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 AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: K. N. V. Lakshmi
Course Name & Code **:** Numerical Methods & Integral Calculus & 20FE10
L-T-P Structure **:** 2-1 -0 **Credits:3**
Program/Sem/Sec : II B.Tech/III sem/A **A.Y.:** 2021 - 22

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): The main objective of this course is to enable the students learn Numerical Techniques for solving the equations and apply interpolation techniques. They will also learn about the Fourier analysis of single valued functions, Multiple Integrals in different coordinate systems and Vector differentiation.

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

CO1	Estimate the best fit polynomial for the given tabulated data using Interpolation.(Understand – L2)
CO2	Apply numerical techniques in solving of equations and evaluation of integrals. (Apply – L3)
CO3	Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes. (Apply – L3)
CO4	Generate the single valued functions in the form of Fourier series and obtain Fourier series representation of periodic function. (Apply – L3)
CO5	Evaluate the directional derivative, divergence and angular velocity of a vector function. (Apply – L3)

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

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

TEXTBOOKS:

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

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

T3 S. S. Sastry, *"Introductory Methods of Numerical Analysis"* 5th Edition, PHI Learning Private Limited, New Delhi, 2012.

REFERENCE BOOKS:

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Interpolation and Finite Differences

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 the course, Course Outcomes	1	25/10/21		TLM1	
2.	Introduction to UNIT I	1	27/10/21		TLM2	
3.	Forward Differences	1	29/10/21		TLM1	
4.	Backward differences	1	30/10/21		TLM1	
5.	Central Differences	1	01/11/21		TLM1	
6.	Symbolic relations and separation of symbols	1	03/11/21		TLM1	
7.	Symbolic relations and separation of symbols	1	05/11/21		TLM1	
8.	Newton's forward formulae for interpolation	1	06/11/21		TLM1	
9.	Newton's backward formulae for interpolation	1	08/11/21		TLM1	
10.	Lagrange's Interpolation	1	10/11/21		TLM1	
11.	TUTORIAL I	1	12/11/21		TLM1	
12.	Lagrange's Interpolation	1	13/11/21		TLM3	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Numerical solutions of Equations and Numerical Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction to UNIT II	1	15/11/21		TLM2	
14.	Algebraic and Transcendental Equations	1	17/11/21		TLM1	
15.	False Position method	1	19/11/21		TLM1	
16.	False Position method	1	20/11/21		TLM1	
17.	Newton- Raphson Method in one variable	1	22/11/21		TLM1	
18.	Newton- Raphson Method applications	1	24/11/21		TLM1	
19.	Tutorial II	1	26/11/21		TLM3	
20.	Trapezoidal rule	1	27/11/21		TLM1	
21.	Simpson's 1/3 Rule, Simpson's 3/8 Rule	1	29/11/21		TLM1	
No. of classes required to complete UNIT-II: 9				**No. of classes taken:**		

UNIT-III: Multiple Integrals

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Introduction to Unit-III	1	01/12/21		TLM2	
23.	Double Integrals -Cartesian coordinates	1	03/12/21		TLM1	
24.	Double Integrals- Polar co ordinates, Spherical Co ordinates	1	04/12/21		TLM1	

25.	Triple Integrals - Cartesian coordinates	1	06/12/21		TLM1	
26.	TUTORIAL - III	1	08/12/21		TLM1	
27.	Triple Integrals – Polar, spherical coordinates	1	10/12/21		TLM3	
28.	Applications to Double integrals (Content Beyond the syllabus)	1	11/12/21		TLM 1	
29.	Change of order of Integration	1	20/12/21		TLM1	
30.	Change of order of Integration	1	22/12/21		TLM1	
No. of classes required to complete UNIT-III: 9				**No. of classes taken:**		

UNIT-IV: Fourier Series

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.	Introduction to UNIT IV	1	24/12/21		TLM1	
32.	Determination of Fourier coefficients, Even and Odd Functions	1	27/12/21		TLM1	
33.	Fourier Series in the [0,2pi]	1	29/12/21		TLM1	
34.	Fourier Series in the [0,2pi]	1	31/12/21		TLM1	
35.	Fourier Series in an arbitrary interval	1	03/01/22		TLM1	
36.	TUTORIAL IV	1	05/01/22		TLM3	
37.	Fourier Series in an arbitrary interval	1	07/01/22		TLM1	
38.	Fourier series in an arbitrary interval odd and even functions		08/01/22		TLM1	
39.	Half-range Sine and Cosine series	1	10/01/22		TLM1	
40.	Half-range Sine and Cosine series	1	12/01/22		TLM1	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Introduction to UNIT V	1	17/01/22		TLM1	
42.	Vector Differentiation	1	19/01/22		TLM1	
43.	Gradient	1	21/01/22		TLM1	
44.	Directional Derivative	1	22/01/22		TLM1	
45.	Divergence	1	24/01/22		TLM1	
46.	TUTORIAL - VII	1	28/01/22		TLM3	
47.	Curl	1	29/01/22		TLM1	
48.	Solenoidal fields, Irrotational fields, potential surfaces	1	31/01/22		TLM1	
49.	Laplacian, second order operators	1	02/02/22		TLM1	
50.	TUTORIAL - VIII	1	04/02/22		TLM 1	
51.	Properties	1	05/02/22		TLM1	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	K. N. V. Lakshmi	Dr. K. R. Kavitha	Dr. A. Rami Reddy	Dr. A. Rami Reddy
Signature				

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor: K.Bhanu Lakshmi
Course Name & Code : Numerical Methods & Integral Calculs&20FE10
L-T-P Structure : 3-1 -0 **Credits:3**
Program/Sem/Sec : II B.Tech/III sem/EEEB **A.Y.:** 2021 - 22

PREREQUISITE:Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):The main objective of this course is to enable the students learn Numerical Techniques for solving the equations and apply interpolation techniques. They will also learn about the Fourier analysis of single valued functions, Multiple Integrals in different coordinate systems and Vector differentiation.

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

CO1	Estimate the best fit polynomial for the given tabulated data using Interpolation.(Understand – L2)
CO2	Apply numerical techniques in solving of equations and evaluation of integrals. (Apply – L3)
CO3	Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes. (Apply – L3)
CO4	Generate the single valued functions in the form of Fourier series and obtain Fourier series representation of periodic function. (Apply – L3)
CO5	Evaluate the directional derivative, divergence and angular velocity of a vector function. (Apply – L3)

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

COs	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	-	2	-	-	-	-	-	-	-	1			
CO2	3	2	-	2	-	-	-	-	-	-	-	1			
CO3	3	2	-	1	-	-	-	-	-	-	-	1			
CO4	3	1	-	-	-	-	-	-	-	-	-	1			
CO5	3	1	-	1	-	-	-	-	-	-	-	1			
1 - Low **2 –**Medium **3 -** High															

TEXTBOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.
T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.
T3 S. S. Sastry, "Introductory Methods of Numerical Analysis" 5th Edition, PHI Learning Private Limited, New Delhi, 2012.

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Interpolation and Finite Differences

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 the course, Course Outcomes	1	25/10/21		TLM1	
2.	Introduction to UNIT I	1	27/10/21		TLM2	
3.	Forward Differences	1	28/10/21		TLM1	
4.	Backward differences	1	29/10/21		TLM1	
5.	Central Differences	1	01/11/21		TLM1	
6.	Symbolic relations and separation of symbols	1	03/11/21		TLM1	
7.	Symbolic relations and separation of symbols	1	05/11/21		TLM1	
8.	Newton's forward formulae for interpolation	1	08/11/21		TLM1	
9.	Newton's backward formulae for interpolation	1	10/11/21		TLM1	
10.	Lagrange's Interpolation	1	11/11/21		TLM1	
11.	Lagrange's Interpolation	1	12/11/21		TLM1	
12.	Tutorial I	1	18/11/21		TLM3	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Numerical solutions of Equations and Numerical Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction to UNIT II	1	15/11/21		TLM2	
14.	Algebraic and Transcendental Equations	1	17/11/21		TLM1	
15.	False Position method	1	19/11/21		TLM1	
16.	False Position method	1	22/11/21		TLM1	
17.	Newton- Raphson Method in one variable	1	24/11/21		TLM1	
18.	Newton- Raphson Method applications	1	25/11/21		TLM1	
19.	Trapezoidal rule	1	26/11/21		TLM1	
20.	Simpson's 1/3 Rule	1	29/11/21		TLM1	
21.	Simpson's 3/8 Rule	1	01/12/21		TLM1	
22.	Tutorial II	1	02/12/21		TLM3	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Multiple Integrals

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Introduction to Unit-III	1	03/12/21		TLM1	
24.	Double Integrals -Cartesian coordinates	1	06/12/21		TLM1	
25.	Double Integrals- Polar co ordinates	1	08/12/21		TLM1	
26.	Problems	1	09/12/21		TLM1	
27.	Applications to Double integrals (Content Beyond the syllabus)	1	10/12/21		TLM2	

I MID EXAMINATIONS (13-12-2021 TO 18-12-2021)						
28.	Triple Integrals - Cartesian coordinates	1	20/12/21		TLM1	
29.	Triple Integrals - Spherical coordinates	1	22/12/21		TLM1	
30.	Tutorial III	1	23/12/21		TLM 3	
31.	Change of order of Integration	1	24/12/21		TLM1	
32.	Change of order of Integration	1	27/12/21		TLM1	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

UNIT-IV: Fourier Series

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Introduction to UNIT IV	1	29/12/21		TLM1	
34.	Determination of Fourier coefficients, Even and Odd Functions	1	30/12/21		TLM1	
35.	Fourier Series expansion in the interval $[0,2\pi]$	1	31/12/21		TLM1	
36.	Fourier Series expansion in the interval $[-\pi,\pi]$	1	03/01/22		TLM1	
37.	Fourier Series in an arbitrary interval	1	05/01/22		TLM1	
38.	Fourier series in an arbitrary interval odd and even functions	1	06/01/22		TLM1	
39.	Half-range Sine and Cosine series	1	07/01/22		TLM1	
40.	Half-range Sine and Cosine series		10/01/22		TLM1	
41.	Tutorial IV	1	12/01/22		TLM3	
42.	Introduction to Fourier transforms (Content Beyond the Syllabus)	1	17/01/22		TLM2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Introduction to UNIT V	1	19/01/22		TLM1	
44.	Vector Differentiation	1	20/01/22		TLM1	
45.	Gradient	1	21/01/22		TLM1	
46.	Directional Derivative	1	24/01/22		TLM1	
47.	Divergence	1	27/01/22		TLM1	
48.	Curl	1	28/01/22		TLM1	
49.	Solenoidal and Irrotational functions, potential surfaces	1	31/01/22		TLM1	
50.	Laplacian and second order operators	1	02/02/22		TLM1	
51.	TUTORIAL - V	1	03/02/22		TLM3	
52.	Properties	1	04/02/22		TLM1	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

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 (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	K.Bhanu Lakshmi	Dr. K. R. Kavitha	Dr. A. Rami Reddy	Dr. A. Rami Reddy
Signature				

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: O.VENKATA SIVA
Course Name & Code : DATA STRUCTURES & 20CS03
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech. /III/A-sec **A.Y.:** 2021-22

PREREQUISITE: Programming Language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques**.**

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

CO1	Write the algorithms for various operations on list using arrays and linked list and analyze the time complexity of its operations.**(Understand - L2)**
CO2	Apply linear data structures like stack and queue in problem solving.(**Apply - L3**)
CO3	Demonstrate various sorting techniques and compare their computational complexities in terms of space and time.**(Understand - L2)**
CO4	Write the algorithms for various operations on binary trees, binary search trees and AVL trees. (**Understand - L2**)
CO5	Demonstrate graph traversal techniques and hashing techniques. (**Understand - L2**)

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

TEXTBOOKS:

T1 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2nd edition [1,2,3 units].

T2 ReemaThareja, Data Structures using c, Oxford Publications [3,4,5].

REFERENCE BOOKS:

R1 Langson, Augenstein &Tenenbaum, 'Data Structures using C and C++', 2nd Ed, PHI.

R2 RobertL.Kruse, Leung and Tando, 'Data Structures and Program Design in C', 2ndedition, PHI.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Data Structures	1	26-10-2021		TLM1	
2.	Classification of Data Structures	1	26-10-2021		TLM1	
3.	Introduction to Algorithm	1	28-10-2021		TLM1	
4.	Algorithm Analysis	1	29-10-2021		TLM1	
5.	Asymptotic Notations	1	30-10-2021		TLM1	
6.	List using Arrays	1	02-11-2021		TLM1	
7.	Single Linked List	3	05-11-2021, 06-11-2021 09-11-2021		TLM1	
8.	Double Linked List	3	11-11-2021 12-11-2021 13-11-2021		TLM1	
9.	Circular Linked List	2	16-11-2021 18-11-2021		TLM1	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	STACKS ADT	1	19-11-2021		TLM2	
11.	STACKS USING ARRAYS	1	20-11-2021		TLM1	
12.	STACKS USING LINKED LIST	1	23-11-2021		TLM1	
13.	INFIX TO POSTFIX CONVERSION	2	25-11-2021 & 26-11-2021		TLM1	
14.	POSTFIX EVALUTION	1	27-11-2021		TLM1	
15.	CHECKING BALANCED PARANTHESIS	1	30-12-2021		TLM1	
16.	QUEUE	1	02-12-2021		TLM1	
17.	QUEUE USING ARRAY	1	03-12-2021		TLM1	
18.	QUEUE USING LINKED LIST	1	04-12-2021		TLM1	
19.	CIRCULAR QUEUE	2	07-12-2021		TLM1	
20.	DEQUE	1	09-12-2021		TLM1	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: SORTING 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
21.	Bubble sort	1	10-12-2021		TLM2	
22.	Insertion Sort	1	11-12-2021		TLM1	
23.	Selection Sort	1	21-12-2021		TLM1	
24.	Merge Sort	2	23-12-2021 & 24-12-2021		TLM1	
25.	Quick Sort	2	28-12-2021 & 30-12-2021		TLM1	
26.	Heap Sort	2	31-12-2021 & 04-01-2022		TLM1	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: TREES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Introduction	1	06-01-2022		TLM1	
28.	Tree Traversals	2	07-01-2022 & 08-01-2022		TLM1	
29.	Binary Trees	1	11-01-2022		TLM2	
30.	Binary Search Trees	2	13-01-2022 & 18-01-2022		TLM1	
31.	AVL Trees	1	20-01-2022		TLM1	
32.	Operations	1	21-01-2022		TLM1	
No. of classes required to complete UNIT-IV: 08				**No. of classes taken:**		

UNIT-V: GRAPHS & HASHING TECHNQIUES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	GRAPHS, FUNDAMENTALS	1	22-01-2022		TLM1	
34.	REPRESENTATION OF GRAPHS	1	25-01-2022		TLM1	
35.	BFS	1	27-01-2022		TLM1	
36.	DFS	1	28-01-2022		TLM1	
37.	Hashing Introduction, Hash function, separate Chaining	1	29-01-2022		TLM1	
38.	Linear & Quadratic Probing	1	01-02-2022		TLM1	
39.	Double & Rehasing	1	05-02-2022		TLM2	
No. of classes required to complete UNIT-V: 07				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	To inculcate an ability to analyze, design and implement data driven applications into the students
PSO 3	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. O.Venkata Siva**	**Dr. K. N. Prashanthi**	**Dr. Y Vijaya Bhaskar Redddy**	**Dr. D.Veeraiah**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: **M.SWATHI**
Course Name & Code **: DATA STRUCTURES & 20CS03**
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech. /III/B-sec **A.Y.:** 2021-22

PREREQUISITE: Programming Language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques**.**

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

CO1	Write the algorithms for various operations on list using arrays and linked list and analyze the time complexity of its operations.**(Understand - L2)**
CO2	Apply linear data structures like stack and queue in problem solving.(**Apply - L3**)
CO3	Demonstrate various sorting techniques and compare their computational complexities in terms of space and time.**(Understand - L2)**
CO4	Write the algorithms for various operations on binary trees, binary search trees and AVL trees.(**Understand - L2**)
CO5	Demonstrate graph traversal techniques and hashing techniques.(**Understand - L2**)

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

TEXTBOOKS:

T1 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2nd edition [1,2,3 units].

T2 ReemaThareja, Data Structures using c, Oxford Publications [3,4,5].

REFERENCE BOOKS:

R1 Langson, Augenstein &Tenenbaum, 'Data Structures using C and C++', 2nd Ed, PHI.

R2 RobertL.Kruse, Leung and Tando, 'Data Structures and Program Design in C', 2ndedition, PHI.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Data Structures	1	26-10-2021		TLM1	
2.	Classification of Data Structures	1	27-10-2021		TLM1	
3.	Introduction to Algorithm	1	28-10-2021		TLM1	
4.	Algorithm Analysis	1	30-10-2021		TLM1	
5.	Asymptotic Notations	1	02-11-2021		TLM1	
6.	List using Arrays	1	03-11-2021		TLM1	
7.	Single Linked List	3	06-11-2021 09-11-2021 10-11-2021		TLM1	
8.	Double Linked List	3	11-11-2021 16-11-2021 17-11-2021		TLM1	
9.	Circular Linked List	2	18-11-2021 20-11-2021		TLM1	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	STACKS ADT	1	23-11-2021		TLM2	
11.	STACKS USING ARRAYS	1	24-11-2021		TLM1	
12.	STACKS USING LINKED LIST	1	25-11-2021		TLM1	
13.	INFIX TO POSTFIX CONVERSION	1	27-11-2021		TLM1	
14.	POSTFIX EVALUTION	1	30-11-2021		TLM1	
15.	CHECKING BALANCED PARANTHESIS	1	01-12-2021		TLM1	
16.	QUEUE	1	02-12-2021		TLM1	
17.	QUEUE USING ARRAY	1	04-12-2021		TLM1	
18.	QUEUE USING LINKED LIST	1	07-12-2021		TLM1	
19.	CIRCULAR QUEUE	1	08-12-2021		TLM1	
20.	DEQUE	1	09-12-2021		TLM1	
No. of classes required to complete UNIT-II: 11				**No. of classes taken:**		

UNIT-III: SORTING 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
21.	Bubble sort	1	11-12-2021		TLM2	
22.	Insertion Sort	1	21-12-2021		TLM1	
23.	Selection Sort	1	22-12-2021		TLM1	
24.	Merge Sort	1	21-12-2021		TLM1	
25.	Quick Sort	1	23-12-2021		TLM1	
26.	Heap Sort	2	28-12-2021 & 29-12-2021		TLM1	
No. of classes required to complete UNIT-III: 07				**No. of classes taken:**		

UNIT-IV: TREES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Introduction	1	30-12-2021		TLM1	
28.	Tree Traversals	1	04-01-2022		TLM1	
29.	Binary Trees	1	05-01-2022		TLM2	
30.	Binary Search Trees	2	06-01-2022 & 18-01-2022		TLM1	
31.	AVL Trees	1	19-01-2022		TLM1	
32.	Operations	1	20-01-2022		TLM1	
No. of classes required to complete UNIT-IV: 07				**No. of classes taken:**		

UNIT-V: GRAPHS & HASHING TECHNQIUES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	GRAPHS, FUNDAMENTALS	1	22-01-2022		TLM1	
34.	REPRESENTATION OF GRAPHS	1	25-01-2022		TLM1	
35.	BFS	1	27-01-2022		TLM1	
36.	DFS	1	29-01-2022		TLM1	
37.	Hashing Introduction, Hash function, separate Chaining	1	01-02-2022		TLM1	
38.	Linear & Quadratic Probing	1	02-02-2022		TLM1	
39.	Double & Rehasing	2	03-02-2022 05-02-2022		TLM2	
No. of classes required to complete UNIT-V: 08				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	To inculcate an ability to analyze, design and implement data driven applications into the students
PSO 3	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ms.M.Swathi**	**Dr. K. N. Prashanthi**	**Dr. Y Vijaya Bhaskar Redddy**	**Dr. D.Veeraiah**
Signature				

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DEPARTMENT OF ELECTRICAL &ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.K.R.L.Prasad
Course Name & Code **:** Electrical Circuit Analysis &20EE05
L-T-P Structure **:** 2-1-0 **Credits:** 3
Program/Sem/Sec : B.Tech/III Sem/A **A.Y.:** 2021-2022

PREREQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

CO1	Analyze electrical circuits using theorems (Apply-L3))
CO2	Evaluate transient response of electrical circuits (Understand-L2
CO3	Examine the performance of three phase circuits (Understand-L2)
CO4	Evaluate the two-port network parameters (Apply-L3)
CO5	Apply Fourier series to the electrical circuits excited by non sinusoidal inputs (Apply-L3)

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2													
CO2	2	2	2													
CO3	2	2	2									2				
CO4	2	2	2									2			2	2
CO5	2	2	2									2			2	2
1 - Low				**2** –Medium								**3** - High				

TEXTBOOKS:

T: William Hayt and Jack E.Kemmerley, "Engineering Circuit Analysis" ,Mc Graw Hill Company, 9th edition,2020

T2: .C.L.Wadhwa, "Network Analysis And Synthesis", New Age International publication, 3 rd edition,2018.

REFERENCE BOOKS:

R1: Van Valkenburg, "Network Analysis and Synthesis", Pearson publication, 3rd edition,2015

R2: A. Sudhakar ,Shyammohan, S Palli, "Electrical Circuits Analysis-2" Tata McGraw- Hill, 5th edition,2015

R3: Charles K Alexander, Mathew. N. O.Sadiku, "Fundamental of Electric Circuits", Tata McGrawHill ,6th edition,2019.

R4: Chakrabarti A,"Electric Circuits Analysis & Synthesis " Dhanpat Rai & Co (p) Ltd, 6th

edition,2014

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: NETWORK THEOREMS (DC & AC EXCITATIONS)

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.	Superposition theorem	1	25-10-2021		TLM1	
2.	Thevenin theorem	1	26-10-2021		TLM1	
3.	Norton theorem	1	27-10-2021		TLM1	
4.	Maximum Power Transfer theorem	1	29-10-2021		TLM1	
5.	TUTORIAL	1	01-11-2021		TLM3	
6.	Millman theorem	1	02-11-2021		TLM1/TLM2	
7.	Reciprocity theorem	1	03-11-2021		TLM1	
8.	Compensation theorem	1	05-11-2021		TLM1	
9.	TUTORIAL	1	08-11-2021		TLM3	
10.	Concept of duality and dual networks	1	09-11-2021		TLM1/TLM2	
11.	REVISION	1	10-11-2021		TLM1	
No. of classes required to complete UNIT-I:				**No. of classes taken:**		

UNIT-II: TRANSIENT ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12	Initial conditions	1	12-11-2021		TLM1	
13	Laplace transforms methods of solutions	1	15-11-2021		TLM1	
14	Transient response of R-L & R-C for D.C Excitation	1	16-11-2021		TLM1 & TLM2	
15	Transient response of RLC for D.C Excitation	1	17-11-2021		TLM1	
16	Transient response of R-L & R-C for Sinusoidal Excitation	1	19-11-2021		TLM1	
17	TUTORIAL	1	22-11-2021		TLM3	
18	Transient response of RLC for Sinusoidal Excitation	1	23-11-2021		TLM1	
19	Analysis of Electrical circuits with standard test signals	1	24-11-2021		TLM1& TLM2	
20	Analysis of Electrical circuits with standard test signals	1	26-11-2021		TLM1	

21	TUTORIAL	1	29-11-2021		TLM3	
22	Problems	1	30-11-2021			
No. of classes required to complete UNIT-II:				No. of classes taken:		

UNIT-III: THREE PHASE CIRCUITS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23	Phase sequence	1	01-12-2021		TLM1	
24	Star-Delta Transformations	1	03-12-2021		TLM1	
25	-I relations in balanced circuits	1	06-12-2021		TLM1	
26	Analysis of three phase balanced load circuits	1	07-12-2021		TLM1	
27	Analysis of three phase balanced load circuits	1	08-12-2021		TLM1	
28	Analysis of three phase unbalanced load circuits	1	10-12-2021		TLM1	
29	TUTORIAL	1	20-12-2021		TLM3	
30	Analysis of three phase unbalanced load circuits	1	21-12-2021		TLM1& TLM2	
31	Measurement of power	1	22-12-2021		TLM1	
32	PROBLEMS	1	24-12-2021		TLM1	
33	TUTORIAL	1	27-12-2021		TLM3	
No. of classes required to complete UNIT-III:				**No. of classes taken:**		

UNIT-IV: TWO PORT NETWORKS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34	Two port network parameters	1	28-12-2021		TLM1	
35	Z parameters	1	29-12-2021		TLM1	
36	Y parameters	1	31-12-2021		TLM1	
37	TUTORIAL	1	03-01-2022		TLM3	
38	ABCD parameters	1	04-01-2022		TLM1	
39	Hybrid parameters	1	05-01-2022		TLM1	
40	Relationship between Network parameters	1	07-01-2022		TLM1	
41	Interconnection of two port networks	1	10-01-2022		TLM1 &TLM2	
42	T and π Network Representation	1	11-01-2022		TLM1	
43	Problems	1	12-01-2022		TLM1	
44	TUTORIAL	1	17-01-2022		TLM3	

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

UNIT-V: FOURIER ANALYSIS OF A.C. CIRCUITS AND FILTERS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45	Fourier theorem	1	18-01-2022		TLM1	
46	Trigonometric and exponential forms	1	19-01-2022		TLM1	
47	Analysis of Electrical Circuits to Non sinusoidal periodic waveforms.	1	21-01-2022		TLM1	
48	TUTORIAL	1	24-01-2022		TLM3	
49	conditions of symmetry	1	25-01-2022		TLM1	
50	line spectra and phase angle spectra	1	28-01-2022		TLM1	
51	TUTORIAL	1	31-01-2022		TLM3	
52	Low pass ,High pass filters	1	01-02-2022		TLM1	
53	Band pass filters	1	02-02-2022		TLM1	
54	Constant-k Low pass filters	1	04-02-2022		TLM1	
55	Constant-k High pass filters	1	07-02-2022		TLM1	
56	m-derived filters	1	08-02-2022		TLM1	
57	REVISION	1	09-02-2022		TLM1	
No. of classes required to complete UNIT-V:				**No. of classes taken:**		

Content Beyond Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
58	Image impedance	1	11-02-2022	TLM1	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	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				
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: Dr.K.R.L.Prasad
Course Name & Code **:** Electrical Circuit Analysis &20EE05
L-T-P Structure **:** 2-1-0 **Credits:** 3
Program/Sem/Sec : B.Tech/III Sem/A **A.Y.:** 2021-2022

PREREQUISITE: Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

CO1	Analyze electrical circuits using theorems (Apply-L3))
CO2	Evaluate transient response of electrical circuits (Understand-L2
CO3	Examine the performance of three phase circuits (Understand-L2)
CO4	Evaluate the two-port network parameters (Apply-L3)
CO5	Apply Fourier series to the electrical circuits excited by non sinusoidal inputs (Apply-L3)

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	**2**	**2**	**2**													
CO2	**2**	**2**	**2**													
CO3	**2**	**2**	**2**									**2**				
CO4	**2**	**2**	**2**									**2**			**2**	**2**
CO5	**2**	**2**	**2**									**2**			**2**	**2**
1 - Low						**2** –Medium						**3** - High				

TEXTBOOKS:

T: William Hayt and Jack E.Kemmerley, "Engineering Circuit Analysis" ,Mc Graw Hill Company, 9th edition,2020

T2: .C.L.Wadhwa, "Network Analysis And Synthesis", New Age International publication, 3 rd edition,2018.

REFERENCE BOOKS:

R1: Van Valkenburg, "Network Analysis and Synthesis", Pearson publication, 3rd edition,2015

R2: A. Sudhakar ,Shyammohan, S Palli, "Electrical Circuits Analysis-2" Tata McGraw- Hill, 5th edition,2015

R3: Charles K Alexander, Mathew. N. O.Sadiku, "Fundamental of Electric Circuits", Tata McGrawHill ,6th edition,2019.

R4: Chakrabarti A,"Electric Circuits Analysis & Synthesis " Dhanpat Rai & Co (p) Ltd, 6th

edition,2014

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: NETWORK THEOREMS (DC & AC EXCITATIONS)

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.	Superposition theorem	1	26-10-2021		TLM1	
2.	Thevenin theorem	1	27-10-2021		TLM1	
3.	Norton theorem	1	28-10-2021		TLM1	
4.	Maximum Power Transfer theorem	1	30-10-2021		TLM1	
5.	Millman theorem	1	02-11-2021		TLM1 &TLM2	
6.	Tutorial	1	03-11-2021		TLM3	
7.	Reciprocity theorem	1	06-11-2021		TLM1	
8.	Compensation theorem	1	09-11-2021		TLM1	
9.	Tutorial	1	10-11-2021		TLM3	
10.	Concept of duality and dual networks	1	11-11-2021		TLM1	
11.	REVISION	1	13-11-2021		TLM1	
No. of classes required to complete UNIT-I:				No. of classes taken:		

UNIT-II: TRANSIENT ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12	Initial conditions		16-11-2021		TLM1	
13	Laplace transforms methods of solutions		17-11-2021		TLM1	
14	Transient response of R-L & R-C for D.C Excitation		18-11-2021		TLM1	
15	Transient response of RLC for D.C Excitation		20-11-2021		TLM1	
16	Transient response of R-L & R-C for Sinusoidal Excitation		23-11-2021		TLM1	
17	Tutorial		24-11-2021		TLM3	
18	Transient response of RLC for Sinusoidal Excitation		25-11-2021		TLM1	
19	Analysis of Electrical circuits with standard test signals		27-11-2021		TLM1	

20	Analysis of Electrical circuits with standard test signals		30-11-2021		TLM1	
21	Tutorial		01-12-2021			
22	Problems		02-12-2021		TLM1	
No. of classes required to complete UNIT-II:				No. of classes taken:		

UNIT-III: THREE PHASE CIRCUITS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23	Phase sequence		04-12-2021		TLM1	
24	Star-Delta Transformations		07-12-2021		TLM1	
25	V-I relations in balanced circuits		08-12-2021		TLM1	
26	Analysis of three phase balanced load circuits		09-12-2021		TLM1	
27	Analysis of three phase balanced load circuits		11-12-2021		TLM1	
28	Analysis of three phase unbalanced load circuits		21-12-2021		TLM1	
29	Tutorial		22-12-2021			
30	Analysis of three phase unbalanced load circuits		23-12-2021		TLM1	
31	Measurement of power		28-12-2021		TLM1	
32	Tutorial		29-12-2021			
33	PROBLEMS		30-12-2021		TLM1	
No. of classes required to complete UNIT-III:				No. of classes taken:		

UNIT-IV: TWO PORT NETWORKS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34	Two port network parameters		01-01-2022		TLM1	
35	Z parameters		04-01-2022		TLM1	
36	Y parameters		05-01-2022		TLM1	
37	ABCD parameters		06-01-2022		TLM1	
38	Hybrid parameters		08-01-2022		TLM1	
39	Relationship between Network parameters		11-01-2022		TLM1	
40	Tutorial		12-01-2022			
41	Interconnection of two port networks		18-01-2022		TLM1	

42	Tutorial		19-01-2022			
43	T and π Network Representation		20-01-2022		TLM1	
44	Problems		22-01-2022		TLM1	
No. of classes required to complete UNIT-IV:				No. of classes taken:		

UNIT-V: FOURIER ANALYSIS OF A.C. CIRCUITS AND FILTERS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45	Fourier theorem		25-01-2022		TLM1	
46	Trigonometric and exponential forms		27-01-2022		TLM1	
47	Analysis of Electrical Circuits to Non sinusoidal periodic waveforms.		29-01-2022		TLM1	
48	conditions of symmetry		01-02-2022		TLM1	
49	Tutorial		02-02-2022			
50	line spectra and phase angle spectra		03-02-2022		TLM1	
51	Low pass ,High pass filters		05-02-2022		TLM1	
52	Band pass filters		08-02-2022		TLM1	
53	Tutorial		09-02-2022			
54	Constant-k filters		10-02-2022		TLM1	
55	m-derived filters		12-02-2022		TLM1	
No. of classes required to complete UNIT-V:				**No. of classes taken:**		

Content Beyond Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
56	Image impedance	1	11-02-2022	TLM1	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	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				
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part - A

PROGRAM : B.Tech. III-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : **ELECTRIC AND MAGNETIC FIELDS (17EE02)**

L-T-P STRUCTURE : 2-2-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.K.HARINATH REDDY**

COURSE COORDINATOR : **Dr.K.HARINATH REDDY**

Pre Requisite: Applied Mathematics-I, Engineering Physics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of this course is to introduce the concepts of electric and magnetic fields and their applications which will be useful in the development of the theory for Electrical Machines and Power Systems.

COURSE OUTCOMES (COs)

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

CO1: Analyze static electric fields due to various charge distributions
CO2: Describe the boundary conditions for conductor and dielectric interfaces
CO3: Analyze static magnetic fields due to various current carrying elements
CO4: Apply Maxwell's equations to diverse engineering problems

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	3		2	2							1	2	1	
CO2	3	2											2	1	
CO3	3	3		2	2							1	2	1	
CO4	3	2		2	2							1	2	2	

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

BOS APPROVED TEXT BOOKS:

T1 William .H.Hayt, 'Engineering Electromagnetics', Tata McGraw Hill 7th edition.

T2 Gangadhar.K.A, "Field theory ", Khanna Publishers, New Delhi, 15th edition, 2004.

BOS APPROVED REFERENCE BOOKS:

R1: Mathew.N.O.Sadiku, "Elements of Electromagnetics",sixth edition,Oxford University Press,2015.

R2: David K Cheng,"Field and Wave Electromagnetics ", Pearson 2nd edition,2004.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: ELECTRO STATICS-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.	Course outcomes, Introduction to Coordinate systems	1	26-10-2021		TLM2	
2.	Coulomb's Law	1	27-10-2021		TLM1	
3.	Electric Field Intensity (EFI)	1	28-10-2021		TLM1	
4.	Electric Fields due to continuous charge distributions	1	29-10-2021		TLM1	
5.	EFI due to a line and a surface charge	1	02-11-2021		TLM1	
6.	**Tutorial-I**	1	03-11-2021		TLM6	
7.	Application of Guass's Law	1	05-11-2021		TLM1	
8.	Maxwell's first law	1	09-11-2021		TLM1	
9.	Electric Flux density, Gauss's law	1	10-11-2021		TLM1	
10.	**Tutorial-II problems**	1	11-11-2021		TLM6	
11.	**-Quiz-1/ Assignment-1**	1	12-11-2021		TLM6	
12.	Revision	1	16-11-2021			
No. of classes required to complete UNIT-I		12				

UNIT-II: ELECTRO STATICS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Electric Potential – Properties of potential function – Potential gradient	1	17-11-2021		TLM1	
14.	**Tutorial-III**	1	18-11-2021		TLM6	
15.	Conductors, Dielectrics,current density & Equation of continuity .	1	19-11-2021		TLM1	
16.	Ohm's law in point form & Behavior of conductors in an electric field	1	23-11-2021		TLM1	
17.	Polarization, Displacement and	1	24-11-2021		TLM1	

	Convection current, Electric field inside a dielectric material					
18.	**Tutorial-IV**	1	25-11-2021		TLM6	
19.	Work done in moving a point charge in an electrostatic field	1	26-11-2021		TLM1	
20.	Electric dipole – Dipole moment , potential and EFI due to an electric dipole	1	30-11-2021		TLM1	
21.	Conductor-Free space and Dielectric boundary conditions	1	01-12-2021		TLM1	
22.	**Tutorial-V**	1	02-12-2021		TLM6	
23.	Capacitance calculation in static electric field	1	03-12-2021		TLM1	
24.	Spherical co-axial capacitors with composite dielectrics	1	07-12-2021		TLM1	
25.	Laplace's and Poison's equations	1	08-12-2021		TLM1	
26.	**Tutorial-VI- Quiz-2/ Assignment-2**	1	09-12-2021		TLM6	
27.	Solution of Laplace's equation in one variable -	1	10-12-2021		TLM1	
28.	MID-I EXAM		14-12-2021			
29.	MID-I EXAM		15-12-2021			
30.	MID-I EXAM		16-12-2021			
31.	MID-I EXAM		17-12-2021			
No. of classes required to complete UNIT-II		15				

UNIT-III: MAGNETO STATICS-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
32.	Static magnetic fields – Biot-Savart's law	1	21-12-2021		TLM1	
33.	Magnetic field intensity (MFI) due to a straight current carrying filament	1	22-12-2021		TLM1	
34.	MFI due to circular, square and solenoid current carrying wire	1	23-12-2021		TLM1	
35.	**Tutorial-VIII**	1	24-12-2021		TLM6	
36.	MFI due to an infinite sheet of current and a	1	28-12-2021		TLM1	

	long current carrying filament					
37.	Relation between magnetic flux, magnetic flux density and MFI, Maxwell's second Equation	1	29-12-2021		TLM1	
38.	Ampere's circuital law and its applications	1	30-12-2021		TLM1	
39.	Point form of Ampere's circuital law	1	31-12-2021		TLM1	
40.	Maxwell's third equation	1	04-01-2022		TLM1	
41.	Field due to a circular loop, rectangular and square loops	1	05-01-2022		TLM1	
No. of classes required to complete UNIT-III		10				

UNIT-IV: MAGNETO STATICS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Magnetic force - Moving charges in a Magnetic field	1	06-01-2022		TLM1	
43.	Lorentz force equation – force on a current element	1	07-01-2022		TLM1	
44.	Force on a straight and a long current carrying conductor	1	11-01-2022		TLM1	
45.	Force between two straight long and parallel current carrying conductors	1	12-01-2022		TLM1	
46.	Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole	1	18-01-2022		TLM1	
47.	Torque on a current loop, magnetic potential, scalar magnetic potential and its limitations	1	19-01-2022		TLM1	
48.	Vector magnetic potential and its properties& vector Poisson's equations	1	20-01-2022		TLM1	
49.	Neuman's formulae and Inductance calculation in static	1	21-01-2022		TLM1	

	magnetic field					
No. of classes required to complete UNIT-IV		08				

UNIT-V: ELECTRODYNAMIC FIELDS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50.	Faraday's laws of electromagnetic induction	1	25-01-2022		TLM1	
51.	Self and Mutual inductance & Statically and Dynamically induced EMFs	1	27-01-2022		TLM1	
52.	Mutual inductance between a straight long wire in the same plan	1	28-01-2022		TLM1	
53.	Maxwell's equations integral and point forms	1	01-02-2022		TLM1	
54.	Modification of Maxwell's equations for time varying fields	1	02-02-2022		TLM1	
55.	Poynting Theorem and Poynting vector **&** Determination of self-inductance of a solenoid and toroid	1	03-02-2022		TLM1	
56.	**Beyond Syllabus:** Wave guide analysis, Wave propagations	1	04-2-2022		TLM2	
57.	MID-II		07-2-2022			
58.	MID-II		08-2-2022			
59.	MID-II		09-2-2022			
60.	MID-II		10-2-2022			
No. of classes required to complete UNIT-V		07				

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

Part - C

EVALUATION PROCESS:

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

PART-D

PROGRAMME OUTCOMES (POs):

PO a	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO b	**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 c	**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 d	**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 e	**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 f	**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 g	**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 h	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO i	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO j	**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 k	**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 l	**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 a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	Design controllers for electrical and electronic systems to improve their performance.

Mr.Dr.K.Harinath Reddy	Mr.Dr.Harinath Reddy	Dr.K.R.L.Prasad	Dr.J.Siva Vara Prasad
Course Instructor	Course Coordinator	Module Coordinator	H.O.D

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part - A

PROGRAM : B.Tech. III-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : **ELECTRIC AND MAGNETIC FIELDS (17EE02)**

L-T-P STRUCTURE : 2-2-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.K.HARINATH REDDY**

COURSE COORDINATOR : **Dr.K.HARINATH REDDY**

Pre Requisite: Applied Mathematics-I, Engineering Physics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of this course is to introduce the concepts of electric and magnetic fields and their applications which will be useful in the development of the theory for Electrical Machines and Power Systems.

COURSE OUTCOMES (COs)

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

CO5: Analyze static electric fields due to various charge distributions
CO6: Describe the boundary conditions for conductor and dielectric interfaces
CO7: Analyze static magnetic fields due to various current carrying elements
CO8: Apply Maxwell's equations to diverse engineering problems

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	3		2	2							1	2	1	
CO2	3	2											2	1	
CO3	3	3		2	2							1	2	1	
CO4	3	2		2	2							1	2	2	

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

BOS APPROVED TEXT BOOKS:

T1 William .H.Hayt, 'Engineering Electromagnetics', Tata McGraw Hill 7th edition.

T2 Gangadhar.K.A, "Field theory ", Khanna Publishers, New Delhi, 15th edition, 2004.

BOS APPROVED REFERENCE BOOKS:

R3: Mathew.N.O.Sadiku, "Elements of Electromagnetics",sixth edition,Oxford University Press,2015.

R4: David K Cheng,"Field and Wave Electromagnetics ", Pearson 2nd edition,2004.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: ELECTRO STATICS-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.	Course outcomes, Introduction to Coordinate systems	1	25-10-2021		TLM2	
2.	Coulomb's Law	1	27-10-2021		TLM1	
3.	Electric Field Intensity (EFI)	1	29-10-2021		TLM1	
4.	Electric Fields due to continuous charge distributions	1	30-10-2021		TLM1	
5.	EFI due to a line and a surface charge	1	01-11-2021		TLM1	
6.	**Tutorial-I**	1	03-11-2021		TLM6	
7.	Application of Guass's Law	1	05-11-2021		TLM1	
8.	Maxwell's first law	1	06-11-2021		TLM1	
9.	Electric Flux density, Gauss's law	1	08-11-2021		TLM1	
10.	**Tutorial-II problems**	1	10-11-2021		TLM6	
11.	**-Quiz-1/ Assignment-1**	1	12-11-2021		TLM6	
12.	Revision	1	13-11-2021			
No. of classes required to complete UNIT-I		12				

UNIT-II: ELECTRO STATICS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Electric Potential – Properties of potential function – Potential gradient	1	15-11-2021		TLM1	
14.	**Tutorial-III**	1	17-11-2021		TLM6	
15.	Conductors, Dielectrics,current density & Equation of continuity .	1	19-11-2021		TLM1	
16.	Ohm's law in point form & Behavior of conductors in an electric field	1	20-11-2021		TLM1	
17.	Polarization, Displacement and	1	22-11-2021		TLM1	

	Convection current, Electric field inside a dielectric material					
18.	**Tutorial-IV**	1	24-11-2021		TLM6	
19.	Work done in moving a point charge in an electrostatic field	1	26-11-2021		TLM1	
20.	Electric dipole – Dipole moment , potential and EFI due to an electric dipole	1	27-11-2021		TLM1	
21.	Conductor-Free space and Dielectric boundary conditions	1	30-11-2021		TLM1	
22.	**Tutorial-V**	1	01-12-2021		TLM6	
23.	Capacitance calculation in static electric field	1	03-12-2021		TLM1	
24.	Spherical co-axial capacitors with composite dielectrics	1	04-12-2021		TLM1	
25.	Laplace's and Poison's equations	1	06-12-2021		TLM1	
26.	**Tutorial-VI- Quiz-2/ Assignment-2**	1	08-12-2021		TLM6	
27.	Solution of Laplace's equation in one variable -	1	10-12-2021		TLM1	
28.	Revision	1	11-12-2021		TLM2	
29.	MID-I EXAM		13-12-2021			
30.	MID-I EXAM		15-12-2021			
31.	MID-I EXAM		17-12-2021			
32.	MID-I EXAM		18-12-2021			
No. of classes required to complete UNIT-II		16				

UNIT-III: MAGNETO STATICS-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
33.	Static magnetic fields – Biot-Savart's law	1	20-12-2021		TLM1	
34.	Magnetic field intensity (MFI) due to a straight current carrying filament	1	22-12-2021		TLM1	
35.	MFI due to circular, square and solenoid current carrying wire	1	24-12-2021		TLM1	
36.	**Tutorial-VIII**	1	25-12-2021		TLM6	

37.	MFI due to an infinite sheet of current and a long current carrying filament	1	27-12-2021		TLM1	
38.	Relation between magnetic flux, magnetic flux density and MFI, Maxwell's second Equation	1	29-12-2021		TLM1	
39.	Ampere's circuital law and its applications	1	31-12-2021		TLM1	
40.	Point form of Ampere's circuital law	1	01-01-2022		TLM1	
41.	Maxwell's third equation	1	03-01-2022		TLM1	
42.	Field due to a circular loop, rectangular and square loops	1	05-01-2022		TLM1	
No. of classes required to complete UNIT-III		10				

UNIT-IV: MAGNETO STATICS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Magnetic force - Moving charges in a Magnetic field	1	07-01-2022		TLM1	
44.	Lorentz force equation – force on a current element	1	08-01-2022		TLM1	
45.	Force on a straight and a long current carrying conductor	1	10-01-2022		TLM1	
46.	Force between two straight long and parallel current carrying conductors	1	12-01-2022		TLM1	
47.	Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole	1	17-01-2022		TLM1	
48.	Torque on a current loop, magnetic potential, scalar magnetic potential and its limitations	1	19-01-2022		TLM1	
49.	Vector magnetic potential and its properties& vector Poisson's equations	1	21-01-2022		TLM1	
50.	Neuman's formulae and	1	22-01-2022		TLM1	

	Inductance calculation in static magnetic field					
No. of classes required to complete UNIT-IV		08				

UNIT-V: ELECTRODYNAMIC FIELDS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	Faraday's laws of electromagnetic induction	1	24-01-2022		TLM1	
52.	Self and Mutual inductance & Statically and Dynamically induced EMFs	1	28-01-2022		TLM1	
53.	Mutual inductance between a straight long wire in the same plan	1	29-01-2022		TLM1	
54.	Maxwell's equations integral and point forms	1	31-01-2022		TLM1	
55.	Modification of Maxwell's equations for time varying fields	1	02-02-2022		TLM1	
56.	Poynting Theorem and Poynting vector **&** Determination of self-inductance of a solenoid and toroid	1	04-02-2022		TLM1	
57.	**Beyond Syllabus:** Wave guide analysis, Wave propagations	1	05-2-2022		TLM2	
58.	MID-II		07-2-2022			
59.	MID-II		09-2-2022			
60.	MID-II		11-2-2022			
61.	MID-II		12-2-2022			
No. of classes required to complete UNIT-V		07				

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

Part - C

EVALUATION PROCESS:

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

PART-D

PROGRAMME OUTCOMES (POs):

PO a	**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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COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. V. Bhagya Lakshmi
Course Name & Code : Environmental Science & 20MC03
L-T-P Structure : 2-0-0 Credits : 0
Program/Sem/Sec : B.Tech., EEE., Sec- A, III-Sem., A.Y : 2021-22

PRE-REQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): The purpose of this course is to provide a general background on developing an understanding of systems and cycles on the earth and how individual organisms live together in complex communities and how human activities influence our air, water and soil. It also helps in developing an understanding about our use of fossil fuels and effect on climate and sustainable management of natural resources.

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

CO 1	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.
CO 2	Evaluate local, regional and global environmental issues related to resources and their sustainable management.
CO 3	Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
CO 4	Acknowledge and prevent the problems related to pollution of air, water and soil.
CO5	Identify the significance of implementing environmental laws and abatement devices for environmental management.

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	3	-	-	-	3	3	3	-	-	-	3	-	-	-
CO2	3	3	-	-	-	3	3	-	-	-	-	3	-	-	-
CO3	3	-	3	-	-	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	-	-	2	3	2	-	-	-	3	-	-	-
CO5	3	3	3	3	-	3	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 Anubha Kaushik, C.P.Kaushik, "Perspectives in Environmental Studies", New age international publishers, 5th Edition, Delhi, 2016.

T2 Mahua Basu, S. Xavier, "Fundamentals of Environmental Studies", Cambridge University Press, 1st Edition, Delhi, 2016.

REFERENCE BOOKS:

R1 S. Deswal, A. Deswal, "A Basic course in Environmental Studies", Educational & Technical Publishers, 2nd Edition, Delhi, 2014.

R2 R. Rajagopalan, "*Environmental Studies (From Crisis to Cure)*", Oxford University Press, 2nd Edition, New Delhi, 2012.

R3 De, A.K, "Environmental Chemistry", New Age International (P) Limited, 5th Edition, New Delhi, 2003.

R4 Dr.K.V.S.G. Murali Krishna, "Environmental Studies", VGS Techno Series, 1st Edition, Vijayawada, 2010.

R5 G. Tyler Miller, Scott Spoolman, "Introduction to Environmental Studies", Cengage Learning, 13th Edition, New Delhi, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: NATURE AND SCOPE OF ENVIRONMENTAL PROBLEMS

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 of course and course objectives. Introduction of components of Environment	1	27-10-2021		2	
2.	Population explosion and variations among Nations.	1	30-10-2021		2	
3.	Resettlement and Rehabilitation - Issues and possible solutions	1	03-11-2021		2	
4.	Environmental Hazards	1	06-11-2021		2	
5.	Role of Information Technology in environmental management and human health.	1	10-11-2021		2	
No. of classes required to complete UNIT-I: 5				No. of classes taken:		

UNIT-II: NATURAL RESOURCES AND CONSERVATION

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 and classification of Natural resources, Forest Resources,	1	13-11-2021		2	
2.	Water Resources	1	17-11-2021		2	
3.	Mineral Resources	1	20-11-2021		2	
4.	Food Resources	1	24-11-2021		2	
5.	Food Resources	1	27-11-2021		2	
6.	Mineral Resources	1	01-12-2021		2	
No. of classes required to complete UNIT-II: 6				No. of classes taken:		

UNIT-III: ECOLOGY AND BIODIVERSITY

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, structure, and functions of an ecosystem	1	04-12-2021		2	
2.	Food chains and Food webs, Ecological succession, Ecological pyramids, Bio-geo-chemical cycles	1	08-12-2021		2	
3.	Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation	1	11-12-2021		2	

4.	I MID EXAMINATION		15-12-2021			
5.	I MID EXAMINATION		18-12-2021			
6.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity. Assignment in Unit II	1	22-12-2021		2	
7.	Man, and wildlife conflicts. Endangered and endemic species of India	1	29-12-2021		2,3	
8.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	31-12-2021		2	
No. of classes required to complete UNIT-III: 8				No. of classes taken:		

UNIT-IV : ENVIRONMENTAL POLLUTION

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.	Air Pollution	1	05-01-2022		2	
2.	Causes, effects, and control measures of: Water Pollution Causes, effects and control measures of: Soil Pollution,	1	08-01-2022		2	
3.	Noise Pollution		12-01-2022			
4.	Solid Waste Management		15-01-2022			
5.	Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	19-01-2022		2,3	
No. of classes required to complete UNIT-IV: 5				No. of classes taken:		

UNIT-V : ENVIRONMENTAL MANAGEMENT

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.	Sustainable Development	1	22-01-2022		2	
2.	Climate disruption- Greenhouse effect, ozone layer depletion and acid rain. Stockholm conference	1	29-01-2022		2,3	
3.	Environmental Impact Assessment (EIA),	1	02-02-2022		2	
4.	Green building, Environmental Law	1	05-02-2022		2,3	
No. of classes required to complete UNIT-V: 04				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. V. Bhagya Lakshmi	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. A. Rami Reddy
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. V. Bhagya Lakshmi
Course Name & Code : Environmental Science & 20MC03
L-T-P Structure : 2-0-0 Credits : 0
Program/Sem/Sec : B.Tech., EEE., Sec- B, III-Sem., A.Y : 2021-22

PRE-REQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): The purpose of this course is to provide a general background on developing an understanding of systems and cycles on the earth and how individual organisms live together in complex communities and how human activities influence our air, water and soil. It also helps in developing an understanding about our use of fossil fuels and effect on climate and sustainable management of natural resources.

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

CO 1	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.
CO 2	Evaluate local, regional and global environmental issues related to resources and their sustainable management.
CO 3	Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
CO 4	Acknowledge and prevent the problems related to pollution of air, water and soil.
CO5	Identify the significance of implementing environmental laws and abatement devices for environmental management.

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	3	-	-	-	3	3	3	-	-	-	3	-	-	-
CO2	3	3	-	-	-	3	3	-	-	-	-	3	-	-	-
CO3	3	-	3	-	-	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	-	-	2	3	2	-	-	-	3	-	-	-
CO5	3	3	3	3	-	3	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 Anubha Kaushik, C.P.Kaushik, "Perspectives in Environmental Studies", New age international publishers, 5th Edition, Delhi, 2016.

T2 Mahua Basu, S. Xavier, "Fundamentals of Environmental Studies", Cambridge University Press, 1st Edition, Delhi, 2016.

REFERENCE BOOKS:

R1 S. Deswal, A. Deswal, "A Basic course in Environmental Studies", Educational & Technical Publishers, 2nd Edition, Delhi, 2014.

R2 R. Rajagopalan, "*Environmental Studies (From Crisis to Cure)*", Oxford University Press, 2nd Edition, New Delhi, 2012.

R3 De, A.K, "Environmental Chemistry", New Age International (P) Limited, 5th Edition,

New Delhi, 2003.
R4 Dr.K.V.S.G. Murali Krishna, "Environmental Studies", VGS Techno Series, 1st Edition, Vijayawada, 2010.
R5 G. Tyler Miller, Scott Spoolman, "Introduction to Environmental Studies", Cengage Learning, 13th Edition, New Delhi, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: NATURE AND SCOPE OF ENVIRONMENTAL PROBLEMS

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 of course and course objectives. Introduction of components of Environment	1	27-10-2021		2	
2.	Population explosion and variations among Nations.	1	30-10-2021		2	
3.	Resettlement and Rehabilitation - Issues and possible solutions	1	03-11-2021		2	
4.	Environmental Hazards	1	06-11-2021		2	
5.	Role of Information Technology in environmental management and human health.	1	10-11-2021		2	
No. of classes required to complete UNIT-I: 5				No. of classes taken:		

UNIT-II: NATURAL RESOURCES AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Introduction and classification of Natural resources, Forest Resources,	1	13-11-2021		2	
6.	Water Resources	1	17-11-2021		2	
7.	Mineral Resources	1	20-11-2021		2	
8.	Food Resources	1	24-11-2021		2	
9.	Food Resources	1	27-11-2021		2	
10.	Mineral Resources	1	01-12-2021		2	
No. of classes required to complete UNIT-II: 6				No. of classes taken:		

UNIT-III: ECOLOGY AND BIODIVERSITY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	Definition, structure, and functions of an ecosystem	1	04-12-2021		2	
10.	Food chains and Food webs, Ecological succession, Ecological pyramids, Bio-geo-chemical cycles	1	08-12-2021		2	
11.	Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation	1	11-12-2021		2	
12.	I MID EXAMINATION		15-12-2021			

13.	I MID EXAMINATION		18-12-2021			
14.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity. Assignment in Unit II	1	22-12-2021		2	
15.	Man, and wildlife conflicts. Endangered and endemic species of India	1	29-12-2021		2,3	
16.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	31-12-2021		2	
No. of classes required to complete UNIT-III: 8				No. of classes taken:		

UNIT-IV : ENVIRONMENTAL POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
6.	Air Pollution	1	05-01-2022		2	
7.	Causes, effects, and control measures of: Water Pollution Causes, effects and control measures of: Soil Pollution,	1	08-01-2022		2	
8.	Noise Pollution		12-01-2022			
9.	Solid Waste Management		15-01-2022			
10.	Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	19-01-2022		2,3	
No. of classes required to complete UNIT-IV: 5				No. of classes taken:		

UNIT-V : ENVIRONMENTAL MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
5.	Sustainable Development	1	22-01-2022		2	
6.	Climate disruption- Greenhouse effect, ozone layer depletion and acid rain. Stockholm conference	1	29-01-2022		2,3	
7.	Environmental Impact Assessment (EIA),	1	02-02-2022		2	
8.	Green building, Environmental Law	1	05-02-2022		2,3	
No. of classes required to complete UNIT-V: 04				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15

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

PART-D

PROGRAMME OUTCOMES (POs):

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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRONICS & COMUNICATION ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : O.Venkata Siva / M.Swathi/ D.Srinivas Rao
Course Name & Code : DATA STRUCTURES LAB & 20CS53
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B.Tech/III/A-Sec. **A.Y.:** 2021-22

PREREQUISITE: C Programming Language

COURSE OBJECTIVE:
The objective of this course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques
COURSE OUTCOMES (CO):
CO1: Implement Linear Data Structures using array and Linked list. (**Apply - L3**)
CO2: Implement Various Sorting Techniques. (**Apply - L3**)
CO3: : Implement Non-Linear Data Structure such as Trees &Graphs. (**Apply - L3**)
CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

Note: 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	HOD Sign
1.	Introduction & List using Arrays	3	01-11-2021		
2.	Linked List Programs	9	08-11-2021, 15-11-2021 29-11-2021		
3.	Stack, Queue Using Arrays, Linked List	3	06-12-2021		
4.	Infix to Postfix, Evaluation of Postfix Expression	3	13-12-2021		
5.	Circular Queue Double Ended Queue	3	20-12-2021		
6.	Bubble sort Selection sort Insertion sort	3	27-12-2021		
7.	Merge sort Quick sort	3	03-01-2022		
8.	Heap sort Binary Tree	3	10-01-2022		
9.	Binary Search Tree	3	17-01-2022		
10.	BFS,DFS	3	24-01-2022		
11.	Lab Internal Exam	3	31-02-2022		

PART-C

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	To inculcate an ability to analyze, design and implement data driven applications into the students
PSO 3	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. O.Venkata Siva**	**Dr.K. Naga Prasanthi**	**Dr. Y.Vijaya Bhaskar Reddy**	**Dr. D. Veeraiah**
Signature				

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DEPARTMENT OF ELECTRONICS & COMUNICATION ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : M.Swathi/ O.Venkata Siva /D.Srinivas Rao
Course Name & Code : DATA STRUCTURES LAB & 20CS53
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B.Tech/III/B-Sec. **A.Y.:** 2021-22

PREREQUISITE: C Programming Language

COURSE OBJECTIVE:
The objective of this course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques
COURSE OUTCOMES (CO):
CO1: Implement Linear Data Structures using array and Linked list. (**Apply - L3**)
CO2: Implement Various Sorting Techniques. (**Apply - L3**)
CO3: : Implement Non-Linear Data Structure such as Trees &Graphs. (**Apply - L3**)
CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

Note: 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	HOD Sign
1.	Introduction & List using Arrays	3	26-10-2021		
2.	Linked List Programs	9	02-11-2021, 09-11-2021 16-11-2021		
3.	Stack, Queue Using Arrays, Linked List	3	23-11-2021		
4.	Infix to Postfix, Evaluation of Postfix Expression	3	30-11-2021		
5.	Circular Queue Double Ended Queue	3	07-12-2021		
6.	Bubble sort Selection sort Insertion sort	3	21-12-2021		
7.	Merge sort Quick sort	3	28-12-2021		
8.	Heap sort Binary Tree	3	04-01-2022		
9.	Binary Search Tree	3	11-01-2022		
10.	BFS, DFS	6	18-01-2022 25-01-2022		
11.	Lab Internal Exam	3	01-02-2022		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 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.
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PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	To inculcate an ability to analyze, design and implement data driven applications into the students
PSO 3	Develop an ability to implement various processes/methodologies/practices employed in design, validation, testing and maintenance of software products.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ms.M.Swathi**	**Dr.K. Naga Prasanthi**	**Dr. Y.Vijaya Bhaskar Reddy**	**Dr. D. Veeraiah**
Signature				

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. Imran Abdul/ Dr. M. S. Giridhar / Mr. M.Raja Naik
Course Name & Code **:** ELECTRICAL CIRCUITS AND SIMULATION LAB& 20EE54
L-T-P Structure **: 0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/A **A.Y.:** 2021-22
PRE-REQUISITES : Fundamentals of Eletrical circuits
COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to impart hands on experience in verification of circuits laws and theorems, study of circuit characteristics and simulation of time response. It also give practical exposure to the usage of CRO, power sources and function generator.

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

CO1	Examine the response of AC and DC electrical circuits using theorems
CO2	Analyze the magnetic circuits
CO3	Design Resonance circuits
CO4	Estimate two port network parameters
CO5	Analyze the electrical circuits using simulation tools

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
Examine the response of AC and DC electric circuits using theorems	2	2		3	2			2	3	2						
Analyze the magnetic circuits	2	2		3	2			2	3	2						
Design resonance circuits	2	2		3	2			2	3	2						
Estimate two port network parameters	2	2		3	2				3	2						
Analyze the electrical circuit using simulation tools	2	2		3	2				3	2						

TEXTBOOKS:

T: William Hayt and Jack E.Kemmerley, "Engineering Circuit Analysis" ,Mc Graw Hill Company, 9th edition,2020

T2: .C.L.Wadhwa, "Network Analysis And Synthesis", New Age International publication, 3 rd edition,2018.

REFERENCE BOOKS:

R1: Van Valkenburg, "Network Analysis and Synthesis", Pearson publication, 3rd edition,2015

R2: A. Sudhakar ,Shyammohan, S Palli, "Electrical Circuits Analysis-2" Tata McGraw- Hill, 5th edition,2015

R3: Charles K Alexander, Mathew. N. O.Sadiku, "Fundamental of Electric Circuits", Tata McGrawHill ,6th edition,2019.

R4: Chakrabarti A,"Electric Circuits Analysis & Synthesis " Dhanpat Rai & Co (p) Ltd, 6th edition,2014

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):
SECTION-A SCHEDULE

DAY : TUESDAY

Batches : 20761A0201-227, 20761A0229-232

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV Week
	Tentative date	26 10	02 11	09 11	16 11	23 11	30 11	07 12	14 12	21 12	28 12	04 01	18 01	25 01	01 02	08 02
	Actual date															
B-1	20761A0233 20761A0234 20761A0235	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**	REVISION OF EXPERIMENTS
B-2	20761A0236 20761A0237 20761A0238	DEMO	1	2	3	4	5	6	7	8	9	10				
B-3	20761A0239 20761A0240 20761A0241	DEMO	1	2	3	4	5	6	7	8	9	10				
B-4	20761A0242 20761A0243 20761A0244	DEMO	1	2	3	4	5	6	7	8	9	10				
B-5	20761A0245 20761A0246 20761A0247	DEMO	1	2	3	4	5	6	7	8	9	10				
B-6	20761A0248 20761A0249 20761A0250	DEMO	1	2	3	4	5	6	7	8	9	10				
B-7	20761A0251 20761A0252 20761A0253	DEMO	1	2	3	4	5	6	7	8	9	10				
B-8	20761A0254 20761A0255 20761A0256	DEMO	1	2	3	4	5	6	7	8	9	10				
B-9	20761A0257 20761A0258 20761A0259	DEMO	1	2	3	4	5	6	7	8	9	10				
B-10	20761A0260 20761A0261 20761A0262 20761A0263	DEMO	1	2	3	4	5	6	7	8	9	10				

DAY : THURSDAY

Batches : 20761A0233 - 263

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week
	Tentative date	28 10	11 11	18 11	25 11	02 12	09 12	16 12	23 12	30 12	06 01	20 01	27 01	03 02	10 02
	Actual date														
B-1	20761A0201 20761A0202 20761A0203	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	20761A0204 20761A0205 20761A0206	DEMO	1	2	3	4	5	6	7	8	9	10			
B-3	20761A0207 20761A0208 20761A0209	DEMO	1	2	3	4	5	6	7	8	9	10			
B-4	20761A0210 20761A0211 20761A0212	DEMO	1	2	3	4	5	6	7	8	9	10			
B-5	20761A0213 20761A0214 20761A0215	DEMO	1	2	3	4	5	6	7	8	9	10			
B-6	20761A0216 20761A0217 20761A0218	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	20761A0219 20761A0220 20761A0221	DEMO	1	2	3	4	5	6	7	8	9	10			
B-8	20761A0222 20761A0223 20761A0224	DEMO	1	2	3	4	5	6	7	8	9	10			
B-9	20761A0225 20761A0226 20761A0227	DEMO	1	2	3	4	5	6	7	8	9	10			
B-10	20761A0229 20761A0230 20761A0231 20761A0232	DEMO	1	2	3	4	5	6	7	8	9	10			

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2	Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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 teamwork**: 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	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr. Imran Abdul, Dr.M.S. Giridhar, Mr. M. Raja Naik	Dr. M.S. Giridhar	Dr. P.Sobha Rani	Dr.J.S.V.PRASAD
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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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. M. RAJA NAYAK / Smt T. NAGA DURGA/ Dr. M.S. GIRIDHAR
Course Name & Code : ELECTRICAL CIRCUITS & SIMULATION LAB & 20EE54
L-T-P Structure : **0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/AB **A.Y.:** 2021-22
PRE-REQUISITES: Fundamentals of Electrical Engineering

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to impart hands on experience in verification of circuit laws and theorems, study of circuit characteristics ans simulation of time response. It also gives practical exposure to the usage of CRO, power sources and function generator.

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

CO1	Examine the response of AC and Dc electric circuits using theorems (Apply-L3)
CO2	Analyze the magnetic circuits (Understand-L2)
CO3	Design resonance circuits (Apply-L3)
CO4	Estimate two port network parameters (Apply-L3)
CO5	Analyze the electrical circuits using simulation tools (Apply-L3)

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

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

TEXTBOOKS:

T1 K. Mahadevan, C. CHITRA," Electrical Circuit Analysis", Eastern Economy Education, New Delhi, 2nd edition, 2018.

T2 William H. Hayt, Jack E. Kammely, Steven M. Durbin "Engineering Circuit Analysis", McGraw Hill Education, New York, 8th edition, 2010.

REFERENCE BOOKS:

R5: David E. Johnson, John L Hilburn, and Johnny Ray Johnson, "Digital Design", Pearson Education , New Delhi, 3rd edition,1996.

R6: B. Subramanyam, "Switching Theory and Logic Design", IK International Publishers, New Delhi,1st edition, 2009.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):
SECTION-A SCHEDULE

DAY : MONDAY
Batches : 20761A0264-293

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV Week
	Tentative date	29 10	05 11	12 11	19 11	26 11	03 12	10 12	17 12	24 12	31 12	07 01	21 01	28 01	04 02	11 02
	Actual date															
B-1	20761A0264 20761A0265 20761A0266	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**	REVISION OF EXPERIMENTS
B-2	20761A0267 20761A0268 20761A0269	DEMO	1	2	3	4	5	6	7	8	9	10				
B-3	20761A0270 20761A0271 20761A0273	DEMO	1	2	3	4	5	6	7	8	9	10				
B-4	20761A0274 20761A0275 20761A0276	DEMO	1	2	3	4	5	6	7	8	9	10				
B-5	20761A0277 20761A0278 20761A0279	DEMO	1	2	3	4	5	6	7	8	9	10				
B-6	20761A0280 20761A0281 20761A0272	DEMO	1	2	3	4	5	6	7	8	9	10				
B-7	20761A0283 20761A0284 20761A0285	DEMO	1	2	3	4	5	6	7	8	9	10				
B-8	20761A0286 20761A0287 20761A0288	DEMO	1	2	3	4	5	6	7	8	9	10				
B-9	20761A0289 20761A0290 20761A0291	DEMO	1	2	3	4	5	6	7	8	9	10				
B-10	20761A0292 20761A0293 20761A0294	DEMO	1	2	3	4	5	6	7	8	9	10				

DAY : FRIDAY

Batches : 20761A0294 – 2C3

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week
	Tentative date	25 10	1 11	8 11	15 11	22 12	29 12	6 12	13 12	20 12	27 12	03 01	17 01	24 01	31 01
	Actual date														
B-1	20761A0295 20761A0296 20761A0297	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	20761A0298 20761A0299 20761A02A0	DEMO	1	2	3	4	5	6	7	8	9	10			
B-3	20761A02A1 20761A02A2 20761A02A3	DEMO	1	2	3	4	5	6	7	8	9	10			
B-4	20761A02A4 20761A02A5 20761A02A6	DEMO	1	2	3	4	5	6	7	8	9	10			
B-5	20761A02A7 20761A02A8 20761A02A9	DEMO	1	2	3	4	5	6	7	8	9	10			
B-6	20761A02B0 20761A02B1 20761A02B2	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	20761A02B3 20761A02B4 20761A02B5	DEMO	1	2	3	4	5	6	7	8	9	10			
B-8	20761A02B6 20761A02B7 20761A02B8 20761A02B9	DEMO	1	2	3	4	5	6	7	8	9	10			
B-9	20761A02C0 20761A02C1 20761A02C2 20761A02C3	DEMO	1	2	3	4	5	6	7	8	9	10			

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2	Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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.
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PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr.M.RAJA NAYAK Smt.T.NAGA DURGA Dr M.S.GIRIDHAR	Mr.M.RAJA NAYAK	Dr.P.SOBHA RANI	Dr.J.S.V.PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. A.V. RAVI KUMAR / Smt G.TABITA / Ms I.D.S.SREE
Course Name & Code : DIGITAL ELECTRONICS LAB & 20EE55
L-T-P Structure : **0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/A **A.Y.:** 2021-22
PRE-REQUISITES : Digital Electronics

COURSE EDUCATIONAL OBJECTIVES (CEOs): This laboratory course enables the students to demonstrate the design and application of digital logic circuits in day-to-day life.

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

CO1	Analyze simple combinational and sequential logic circuits (Understand-L2)
CO2	Demonstrate different application of ICs (Apply-L3)
CO3	Design the logic circuits using simulation tools (Apply-L3)

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	2	2			2	2	2			2		2	
CO2	2	2	2	2	2			2	2	2			2		2	
CO3	2	2	2	2	2			2	2	2			2		2	
1 - Low				**2 –**Medium								**3 -** High				

TEXTBOOKS:

T1 Morris Mano, Michael D. Ciletti ,"Digital Design with an Introduction to the Verilog HDL", Pearson Education, New Jersey, 5th edition, 2013.

T2 Zvi Kohavi, Niraj K. Jha, "Switching and Finite Automata Theory", Cambridge University Press, New York, 3rd edition, 2010.

REFERENCE BOOKS:

R7: John F. Wakerly, "Digital Design", Pearson Education ,New Delhi, 4th edition,2014.

R8: A. Anand Kumar, "Switching Theory and Logic Design", PHI Publishers,New Delhi,3rd edition, 2016

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):
SECTION-A SCHEDULE

DAY : TUESDAY

Batches : 20761A0201-227, 20761A0229-232

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV Week
	Tentative date	26 10	02 11	09 11	16 11	23 11	30 11	07 12	14 12	21 12	28 12	04 01	18 01	25 01	01 02	08 02
	Actual date															
B-1	20761A0201 20761A0202 20761A0203	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**	REVISION OF EXPERIMENTS
B-2	20761A0204 20761A0205 20761A0206	DEMO	1	2	3	4	5	6	7	8	9	10				
B-3	20761A0207 20761A0208 20761A0209	DEMO	1	2	3	4	5	6	7	8	9	10				
B-4	20761A0210 20761A0211 20761A0212	DEMO	1	2	3	4	5	6	7	8	9	10				
B-5	20761A0213 20761A0214 20761A0215	DEMO	1	2	3	4	5	6	7	8	9	10				
B-6	20761A0216 20761A0217 20761A0218	DEMO	1	2	3	4	5	6	7	8	9	10				
B-7	20761A0219 20761A0220 20761A0221	DEMO	1	2	3	4	5	6	7	8	9	10				
B-8	20761A0222 20761A0223 20761A0224	DEMO	1	2	3	4	5	6	7	8	9	10				
B-9	20761A0225 20761A0226 20761A0227	DEMO	1	2	3	4	5	6	7	8	9	10				
B-10	20761A0229 20761A0230 20761A0231 20761A0232	DEMO	1	2	3	4	5	6	7	8	9	10				

DAY : THURSDAY

Batches : 20761A0233 - 263

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week
	Tentative date	28 10	11 11	18 11	25 11	02 12	09 12	16 12	23 12	30 12	06 01	20 01	27 01	03 02	10 02
	Actual date														
B-1	20761A0233 20761A0234 20761A0235	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	20761A0236 20761A0237 20761A0238	DEMO	1	2	3	4	5	6	7	8	9	10			
B-3	20761A0239 20761A0240 20761A0241	DEMO	1	2	3	4	5	6	7	8	9	10			
B-4	20761A0242 20761A0243 20761A0244	DEMO	1	2	3	4	5	6	7	8	9	10			
B-5	20761A0245 20761A0246 20761A0247	DEMO	1	2	3	4	5	6	7	8	9	10			
B-6	20761A0248 20761A0249 20761A0250	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	20761A0251 20761A0252 20761A0253	DEMO	1	2	3	4	5	6	7	8	9	10			
B-8	20761A0254 20761A0255 20761A0256	DEMO	1	2	3	4	5	6	7	8	9	10			
B-9	20761A0257 20761A0258 20761A0259	DEMO	1	2	3	4	5	6	7	8	9	10			
B-10	20761A0260 20761A0261 20761A0262 20761A0263	DEMO	1	2	3	4	5	6	7	8	9	10			

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15

Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
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PEO3	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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
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PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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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	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr.A.V.RAVIKUMAR Smt.G.TABITHA Ms I D SATYA SREE	Mr.A.V.RAVIKUMAR	Dr A V G A MARTHANDA	Dr.J.S.V.PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P.Rathnakar Kumar / Mr.A.Ravi Kumar / Ms I.D.S.SREE
Course Name & Code **:** DIGITAL ELECTRONICS LAB & 20EE55
L-T-P Structure **: 0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/B **A.Y.:** 2021-22
PRE-REQUISITES : Digital Electronics
COURSE EDUCATIONAL OBJECTIVES (CEOs): This laboratory course enables the students to demonstrate the design and application of digital logic circuits in day-to-day life.

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

CO1	Analyze simple combinational and sequential logic circuits (Understand-L2)
CO2	Demonstrate different application of ICs (Apply-L3)
CO3	Design the logic circuits using simulation tools (Apply-L3)

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

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

TEXTBOOKS:

T1 Morris Mano, Michael D. Ciletti ,"Digital Design with an Introduction to the Verilog HDL", Pearson Education, New Jersey, 5th edition, 2013.

T2 Zvi Kohavi, Niraj K. Jha, "Switching and Finite Automata Theory", Cambridge University Press, New York, 3rd edition, 2010.

REFERENCE BOOKS:

R9: John F. Wakerly, "Digital Design", Pearson Education ,New Delhi, 4th edition,2014.

R10: A. Anand Kumar, "Switching Theory and Logic Design", PHI Publishers,New Delhi,3rd edition, 2016

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):
SECTION-B SCHEDULE

DAY : MONDAY

Batches : 20761A0264-270, 271,20761A0273-294

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week
	Tentative date	25-10-21	01/ 11	08/ 11	15/ 11	22/ 11	29/ 11	06/ 12	20/ 12	27/ 12	03/ 01/22	10/ 01	17/ 01	24/ 01	31/ 01
	Actual date														
B-1	20761A0264 20761A0265 20761A0266	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A0267 20761A0268 20761A0269	DEMO	1	2	3	4	5	6	7	8	9	10			
B-3	20761A0270 20761A0271 20761A0273	DEMO	1	2	3	4	5	6	7	8	9	10			
B-4	20761A0274 20761A0275 20761A0276	DEMO	1	2	3	4	5	6	7	8	9	10			
B-5	20761A0277 20761A0278 20761A0279	DEMO	1	2	3	4	5	6	7	8	9	10			
B-6	20761A0280 20761A0281 20761A0282	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	20761A0283 20761A0284 20761A0285	DEMO	1	2	3	4	5	6	7	8	9	10			
B-8	20761A0286 20761A0287 20761A0288	DEMO	1	2	3	4	5	6	7	8	9	10			
B-9	20761A0289 20761A0290 20761A0291	DEMO	1	2	3	4	5	6	7	8	9	10			
B-10	20761A0292 20761A0293 20761A0294	DEMO	1	2	3	4	5	6	7	8	9	10			

DAY : FRIDAY

Batches : 20761A0295 – 299, 20761A02A0-A9, 20761A02B0-B9, 20761A02C0-C3

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week
	Tentative date	29-10-21	05/ 11	12/ 11	19/ 11	26/ 11	03/ 12	10/ 12	24/ 12	31/ 12	07-01-22	21/ 01	28/ 01	04/ 02
	Actual date													
B-1	20761A0295 20761A0296 20761A0297	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A0298 20761A0299 20761A02A0	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A02A1 20761A02A2 20761A02A3	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A02A4 20761A02A5 20761A02A6	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A02A7 20761A02A8 20761A02A9	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A02B0 20761A02B1 20761A02B2	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A02B3 20761A02B4 20761A02B5	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A02B6 20761A02B7 20761A02B8	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	20761A02B9 20761A02C0 20761A02C1	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	20761A02C2 20761A02C3	DEMO	1	2	3	4	5	6	7	8	9	10		

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2	Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

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 teamwork**: 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	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr.P.Rathnakar Kumar Mr.A.V.RAVIKUMAR Ms I D SATYA SREE	Mr.A.V.RAVIKUMAR	Dr A V G A MARTHANDA	Dr.J.S.V.PRASAD
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.
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DEPARTMENT OF EEE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. M. Uma Vani
Course Name & Code : Digital Electronics (20EE06)
L-T-P Structure : 2-1-0 **Credits:** 3
Program/Sem/Sec : B.Tech/III/A & B **A.Y.: 2021-22**

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to introduce the number systems, Boolean algebra, and digital logic circuit design of both combinational and sequential (SSI/MSI/LSI/VLSI) circuits, using logic gates, and PLDs**.**

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

CO1	Interpret the number systems **(Remember-L1)**
CO2	Design digital logic circuits **(Apply-L3)**
CO3	Analyze combinational and sequential logic circuits **(Understand-L2)**
CO4	Realize Memory Organization and state machines **(Understand-L2)**

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		2										3
CO2	3	2	3		2										3
CO3	3	2	3		2										3
CO4	3														3
1 - Low			**2 –**Medium						**3 -** High						

TEXTBOOKS:

1. Morris Mano, Michael D. Ciletti ,"Digital Design with an Introduction to the Verilog HDL", Pearson Education, New Jersey, 5th edition, 2013.
2. Zvi Kohavi, Niraj K. Jha, "Switching and Finite Automata Theory", Cambridge University Press, New York, 3rd edition, 2010.

REFERENCE:

1. John F. Wakerly, "Digital Design", Pearson Education ,New Delhi, 4th edition, 2014.
2. Thomas L. Floyd, "Digital Fundamentals", Pearson Education, New Jersey,11th edition, 2015.
3. Charles H. Roth, Larry.L.Kinney, "Fundamentals of Logic Design", Cengage learning Publishers,7th edition,2015.
4. M.V.Subramanyam, "Switching Theory and Logic Design", Laxmi Publications(P) Ltd. New Delhi,2011.
5. A. Anand Kumar, "Switching Theory and Logic Design", PHI Publishers,New Delhi, 3rd edition, 2016.
6. Comer, "Digital Logic and State Machine Design", Oxford Higher Education, 3rd edition 2012.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN-A/Sec) (Commencement of Classwork:25-10-2021 to 5-2-2022)

UNIT-I: Number Systems

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 and learning Outcomes	1	25-10-2021		TLM1/2	
2.	Number Systems introduction	1	27-10-2021		TLM1/2	
3.	Conversions of number systems	1	28-10-2021		TLM1/2	
4.	Complements-signed and unsigned binary numbers	1	29-10-2021		TLM1/2	
5.	Binary arithmetic	1	*30-10-2021		TLM1/2	
6.	**Tutorial-1**	**1**	**1-11-2021**		**TLM3**	
7.	Binary codes-BCD,Gray,Excess-3, ASCII/EBCDIC	2	3-11-2021, 5-11-2021		TLM1/2	
8.	Binary code conversions	1	6-11-2021		TLM1/2	
9.	**Tutorial-2**	**1**	**8-11-2021**		**TLM3**	
10.	Parity bits, Error detection and correction code-Hamming code	2	10-11-2021, 11-11-2021		TLM1/2	
11.	Boolean algebra-Boolean postulates	1	12-11-2021		TLM1/2	
12.	De Morgan's theorem, duality	1	15-11-2021		TLM1/2	
13.	Canonical forms-SOP form	1	17-11-2021		TLM1/2	
14.	Canonical forms-POS form	1	18-11-2021		TLM1/2	
15.	K-Map minimisation upto 5 variables	1	19-11-2021		TLM1/2	
16.	K-map minimisation with don't care conditions	1	*20-11-2021		TLM1/2	
17.	**Quiz /Tutorial-3**	1	**22-11-2021**		**TLM3**	
No. of classes required to complete UNIT-I: 19				**No. of classes taken:**		

UNIT-II: Boolean Algebra and Logic Gates

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Basic Gates- AND,OR, NOT, EXOR, EXNOR	2	24-11-2021, 25-11-2021		TLM1/2	
19.	Universal gates NAND, NOR	1	26-11-2021		TLM1/2	
20.	2-level logic gate implementation (AND-OR,OR-AND)	1	*27-11-2021		TLM1/2	
21.	**Tutorial-4,** 2-level logic gate implementation (NAND only, NOR only)	2	**29-11-2021,** 1-12-2021		**TLM3,** TLM1/2,	
22.	Multi-level logic gate implementation AND-OR,OR-AND, NAND only, NOR only	2	2-12-2021, 3-12-2021		TLM1/2	
23.	Implementation of AND, OR, NAND, NOR, NOT gates using resistors, diodes, and transistors.	2	*4-12-2021, 9-12-2021		TLM1/2	
24.	**Tutorial-5**	**1**	**6-12-2021**		**TLM3**	
No. of classes required to complete UNIT-II: 11				**No. of classes taken:**		

UNIT-III: Combinational Logic Circuits

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.	Design procedures- adders, subtractors	1	8-12-2021		TLM1/2	
26.	Serial adder/ subtractor	1	9-12-2021		TLM1/2	
27.	Parallel adder/ subtractor	1	10-12-2021		TLM1/2	

28.	**Mid-I from 13-12-2021 to 18-12-2021**					
29.	Carry look ahead adder	1	20-12-2021		TLM1/2	
30.	BCD adder	1	22-12-2021		TLM1/2	
31.	Magnitude comparator	1	23-12-2021		TLM1/2	
32.	Decoder, Encoder	1	24-12-2021		TLM1/2	
33.	**Tutorial-6**	**1**	**27-12-2021**		**TLM3**	
34.	Multiplexer	1	29-12-2021		TLM1/2	
35.	Demultiplexer	1	30-12-2021		TLM1/2	
36.	Parity generator/checker	1	31-12-2021		TLM1/2	
37.	Code converters	1	3-1-2022		TLM1/2	
38.	Memories-RAM,ROM,	1	5-1-2022		TLM1/2	
39.	PAL, PLA	1	6-1-2022		TLM1/2	
40.	Implementation of combinational logic using MUX, PROM	1	7-1-2022		TLM1/2	
41.	Implementation of combinational logic using PLA and PAL	1	10-1-2022		TLM1/2	
42.	**Tutorial-7**	**1**	**17-1-2022**		**TLM3**	
No. of classes required to complete UNIT-III:17				**No. of classes taken:**		

UNIT-IV: Sequential Logic Circuits

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Latches, flipflops-JK,SR	2	19-1-2022, 20-1-2022		TLM1/2	
44.	Latches, flipflops-D,T	1	21-1-2022		TLM1/2	
45.	**Tutorial-8**	**1**	**24-1-2022**		**TLM3**	
46.	Master-slave FF, characteristic equations and excitation tables	**1**	26-1-2022		TLM1/2	
47.	Modes of triggering-edge and level triggering	1	***22-1-2022**		TLM1/2	
48.	Realisation of one flip flop using other FFs	1	27-1-2022		TLM1/2	
49.	Registers and their operation-Synchronous and asynchronous counters	1	28-1-2022		TLM1/2	
50.	Modulo-n counter, race around condition	1	***29-1-2022**		TLM1/2	
No. of classes required to complete UNIT-IV: 9				**No. of classes taken:**		

UNIT-V: Asynchronous Sequential Circuits and Algorithmic State Machines

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	Sequence detector, FSM capabilities and limitations	2	31-1-2022, 2-2-2022		TLM1/2	
52.	Mealy and Moore models, Problems	1	3-2-2022		TLM1/2	
53.	**Tutorial-9**	**1**	**4-2-2022**		**TLM3**	
54.	Design of sequential circuits	1	***5-2-2022**		TLM1/2	
55.	Algorithmic State Machines	**1**	**To plan Extra hour**		TLM1/2	
56.	Components of ASM chart-Salient features, Simple examples	**1**	**To plan Extra hour**		TLM1/2	
No. of classes required to complete UNIT-V: 8				**No. of classes taken:**		
Mid-I from 7-2-2022 to 12-2-2022						

***SOC hour allotted**

COURSE DELIVERY PLAN (LESSON PLAN-B/Sec): (Commencement of Classwork:25-10-2021 to 5-2-2022)

UNIT-I: Number Systems

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 and learning Outcomes	1	26-10-2021		TLM1/2	
2.	Number Systems introduction	1	27-10-2021		TLM1/2	
3.	Conversions of Number systems	1	*28-10-2021		TLM1/2	
4.	Complements-signed and unsigned binary numbers	1	29-10-2021		TLM1/2	
5.	Binary arithmetic	1	30-10-2021		TLM1/2	
6.	**Tutorial-1**	**1**	**2-11-2021**		**TLM3**	
7.	Binary codes-BCD,Gray,Excess-3,ASCII/EBCDIC	2	3-11-2021, 5-11-2021		TLM1/2	
8.	Binary code conversions	1	6-11-2021		TLM1/2	
9.	Parity bits	1	9-11-2021		TLM1/2	
10.	Error detection and correction code-Hamming code	1	10-11-2021		TLM1/2	
11.	Boolean algebra-Boolean postulates	1	*11-11-2021		TLM1/2	
12.	De Morgan's theorem, duality	1	12-11-2021		TLM1/2	
13.	**Tutorial-2**	**1**	**16-11-2021**		**TLM3**	
14.	Canonical forms-SOP form	1	17-11-2021		TLM1/2	
15.	Canonical forms-POS form	1	*18-11-2021		TLM1/2	
16.	K-Map minimisation upto 5 variables	**1**	19-11-2021		TLM1/2	
17.	K-map minimisation with don't care conditions	1	20-11-2021		TLM1/2	
18.	**Tutorial-3/Quiz**	**1**	**23-11-2021**		**TLM3**	
No. of classes required to complete UNIT-I: 19				**No. of classes taken:**		

UNIT-II: Boolean Algebra and Logic Gates

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.	Basic Gates- AND,OR, NOT,EXOR,EXNOR	2	24-11-2021, *25-11-2021		TLM1/2	
20.	Universal gates_NAND, NOR	1	26-11-2021		TLM1/2	
21.	2-level logic gate implementation (AND-OR, OR-AND)	1	27-11-2021		TLM1/2	
22.	**Tutorial-4,** 2-level logic gate implementation (NAND only, NOR only)	2	**30-11-2021**, 1-12-2021		**TLM3** TLM1/2	
23.	Multi-level logic gate implementation AND-OR, OR-AND, NAND only, NOR only	2	***2-12-2021,** 3-12-2021		TLM1/2	
24.	Implementation of AND, OR, NAND, NOR, NOT gates using resistors, diodes, and transistors.	2	4-12-2021, 7-12-2021		TLM1/2	
No. of classes required to complete UNIT-II: 11				**No. of classes taken:**		

UNIT-III: Combinational Logic Circuits

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.	Design procedures- adders, subtractors	1	8-12-2021		TLM1/2	
26.	Serial adder/ subtractor	1	*9-12-2021		TLM1/2	
27.	Parallel adder/ subtractor	1	10-12-2021		TLM1/2	
28.	**Mid-I from 13-12-2021 to 18-12-2021**					
29.	Carry look ahead adder	1	21-12-2021		TLM1/2	

30.	BCD adder	1	22-12-2021		TLM1/2	
31.	Magnitude comparator	1	***23-12-2021**		TLM1/2	
32.	Decoder, Encoder	1	24-12-2021		TLM3	
33.	**Tutorial-5**	**1**	**28-12-2021**		**TLM3**	
34.	Multiplexer	1	29-12-2021		TLM1/2	
35.	Demultiplexer	1	***30-12-2021**			
36.	Parity generator/checker	1	31-12-2021		TLM1/2	
37.	Code converters	1	4-1-2022		TLM1/2	
38.	Memories-RAM, ROM,	1	5-1-2022		TLM1/2	
39.	PAL, PLA	1	***6-1-2022**		TLM1/2	
40.	Implementation of combinational logic using MUX, PROM	1	7-1-2022		TLM1/2	
41.	Implementation of combinational logic using PLA and PAL	1	8-1-2022		TLM1/2	
42.	**Tutorial-6**	**1**	**18-1-2022**		**TLM3**	
No. of classes required to complete UNIT-III: 17				**No. of classes taken:**		

UNIT-IV: Sequential Logic Circuits

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Latches, flipflops-JK,SR	1	19-1-2022		TLM1/2	
44.	Latches, flipflops-D,T	1	***20-1-2022**		TLM1/2	
45.	master-slave FF, characteristic equations and excitation tables	2	21-1-2022, 22-1-2022		TLM1/2	
46.	**Tutorial-7**	**1**	**25-1-2022**		**TLM3**	
47.	Modes of triggering-edge and level triggering	1	26-1-2022		TLM1/2	
48.	Realisation of one flip flop using other FFs	1	***27-1-2022**		TLM1/2	
49.	Registers and their operation-Synchronous and asynchronous counters	1	28-1-2022		TLM1/2	
50.	Modulo-n counter, race around condition	1	29-1-2022		TLM1/2	
No. of classes required to complete UNIT-IV: 9				**No. of classes taken:**		

UNIT-V: Asynchronous Sequential Circuits and Algorithmic State Machines

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	**Tutorial-8**	**1**	**1-2-2022**		**TLM3**	
52.	Sequence detector, FSM capabilities and limitations	1	2-2-2022		TLM1/2	
53.	Mealy and Moore models	1	***3-2-2022**		TLM1/2	
54.	Minimisation of completely specified and incompletely specified state machines	1	4-2-2022		TLM1/2	
55.	Algorithmic state machines	1	5-2-2022		TLM1/2	
56.	Salient features of ASM chart, ASM examples	**1**	**To plan Extra hour**		TLM1/2	
57.	System design using data path and control systems, Control implementation	**1**	**To plan Extra hour**		TLM1/2	
No. of classes required to complete UNIT-V: 7				**No. of classes taken:**		
Mid-I from 7-2-2022 to 12-2-2022						

***SOC hour allotted**

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

PART-C

EVALUATION PROCESS (R20 Regulation)

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	D1=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): D+Q+A	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs)

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1	Specify, design, and analyze systems that efficiently generate, transmit and distribute electrical power.
PSO 2	Design and analyze electrical machines, modern drive and lighting systems.
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems.
PSO 4	Design controllers for electrical and electronic systems to improve their performance.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**HoD**
Name of the Faculty	Dr.M.UmaVani	Dr.M.UmaVani	Dr. A V G A. Marthanda	Dr.J.S.V.Prasad
Signature				