DS-A **A.Y. :**2025-26

Prerequisites: Nil

Course Educational Objective:

- To enable the students to perform different types of volumetric titrations.
- It provides an overview of preparation of polymers, nanomaterials and analytical techniques.

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

CO1: Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. (**Analyze**)

CO2: Acquire practical knowledge related to preparation of Bakelite and nanomaterials. (**Apply**)

CO3: Measure the strength of acid present in Pb-Acid battery. (**Apply**)

CO4: Analyze important parameters of water to check its suitability for drinking purpose andindustrial applications. (**Analyze)**

CO5: Improve individual / teamwork skills, communication and report writing skills with ethical values. (**Apply**)

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

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

Bos Approved Lab Manual

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): AI&DS-A

S.No.	Experiment	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	HOD Sign Weekly
1.	Introduction to Chemistry lab, CO's,PO's	3	19-08-2025		TLM1	CO1	
2	Explanation of chemicals and glassware	3	26-08-2025		TLM4	CO1	
3.	Preparation of a Bakelite	3	02-09-2025		TLM4	CO2	
4.	Measuring of pH of water sample	3	09-09-2025		TLM4	CO4	
5.	Determination of amount of HCl using standard Na_2CO_3 solution	3	16-09-2025		TLM4	CO1	
6.	Determination of Strength of an acid in Pb-Acid battery	3	23-09-2025		TLM4	CO3	
7.	Determination of Alkalinity of a given water sample	3	07-10-2025		TLM4	CO1	
8.	Estimation of Ferrous ion by permanganometry	3	14-10-2025		TLM4	CO1	
9.	Estimation of Ferrous ion by Dichrometry	3	28-10-2025		TLM4	CO4	
10.	Estimation of total hardeness of given water sample	3	04-11-2025		TLM4	CO4	
11.	Conductometric titration of strong acid *versus* strong base	3	11-11-2025		TLM4	CO1	
12.	Conductometric titration of weak acid *versus* strong base	3	18-11-2025		TLM4	CO1	
13.	Additional experiment	3	25-11-2025		TLM4	CO1	
14.	Additional experiment/repeat	3	02-12-2025		TLM4	CO1	
15.	Additional experiment/repeat	3	09-12-2025		TLM4	CO1	
16.	Internal Exam	3	16-12-2025		TLM4	CO1	
17.	Internal Exam	3	23-12-2025		TLM4	CO1	
	Total						

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

Part - C

EVALUATION PROCESS:

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:

Evaluation Task	Marks
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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PO11	**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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.S.Vijaya Dasaradha	**Dr.V.Parvathi**	**Dr.V.Parvathi**	**Dr. T.Satyanarayana**
Signature				

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L.B.REDDY NAGAR, MYLAVARAM. NTR District, AP, India. 521230.
hodads@lbrce.ac.in , ads@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. P. Bhagath / Mr. P. Gandhi Prakash

Course Name & Code : Computer Programming Lab (23CS51)

L-T-P Structure : 0-0-3 Credits: 1.5

Program/Sem/Sec : B.Tech./AI&DS/I/A A.Y. : 2025-26

PRE-REQUISITE: Fundamentals of Mathematics, Basics of Computer.

COURSE EDUCATIONAL OBJECTIVE (CEO): The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

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

CO1:	Read, understand, and trace the execution of programs written in C language.	Understand-L2
CO2:	Apply the right control structure for solving the problem.	Apply–L3
CO3:	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers and files in C.	Apply–L3
CO4:	Improve individual / teamwork skills, communication and report writing skills with ethical values.	

COURSE ARTICULATION MATRIX (Correlation between COs, Pos & PSOs)

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN)

S. No.	Programs to be covered	No. of Classes		Date of Completion	Delivery Method
		Required as per the Schedule	Taken		
1.	Week1: Familiarization with programming environment	03		18-08-2025	DM5
2.	Week2: Problem-solving using Algorithms and Flow charts.	03		25-08-2025	DM5
3.	Week3:Exercise Programs on Variable types and type conversions	03		01-09-2025	DM5
4.	Week4: Exercise Programs on Operators and the precedence and as associativity.	03		08-09-2025	DM5
5.	Week5:Exercise Programs on Branching and logical expressions	03		15-09-2025	DM5
6.	Week6:Exercise Programs on Loops, while and for loops	03		22-09-2025	DM5
7.	Week7: Exercise Programs on 1 D Arrays & searching.	03		06-10-2025	DM5
8.	Week8:ExerciseProgramson2 D arrays, sorting and Strings.	03		13-10-2025	DM5
9.	Week9: Exercise Programs on Pointers, structures and dynamic memory allocation	03		27-10-2025	DM5
10.	Week10:ExerciseProgramson Bit fields, Self-Referential Structures, Linked lists	03		03-11-2025	DM5
11.	Week 11:Exercise Programson Functions, call by value, scope and extent.	03		10-11-2025	DM5
12.	Week 12: Exercise Programs on Recursion, the structure of recursive calls	03		17-11-2025	DM5
13.	Week 13: Exercise Programs on Call by reference, dangling pointers	03		24-11-2025	DM5
14.	Week 14: Exercise Programs on File handling.	03		01-12-2025	DM5
15.	Week 15: Exercise Programs on File handling.	03		08-12-2025	DM5
16.	Revision of all weeks	03		15-12-2025	DM5
17.	Lab Internal	03		22-12-2025	DM5

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

PROGRAMME OUTCOMES (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
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PO12	**Life-long learning**: Recognize the need for and have the preparation and ability to engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. P. Bhagath**	**Dr. M. Srinivasa Rao**	**Dr. D. Srinivasa Rao**	**Dr. P. Bhagath**
Signature				