



COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.P.Sobha Rani

Course Name & Code : 20EE18: Power Systems-III

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

Program/Sem/Sec : B.Tech VI sem A/S

Credits: 3

A.Y.: 2023-24

PREREQUISITE: Power system-I, Power System-II

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to learn power flow solution methods, unit commitment problem and importance of economic load dispatch, concepts of power system operation and control and importance of frequency control.

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

CO1	Understand application of load flow methods
CO2	Analyze the economic operation of power system
CO3	Analyze load frequency control of power system
CO4	Determine the stability of power system

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			2
CO4	2	2	2										2			

TEXTBOOKS:

T1 John J.Grainger & W.D Stevenson, "Power system Analysis", McGraw Hill International,2017

T2 D.P.Kothari and I.J.Nagarath, "Modern Power System Analysis", 4th Edition, Tata McGraw Hill Education Private limited,2011

REFERENCE BOOKS:

R1 C.L.Wadhwa, "Electrical Power Systems", New Age International,2016

R2 Prabha Kundur, "Power system stability and control", McGraw Hill Professional, first edition,2006

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Network Matrices

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, COs	1	04-12-23		TLM1	
2.	Graph theory: Definitions	1	05-12-23		TLM2	
3.	Relevant concepts in graph theory	1	06-12-23		TLM2	
4.	Ybus formation by direct inspection method	1	07-12-23		TLM2	
5.	Numerical problems	1	11-12-23		TLM2	
6.	Singular transformation method	1	12-12-23		TLM2	
7.	Tutorial	1	14-12-23		TLM3	
8.	Singular transformation method	1	13-12-23		TLM2	
9.	Zbus Building algorithm	1	18-12-23		TLM2	
10.	Numerical problems	1	19-12-23		TLM3	
11.	Tutorial	1	20-12-23		TLM3	
12.	Introduction to Load flow studies	1	21-12-23		TLM2	
13.	Bus classification	1	26-12-23		TLM2	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: Load Flow Studies

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Load flow equations	1	27-12-23		TLM2	
15.	Gauss-Seidel method	2	28-12-23 02-01-24		TLM2	
16.	Newton Raphson method	1	03-01-24		TLM2	
17.	Tutorial	1	04-01-24		TLM3	
18.	Newton Raphson method	1	08-01-24		TLM2	
19.	Fast Decoupled method	2	09-01-24 10-01-24		TLM2	
20.	Merits and Demerits	1	11-01-24		TLM2	

21.	System data for load flow study	1	17-01-24		TLM2	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: Economic Operation of Power System

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.	Economic load dispatch without transmission losses	2	18-01-24 22-01-24		TLM2	
23.	Economic load dispatch with transmission losses	1	23-01-24		TLM2	
24.	Transmission loss as a function of plant generation	1	24-01-24		TLM2	
25.	Tutorial	1	25-01-24		TLM3	
26.	Calculation of loss coefficients	2	05-02-24 06-02-24		TLM2	
27.	Distribution of load between plants	1	07-02-24		TLM2	
28.	Unit commitment problem	1	08-02-24		TLM2	
29.	Priority order scheduling	1	12-02-24		TLM2	
30.	Hydro-Thermal coordination	2	13-02-24 14-02-24		TLM2	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: Load Frequency Control

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.	Synchronous machine dynamics	1	15-02-24		TLM2	
32.	Mathematical model of speed governing system	2	19-02-24 20-02-24		TLM2	
33.	Turbine models	2	21-02-24 22-02-24		TLM2	
34.	Division of power system into control areas	1	26-02-24 27-02-24		TLM2	
35.	P-f control of single area system	1	28-02-24		TLM2	
36.	Tutorial	1	29-02-24		TLM3	
37.	P-f control of two area system	2	04-03-24 05-03-24		TLM2	
38.	Assignment	1	06-03-24		TLM3	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: Power System Stability

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Stability problem	1	11-03-24			
40.	Swing Equation	2	12-03-24 13-03-24			

41.	Equal area criterion of stability	1	14-03-24			
42.	Applications of equal area criterion	1	18-03-24			
43.	Step by step solution of swing equation	2	19-03-24 20-03-24			
44.	Factors affecting transient stability	1	21-03-24			
45.	Methods to improve steady state and transient stability	1	26-03-24			
46.	Methods to improve steady state and transient stability	1	27-03-24			
47.	Comparison of angle and voltage stability	1	28-03-24			
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 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	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Title	Course Instructor	Module Coordinator	Head of the Department
Name of the Faculty	Dr.P.Sobha Rani	Dr.M.S.Giridhar	Dr.J.Sivavara Prasad
Signature			



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.P.Sobha Rani

Course Name & Code : 20EE18: Power Systems-III

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

Program/Sem/Sec : B.Tech VI sem B/S

Credits: 3

A.Y.: 2023-24

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

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CO4	Determine the stability of power system

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			2
CO4	2	2	2										2			

TEXTBOOKS:

T1 John J.Grainger & W.D Stevenson, "Power system Analysis", McGraw Hill International,2017

T2 D.P.Kothari and I.J.Nagarath, "Modern Power System Analysis", 4th Edition, Tata McGraw Hill Education Private limited,2011

REFERENCE BOOKS:

R1 C.L.Wadhwa, "Electrical Power Systems", New Age International,2016

R2 Prabha Kundur, "Power system stability and control", McGraw Hill Professional, first edition,2006

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Network Matrices

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, COs	1	04-12-23		TLM1	
2.	Graph theory: Definitions	1	05-12-23		TLM2	
3.	Relevant concepts in graph theory	1	06-12-23		TLM2	
4.	Ybus formation by direct inspection method	1	08-12-23		TLM2	
5.	Tutorial	1	11-12-23		TLM2	
6.	Singular transformation method	1	12-12-23		TLM2	
7.	Numerical problems	1	13-12-23		TLM3	
8.	Singular transformation method	1	15-12-23		TLM2	
9.	Zbus Building algorithm	1	18-12-23		TLM2	
10.	Numerical problems	1	19-12-23		TLM3	
11.	Introduction to Load flow studies	1	20-12-23		TLM2	
12.	Tutorial	1	22-12-23		TLM3	
13.	Bus classification	1	26-12-23		TLM2	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: Load Flow Studies

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Load flow equations	1	27-12-23		TLM2	
15.	Gauss-Seidel method	2	29-12-23 02-01-24		TLM2	
16.	Newton Raphson method	2	03-01-24 05-01-24		TLM2	
17.	Tutorial	1	08-01-24		TLM3	
18.	Fast Decoupled method	2	09-01-24 10-01-24		TLM2	
19.	Merits and Demerits	1	12-01-24		TLM2	
20.	System data for load flow study	1	17-01-24		TLM2	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: Economic Operation of Power System

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.	Economic load dispatch without transmission losses	2	19-01-24 22-01-24		TLM2	
22.	Economic load dispatch with transmission losses	1	23-01-24		TLM2	
23.	Transmission loss as a function of plant generation	1	24-01-24		TLM2	
24.	Calculation of loss coefficients	2	05-02-24 06-02-24		TLM2	
25.	Distribution of load between plants	1	07-02-24		TLM2	
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27.	Priority order scheduling	1	12-02-24		TLM2	
28.	Hydro-Thermal coordination	2	13-02-24 14-02-24		TLM2	
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UNIT-IV: Load Frequency Control

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Synchronous machine dynamics	1	16-02-24		TLM2	
30.	Mathematical model of speed governing system	2	19-02-24 20-02-24		TLM2	
31.	Turbine models	2	21-02-24 23-02-24		TLM2	
32.	Division of power system into control areas	1	26-02-24 27-02-24		TLM2	
33.	P-f control of single area system	1	28-02-24		TLM2	
34.	P-f control of two area system	1	01-03-24 05-03-24		TLM2	
35.	Tutorial	2	04-03-24		TLM3	
36.	Assignment	1	06-03-24		TLM3	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: Power System Stability

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Stability problem	1	11-03-24		TLM2	
38.	Swing Equation	2	12-03-24 13-03-24		TLM2	
39.	Equal area criterion of stability	1	15-03-24		TLM2	
40.	Applications of equal area criterion	1	18-03-24		TLM2	

41.	Step by step solution of swing equation	1	19-03-24		TLM2	
42.	Factors affecting transient stability	1	20-03-24		TLM2	
43.	Methods to improve steady state and transient stability	1	22-03-24		TLM2	
44.	Methods to improve steady state and transient stability	1	26-03-24		TLM2	
45.	Comparison of angle and voltage stability	1	27-03-24		TLM2	
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/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to 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 apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Title	Course Instructor	Module Coordinator	Head of the Department
Name of the Faculty	Dr.P.Sobha Rani	Dr.M.S.Giridhar	Dr.J.Sivavara Prasad
Signature			



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(An Autonomous Institution Since 2010)

Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified

Department of Electrical and Electronics Engineering

Accredited by NBA under Tier-I

COURSE HANDOUT

PROGRAM : B.Tech., VI-Sem., EEE , A-Sec

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : Solid State Drives - 20EE19

L-T-P STRUCTURE : 2-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : P.Deepak Reddy

COURSE COORDINATOR : P.Deepak Reddy

PRE-REQUISITES: Power Electronics, Electrical Machines-I & Electrical Machines-II.

COURSE EDUCATIONAL OBJECTIVE: This course is an extension of power electronics applications to electrical drives. It converts in detail the basic and advanced speed control techniques using power electronic converters that are used in industry. It is equally important to understand to four quadrant operation of electrical drives and slip power recovery schemes in induction motors.

COURSE OUTCOMES(COs)

At the end of the course, the student will be able to

CO1: Examine the performance of dc motor drive by rectifier and chopper control method. (Apply-L3)

CO2: Understand the controlling mechanisms for squirrel cage induction motor and synchronous motors. (Understand-L2)

CO3: Analyze the slip power recovery schemes for wound rotor induction motor. (Apply-L3)

CO4: Analyze the BLDC motor drives. (Apply-L3)

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

COs	POa	POb	POc	POd	POe	POf	POg	POh	POi	POj	POk	POl	PSOa	PSOb	PSOc	PSOd
CO1	3	3	-	-	3	-	-	-	-	-	-	1	-	3		-
CO2	3	3	-	3	3	-	-	-	-	-	-	-	-	3		2
CO3	3	3	-	3	3	-	-	-	-	-	-	-	-	3		2
CO4	3	3	-	3	3	-	-	-	-	-	-	-	-	3		2

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

BOS APPROVED TEXT BOOKS:

T1 G.K.Dubey, "Power Semi Conductor Dives", Prentice Hall, 1988

T2 B.K.Bose, "Modern Power Electronics and AC drives", PHI learning pvt ltd, 2005

BOS APPROVED REFERENCE BOOKS:**R1** Vedam Subramanyam, “Thyristor control of Electric Drives” Tata McGraw Hill Publications.**R2** S K Pillai, “A first course on Electrical Drives”, New age International(P) ltd. 3rd Edition.**R3** R.Krishnan “Electrical motor drives modelling, analysis & control”, pearsson education, 2015**COURSE DELIVERY PLAN (LESSON PLAN): Section-A****UNIT-I : RECTIFIER & CHOPPER CONTROLLED DC MOTOR DRIVES**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject & Course Outcomes	1	04-12-2023		TLM1	CO1	1	
2.	UNIT-I, Significance of variable speed drives	1	05-12-2023		TLM1	CO1	1	
3.	Single-phase fully controlled rectifier fed separately excited DC motor and series motor	1	06-12-2023		TLM1	CO1	1	
4.	Single-phase semi controlled rectifier fed separately excited DC motor and series motor	1	09-12-2023		TLM1	CO1	1	
5.	TUTORIAL-1	1	11-12-2023		TLM3	CO1	1	
6.	Three-phase, fully controlled rectifier fed separately excited DC motor and series motor	1	12-12-2023		TLM1	CO1	1	
7.	Three-phase, semi controlled rectifier fed separately excited DC motor and series motor	1	13-12-2023		TLM1	CO1	1	
8.	Principle of operation and control techniques, motoring operation of separately excited dc motor	1	16-12-2023		TLM1	CO1	1	
9.	TUTORIAL-2	1	18-12-2023		TLM3	CO1	1	
10.	motoring operation of dc series motor, regenerative braking of separately excited dc motor and dc series motor	1	19-12-2023		TLM1	CO1	1	
11.	dynamic braking of separately excited dc motor and dc series motor, plugging of separately excited dc motor and dc series motor	1	20-12-2023		TLM1	CO1	1	

12.	multi quadrant control of chopper fed dc motors	1	23-12-2023		TLM1	CO1	1	
13.	Problems	1	26-12-2023		TLM1	CO1	1	
No. of classes required to complete UNIT-I		13			No. of classes taken:			

UNIT-II : CONTROL OF INDUCTION MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Stator voltage control of Induction Motor	1	27-12-2023		TLM1	CO2	2	
15.	Stator frequency control- Open loop V/f control of Induction Motor	1	30-12-2023		TLM1	CO2	2	
16.	Control of Induction motor by ac voltage controller	1	02-01-2024		TLM1	CO2	2	
17.	Control of induction motor by voltage source Inverter		03-01-2024		TLM1	CO2	2	
18.	Control of induction motor by current source Inverter	1	06-01-2024		TLM1	CO2	2	
19.	TUTORIAL-3	1	08-01-2024		TLM3	CO2	2	
20.	Control of induction motor by cyclo converter	1	09-01-2024		TLM1	CO2	2	
21.	Comparison of voltage source and current source inverter drives	1	10-01-2024		TLM1	CO2	2	
22.	problems	1	17-01-2024		TLM1	CO2	2	
23.	TUTORIAL-4	1	20-01-2024		TLM3	CO2	2	
No. of classes required to complete UNIT-II		10			No. of classes taken:			

UNIT-III : SLIP POWER CONTROLLED WOUND ROTOR INDUCTION MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
24.	Static rotor resistance control	1	22-01-2024		TLM1	CO3	1	
25.	Static rotor resistance control		23-01-2024		TLM1	CO3	1	
26.	Slip-power recovery schemes	1	24-01-2024		TLM1	CO3	1	
27.	Static Scherbius, Phasor diagram	1	27-01-2024		TLM1	CO3	1	
I-MID EXAMINATIONS(29/01/2024 TO 03/02/2024)								
28.	TUTORIAL-5	1	05-02-2024		TLM3	CO3	1	
29.	Static Kramer drive, Phasor diagram	1	06-02-2024		TLM1	CO3	1	
30.	Closed loop speed control of Static Scherbius drive	1	07-02-2024		TLM1	CO3	1	
31.	TUTORIAL-6	1	12-02-2024		TLM3	CO3	1	
32.	Modes of operation of Static Scherbius	1	13-02-2024		TLM1	CO3	1	
33.	Problems, Applications	1	14-02-2024		TLM1	CO3	1	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV : CONTROL OF SYNCHRONOUS MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
34.	Synchronous motors- variable frequency control	1	17-02-2024		TLM1	CO2	1	
35.	TUTORIAL-7	1	19-02-2024		TLM3	CO2	1	
36.	Operation of self controlled Synchronous motors-by VSI.	1	20-02-2024		TLM1	CO2	1	
37.	Operation of self controlled Synchronous motors-by CSI.	1	21-02-2024		TLM1	CO2	1	
38.	Operation of self controlled Synchronous motors-by Cyclo converters	1	24-02-2024		TLM1	CO2	1	
39.	TUTORIAL-8	1	26-02-2024		TLM3	CO2	1	

40.	Load commutated CSI fed Synchronous Motor	1	27-02-2024		TLM1	CO2	1	
41.	Closed Loop control operation of synchronous motor drives (Block Diagram Only)	1	2-03-2024		TLM1	CO2	1	
42.	TUTORIAL-9	1	4-03-2024		TLM3	CO2	1	
43.	Problems	1	5-03-2024		TLM6	CO2	1	
44.	Repetition	1	6-03-2024		TLM2	CO2	1	
45.	No. of classes required to complete UNIT-IV	11			No. of classes taken:			

UNIT-V : CONTROL OF BLDC MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
46.	TUTORIAL-10	1	11-03-2024		TLM3	CO4	1	
47.	Principle of operation of BLDC machine	1	12-03-2024		TLM1	CO4	1	
48.	Sensing and logic switching scheme	1	13-03-2024		TLM1	CO4	1	
49.	BLDM a variable speed SM	1	16-03-2024		TLM1	CO4	1	
50.	TUTORIAL-11	1	18-03-2024		TLM3	CO4	1	
51.	Methods of reducing torque pulsations	1	19-03-2024		TLM1	CO4	1	
52.	Three phase full wave BLDC motor	1	20-03-2024		TLM1	CO4	1	
53.	Sinusoidal shape of BLDC motor	1	23-03-2024		TLM1	CO4	1	
54.	TUTORIAL-12	1	25-03-2024		TLM3	CO4	1	
55.	Current controlled BLDC motor servo drive	1	26-03-2024		TLM1	CO4	1	
56.	problems	1	27-03-2024		TLM1	CO4	1	
57.	Repetition	1	30-03-2024		TLM6	CO4	1	
No. of classes required to complete UNIT-V		12			No. of classes taken:			

II-MID EXAMINATIONS(01/04/2024 TO 06/04/2024)

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
58.	Power Factor correction	1			TLM2	CO1	2	
59.	Multilevel Inverter	1			TLM4	CO2	2	
60.								

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 (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 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	Ethics: 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.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**PROGRAMME OUTCOMES (POs)****PSOs**

P.Deepak Reddy	P.Deepak Reddy	P.Deepak Reddy	Dr.J.S.V.Prasad
Course Instructor	Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(An Autonomous Institution Since 2010)

Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified

Department of Electrical and Electronics Engineering

Accredited by NBA under Tier-I

COURSE HANDOUT

PROGRAM : B.Tech., VI-Sem., EEE , B-Sec

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : **Solid State Drives - 20EE19**

L-T-P STRUCTURE : 2-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Mrs.G.Tabita

COURSE COORDINATOR : Mr.P.Deepak Reddy

PRE-REQUISITES: Power Electronics, Electrical Machines-I & Electrical Machines-II.

COURSE EDUCATIONAL OBJECTIVE: This course is an extension of power electronics applications to electrical drives. It converts in detail the basic and advanced speed control techniques using power electronic converters that are used in industry. It is equally important to understand to four quadrant operation of electrical drives and slip power recovery schemes in induction motors.

COURSE OUTCOMES(Cos)

At the end of the course, the student will be able to

CO1: Examine the performance of dc motor drive by rectifier and chopper control method. (Apply-L3)

CO2: Understand the controlling mechanisms for squirrel cage induction motor and synchronous motors. (Understand-L2)

CO3: Analyze the slip power recovery schemes for wound rotor induction motor. (Apply-L3)

CO4: Analyze the BLDC motor drives. (Apply-L3)

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

Cos	Poa	Pob	Poc	Pod	Poe	Pof	Pog	Poh	Poi	Poj	Pok	Pol	PSOa	PSOb	PSOc	PSOd
CO1	3	3	-	-	3	-	-	-	-	-	-	1	-	3		-
CO2	3	3	-	3	3	-	-	-	-	-	-	-	-	3		2
CO3	3	3	-	3	3	-	-	-	-	-	-	-	-	3		2
CO4	3	3		3	3									3		2

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

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

BOS APPROVED TEXT BOOKS:

T1 G.K.Dubey, "Power Semi Conductor Dives", Prentice Hall, 1988

T2 B.K.Bose, "Modern Power Electronics and AC drives", PHI learning pvt ltd, 2005

BOS APPROVED REFERENCE BOOKS:

R1 Vedam Subramanyam, "Thyristor control of Electric Drives" Tata McGraw Hill Publications.

R2 S K Pillai, "A first course on Electrical Drives", New age International(P) ltd. 3rd Edition.

R3 R.Krishnan "Electrical motor drives modelling, analysis & control", pearsson education, 2015

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : RECTIFIER & CHOPPER CONTROLLED DC MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject & Course Outcomes	1	04-12-2023		TLM1	CO1	1	
2.	UNIT-I, Significance of variable speed drives	1	05-12-2023		TLM1	CO1	1	
3.	Single-phase fully controlled rectifier fed separately excited DC motor and series motor	1	06-12-2023		TLM1	CO1	1	
4.	Single-phase semi controlled rectifier fed separately excited DC motor and series motor	1	08-12-2023		TLM1	CO1	1	
5.	Three-phase, fully controlled rectifier fed separately excited DC motor and series motor	1	11-12-2023		TLM1	CO1	1	
6.	TUTORIAL-1	1	12-12-2023		TLM3	CO1	1	
7.	Three-phase, semi controlled rectifier fed separately excited DC motor and series motor	1	13-12-2023		TLM1	CO1	1	
8.	Principle of operation and control techniques, motoring operation of separately excited dc motor	1	15-12-2023		TLM1	CO1	1	
9.	motoring operation of dc series motor, regenerative braking of separately excited dc motor and dc series motor	1	18-12-2023		TLM1	CO1	1	
10.	TUTORIAL-2	1	19-12-2023		TLM3	CO1	1	
11.	dynamic braking of separately excited dc motor and dc series motor, plugging of separately excited dc motor and dc series motor	1	20-12-2023		TLM1	CO1	1	
12.	multi quadrant control of chopper fed dc motors	1	22-12-2023		TLM1	CO1	1	
13.	TUTORIAL-3	1	26-12-2023		TLM3	CO1	1	
No. of classes required to complete UNIT-I		13				No. of classes taken:		

UNIT-II : CONTROL OF INDUCTION MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Stator voltage control of Induction Motor	1	27-12-2023		TLM1	CO2	2	
15.	Stator frequency control-Open loop V/f control of Induction	1	29-12-2023		TLM1	CO2	2	

	Motor							
16.	Control of Induction motor by ac voltage controller and voltage source Inverter	1	02-01-2024		TLM1	CO2	2	
17.	TUTORIAL-4	1	03-01-2024		TLM3	CO2	2	
18.	Control of induction motor by current source Inverter	1	05-01-2024		TLM1	CO2	2	
19.	Control of induction motor by cyclo converter	1	08-01-2024		TLM1	CO2	2	
20.	TUTORIAL-5	1	09-01-2024		TLM3	CO2	2	
21.	Comparison of voltage source and current source inverter drives	1	10-01-2024		TLM1	CO2	2	
22.	problems	1	17-01-2024		TLM1	CO2	2	
No. of classes required to complete UNIT-II		9			No. of classes taken:			

UNIT-III : SLIP POWER CONTROLLED WOUND ROTOR INDUCTION MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
23.	Static rotor resistance control	1	19-01-2024		TLM1	CO3	1	
24.	Static rotor resistance control	1	22-01-2024		TLM1	CO3	1	
25.	TUTORIAL-6	1	23-01-2024		TLM3	CO3	1	
26.	Slip-power recovery schemes, Static Scherbius, Phasor diagram	1	24-01-2024		TLM1			
I-MID EXAMINATIONS(29/01/2024 TO 03/02/2024)								
27.	Static Kramer drive, Phasor diagram	1	05-02-2024		TLM1	CO3	1	
28.	TUTORIAL-7	1	06-02-2024		TLM3	CO3	1	
29.	Closed loop speed control of Static Scherbius drive	1	07-02-2024		TLM1	CO3	1	
30.	Modes of operation of Static Scherbius	1	12-02-2024		TLM1	CO3	1	
31.	TUTORIAL-7	1	13-02-2024		TLM3	CO3	1	
32.	Problems, Applications	1	14-02-2024		TLM1	CO3	1	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV : CONTROL OF SYNCHRONOUS MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
33.	Synchronous motors- variable frequency control	1	16-02-2024		TLM1	CO2	1	
34.	Operation of self controlled Synchronous motors-by VSI.	1	19-02-2024		TLM1	CO2	1	
35.	TUTORIAL-8	1	20-02-2024		TLM3	CO2	1	
36.	Operation of self controlled Synchronous motors-by CSI.	1	21-02-2024		TLM1	CO2	1	

37.	Operation of self controlled Synchronous motors-by Cyclo converters	1	23-02-2024		TLM1	CO2	1	
38.	Load commutated CSI fed Synchronous Motor	1	26-02-2024		TLM1	CO2	1	
39.	TUTORIAL-9	1	27-02-2024		TLM3	CO2	1	
40.	Closed Loop control operation of synchronous motor drives (Block Diagram Only)	1	28-02-2024		TLM1	CO2	1	
41.	Problems	1	01-03-2024					
42.	Problems	1	04-03-2024		TLM1	CO2	1	
43.	TUTORIAL-10	1	05-03-2024		TLM3	CO2	1	
44.	Repetition	1	06-03-2024		TLM1	CO2	1	
45.	No. of classes required to complete UNIT-IV	12			No. of classes taken:			

UNIT-V : CONTROL OF BLDC MOTOR DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
46.	Principle of operation of BLDC machine	1	11-03-2024		TLM1	CO4	1	
47.	TUTORIAL-11	1	12-03-2024		TLM3	CO4	1	
48.	Sensing and logic switching scheme	1	13-03-2024		TLM1	CO4	1	
49.	BLDM a variable speed SM	1	15-03-2024		TLM1	CO4	1	
50.	Methods of redusing torque pulations	1	18-03-2024		TLM1	CO4	1	
51.	TUTORIAL-12	1	19-03-2024		TLM3	CO4	1	
52.	Three phase full wave BLDC motor	1	20-03-2024		TLM1	CO4	1	
53.	Sinusoidal shape of BLDC motor	1	22-03-2024		TLM1	CO4	1	
54.	Current controlled BLDC motor servo drive	1	25-03-2024		TLM1	CO4	1	
55.	TUTORIAL-13	1	26-03-2024		TLM3	CO4	1	
56.	problems	1	27-03-2024		TLM1	CO4	1	
57.	Repetition	1	29-03-2024		TLM6	CO4	1	
No. of classes required to complete UNIT-V		12			No. of classes taken:			

II-MID EXAMINATIONS(01/04/2024 TO 06/04/2024)

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
58.	Power Factor correction	1			TLM2	CO1	2	
59.	Multilevel Inverter	1			TLM4	CO2	2	
60.								

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 (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

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.
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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 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.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PROGRAMME OUTCOMES (POs)

PSOs

Mrs.G.Tabita	Mr.P.Deepak Reddy	Mr.P.Deepak Reddy	Dr.J.S.V.Prasad
Course Instructor	Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)

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

Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi

NAAC Accredited with "A grade, Certified by ISO 9001:2015, <http://www.lbrce.ac.in>

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Phone: 08659-222933/Extn: 203

hodeee@lbrce.ac.in, eee.lbrce@gmail.com

COURSE HANDOUT

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

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : Basic Microprocessors & Microcontrollers – 20EE20

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr J.Sivavara Prasad

COURSE COORDINATOR : Dr J.Sivavara Prasad

PRE-REQUISITE: Digital Electronics

COURSE OBJECTIVE : The objective of the Microprocessor and Microcontrollers is to familiarize with the architecture of 8086 processor, assembling language programming and interfacing with various modules. Microcontroller concepts help the student to do any type of industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

COURSE OUTCOMES (CO)

CO1	Understand the architecture and operation of 8086 microprocessor & 8051 microcontroller
CO2	Apply the instructions of 8086/8051 for various applications
CO3	Analyze the operation of peripherals and devices for different applications
CO4	Develop a system by interfacing memory, peripherals and I/O devices to 8086/8051

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
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CO2	2	3	-	-	2	-	-	-	-	-	-	-	-	-	-	
CO3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	-	
CO4	2	3	3	-	2	-	-	-	-	-	-	-	-	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).

BOS APPROVED TEXT BOOKS:

- T1** Douglas V. Hall, "Micro Processors & Interfacing", TMH, 2007.
- T2** A. K. Ray and K.M. Bhurchandi, Advanced Microprocessor And Peripherals, 2nd Edition TMH Publishers.
- T3** Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. Mckinlay "Microcontrollers and Embedded System", Pearson Education

Publishers, 2nd Edition

BOS APPROVED REFERENCE BOOKS:

R1 Raj Kamal, Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson Education Publishers.

R2 J. K. Uffenbeck, “The 8088 and 8086 Micro Processors”, PHI, 4th Edition, 2003.

R3 Ajay Deshmukh, “Micro Controllers-Theory and Applications”, Tata McGraw Hill Publishers.

R4 Kenneth J. Ayala, “The 8051 Micro Controller”, Cengage Learning Publishers, 3rd Edition, 2000.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Microprocessor Architecture & Instruction Set

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	04-12-23		TLM1	CO1	A.K.Ray	
2.	Course Outcomes							
3.	Introduction to UNIT-I							
4.	Micro computer based system	1	05-12-23		TLM1	CO1	A.K.Ray	
5.	8086 Block diagram	1	06-12-23		TLM1	CO1	A.K.Ray	
6.	Register organization	1	08-12-23		TLM1	CO1	A.K.Ray	
7.	Addressing Modes of 8086	1	11-12-23		TLM1	CO1	A.K.Ray	
8.	Instruction set of 8086	1	12-12-23		TLM1	CO2	A.K.Ray	
9.	ALP for arithmetic operations	1	13-12-23		TLM4 TLM5	CO2	A.K.Ray	
10.	ALP for logical operations	1	15-12-23		TLM4 TLM5	CO2	A.K.Ray	
11.	ALP for string operations	1	18-12-23		TLM4 TLM5	CO2	A.K.Ray	
12.	Assembly Directives and Macro's	1	19-12-23		TLM1	CO2	A.K.Ray	
13.	Simple Programs using Assembler	1	20-12-23		TLM4 TLM5	CO2	A.K.Ray	
No. of classes required to complete UNIT-I: 11					No. of classes taken:			

UNIT-II : 8086 Memory and I/O Interfacing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Pin diagram of 8086	1	22-12-23		TLM1	CO1	A.K.Ray	

15.	Minimum mode operation of 8086	1	26-12-23		TLM1	CO1		
16.	Timing diagrams for Minimum mode	1	27-12-23		TLM1	CO1	A.K.Ray	
17.	Maximum mode operation of 8086	1	29-12-23		TLM1	CO1	A.K.Ray	
18.	Timing diagrams for Maximum mode	1	01-01-24		TLM1	CO1	A.K.Ray	
19.	Different memories	1	02-01-24		TLM1	CO3	A.K.Ray	
20.	8-bit Memory and I/O interfacing with 8086	1	03-01-24		TLM1	CO4	A.K.Ray	
21.	16-bit memory and I/O interfacing with 8086	2	05-01-24 08-01-24		TLM1	CO4	A.K.Ray	
22.	Interrupt structure, vector table, Interrupt service routines	1	09-01-24		TLM1	CO4	A.K.Ray	

No. of classes required to complete UNIT-II : 10 No. of classes taken:

UNIT-III : Peripherals and Interfacing:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
23.	Basic block diagram of 8255	1	10-01-24		TLM1	CO3	A.K.Ray	
24.	Signal description of 8255 and interfacing with 8086	2	12-01-24 19-01-24		TLM1 TLM8	CO4	A.K.Ray	
25.	A/D converter basic diagram Signal description and interfacing with 8086	1	22-01-24		TLM1	CO3	A.K.Ray	
26.	D/A converter basic diagram	1	23-01-24		TLM8	CO3	A.K.Ray	
27.	Signal description of	1	24-01-24		TLM1	CO4	A.K.Ray	

	D/A converter and interfacing with 8086							
28.	Basic block diagram and signal description of 8257-DMA and interfacing with 8086	2	05-02-24 06-02-24		TLM1	CO3	A.K.Ray	
29.	Interfacing 8086 with key board	1	07-02-24		TLM1	CO4	A.K.Ray	
30.	Basic block diagram of 8259 and Cascaded connection of 8259 with 8086	2	09-02-24 12-02-24		TLM1	CO3	A.K.Ray	
No. of classes required to complete UNIT-III: 12				No. of classes taken:				

UNIT-IV : Microcontrollers

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
31.	Architecture of 8051	1	13-02-24		TLM1	CO1	Muhammad Ali Mazidi	
32.	Register organization and I/O ports of 8051	1	14-02-24		TLM1	CO1	Muhammad Ali Mazidi	
33.	Memory Organization of 8051	1	16-02-24		TLM1	CO3	Muhammad Ali Mazidi	
34.	Addressing modes of 8051	1	19-02-24		TLM1	CO1	Muhammad Ali Mazidi	
35.	Instruction set of 8051	2	20-02-24 21-02-24		TLM1	CO2	Muhammad Ali Mazidi	
36.	Simple Programs using Stack Pointer	2	23-02-24 26-02-24		TLM1	CO2	Muhammad Ali Mazidi	
37.	Programs using 8051	2	27-02-24 28-02-24		TLM4 TLM1	CO2	Muhammad Ali Mazidi	
No. of classes required to complete UNIT-IV : 10				No. of classes taken:				

UNIT-V : 8051 Interfacing

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	Learning Outcome	Text Book followed	HOD Sign
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		Required	Completion	Completion	Methods	COs		Weekly
38.	Modes of timer operation	2	01-03-24 04-03-24		TLM1	CO1	Muhammad Ali Mazidi	
39.	Serial port operation	1	05-03-24		TLM1	CO1	Muhammad Ali Mazidi	
40.	Interrupt structure of 8051	2	06-03-24 11-03-24		TLM1 TLM2	CO1	Muhammad Ali Mazidi	
41.	Interfacing seven segment display	2	12-03-24 13-03-24		TLM2	CO4	Muhammad Ali Mazidi	
42.	Interfacing stepper motor	1	15-03-24		TLM2 TLM4	CO4	Muhammad Ali Mazidi	
43.	Interfacing serial/parallel printer	2	18-03-24 19-03-24		TLM2	CO4	Muhammad Ali Mazidi	
44.	Revision	3	20-03-24 22-03-24 26-03-24			-		

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

No. of classes taken:

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
45.	Advanced microprocessors and microcontrollers	1	27-03-24		TLM2	CO1	1.A.K.Ray 2.Muhammad Ali Mazidi	

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Microprocessor Architecture & Instruction Set

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	04-12-23		TLM1	CO1	A.K.Ray	
2.	Course Outcomes							
3.	Introduction to UNIT-I							
4.	Micro computer based system	1	06-12-23		TLM1	CO1	A.K.Ray	
5.	8086 Block diagram	1	07-12-23		TLM1	CO1	A.K.Ray	
6.	Register organization	1	11-12-23		TLM1	CO1	A.K.Ray	
7.	Addressing Modes of 8086	1	13-12-23		TLM1	CO1	A.K.Ray	

8.	Instruction set of 8086	1	14-12-23		TLM1	CO2	A.K.Ray	
9.	ALP for arithmetic operations	1	16-12-23		TLM4 TLM1	CO2	A.K.Ray	
10.	ALP for logical operations	1	18-12-23		TLM4 TLM1	CO2	A.K.Ray	
11.	ALP for string operations	1	20-12-23		TLM4 TLM1	CO2	A.K.Ray	
12.	Assembly Directives and Macro's	1	21-12-23		TLM1	CO2	A.K.Ray	
13.	Simple Programs using Assembler	1	23-12-23		TLM4 TLM1	CO2	A.K.Ray	

No. of classes required to complete UNIT-I: 11

No. of classes taken:

UNIT-II : 8086 Memory and I/O Interfacing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Pin diagram of 8086	1	27-12-23		TLM1	CO1	A.K.Ray	
15.	Minimum mode operation of 8086	1	28-12-23		TLM1	CO1	A.K.Ray	
16.	Timing diagrams for Minimum mode	1	30-12-23		TLM1	CO1	A.K.Ray	
17.	Maximum mode operation of 8086	1	01-01-24		TLM1	CO1	A.K.Ray	
18.	Timing diagrams for Maximum mode	1	03-01-24		TLM1	CO1	A.K.Ray	
19.	Different memories	1	04-01-24		TLM1	CO3	A.K.Ray	
20.	8-bit Memory and I/O interfacing with 8086	1	06-01-24		TLM1	CO4	A.K.Ray	
21.	16-bit memory and I/O interfacing with 8086	1	08-01-24		TLM1	CO4	A.K.Ray	
22.	Interrupt structure, vector table, Interrupt service routines	2	10-01-24 11-01-24		TLM1	CO4	A.K.Ray	

No. of classes required to complete UNIT-II : 10

No. of classes taken:

UNIT-III : Peripherals and Interfacing:

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	Learning Outcome	Text Book	HOD Sign
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		Required	Completion	Completion	Methods	COs	followed	Weekly
23.	Basic block diagram of 8255	1	18-01-24		TLM1	CO3	A.K.Ray	
24.	Signal description of 8255 and interfacing with 8086	2	20-01-24 22-01-24		TLM1 TLM2	CO4	A.K.Ray	
25.	A/D converter basic diagram Signal description and interfacing with 8086	1	24-01-24		TLM1	CO3	A.K.Ray	
26.	D/A converter basic diagram	1	25-01-24		TLM2	CO3	A.K.Ray	
27.	Signal description of D/A converter and interfacing with 8086	2	27-01-24 05-02-24		TLM1	CO4	A.K.Ray	
28.	Basic block diagram and signal description of 8257-DMA and interfacing with 8086	2	07-02-24 08-02-24		TLM1	CO3	A.K.Ray	
29.	Interfacing 8086 with key board	1	12-02-24		TLM1	CO4	A.K.Ray	
30.	Basic block diagram of 8259 and Cascaded connection of 8259 with 8086	2	14-02-24 15-02-24		TLM1	CO3	A.K.Ray	
No. of classes required to complete UNIT-III: 11				No. of classes taken:				

UNIT-IV : Microcontrollers

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
31.	Architecture of 8051	1	17-02-24		TLM1	CO1	Muhammad Ali Mazidi	

32.	Register organization and I/O ports of 8051	1	19-02-24		TLM1	CO1	Muhammad Ali Mazidi
33.	Memory Organization of 8051	1	21-02-24		TLM1	CO3	Muhammad Ali Mazidi
34.	Addressing modes of 8051	1	22-02-24		TLM1	CO1	Muhammad Ali Mazidi
35.	Instruction set of 8051	2	24-02-24 26-02-24		TLM1	CO2	Muhammad Ali Mazidi
36.	Simple Programs using Stack Pointer	2	28-02-24 29-02-24		TLM4	CO2	Muhammad Ali Mazidi
37.	Programs using 8051	2	02-03-24 04-03-24		TLM4 TLM1	CO2	Muhammad Ali Mazidi

No. of classes required to complete UNIT-IV : 10 No. of classes taken:

UNIT-V : 8051 Interfacing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
38.	Modes of timer operation	2	06-03-24 07-03-24		TLM1	CO1	Muhammad Ali Mazidi	
39.	Serial port operation	1	11-03-24		TLM1	CO1	Muhammad Ali Mazidi	
40.	Interrupt structure of 8051	2	13-03-24 14-03-24		TLM1 TLM2	CO1	Muhammad Ali Mazidi	
41.	Interfacing seven segment display	1	16-03-24		TLM2	CO4	Muhammad Ali Mazidi	
42.	Interfacing stepper motor	1	18-03-24		TLM2 TLM4	CO4	Muhammad Ali Mazidi	
43.	Interfacing serial/parallel printer	2	20-03-24 21-03-24		TLM2	CO4	Muhammad Ali Mazidi	
44.	Revision	3	23-03-24 27-03-24 28-03-24			-	-	

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

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
45.	Advanced microprocessor	1	30-03-24		TLM2	CO1	1.A.K.Ray 2.Muhamma	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (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)	A1=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):	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

Dr.J.S.V.Prasad	Dr.J.S.V.Prasad	Dr.J.S.V.Prasad
Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PART-A

Name of Course Instructor: Imran Abdul

Course Name & Code : Classical and Heuristic Optimization Techniques-20EE22

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

Program/Sem/Sec : B.Tech., VI-Sem., EEE – A section

A.Y.: : 2023-24

PREREQUISITE: Differential Equations, Linear algebra and Transformation Techniques

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course enables the student to understand the need of constrained decision –making problems.

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

CO1	Solve various constrained and unconstrained problems in single variable as well as multivariable (Apply-L3)
CO2	Apply the concept of optimally criteria for various types of optimization problems(Apply-L3)
CO3	Interpret non-traditional optimization techniques (Understand-L2)
CO4	Identify a suitable technique to solve a particular engineering problem(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										1			
CO2	3	2										1			
CO3	3	2										1			
CO4	3	2										1			
	1 - Low			2 -Medium						3 - High					

TEXTBOOKS:

T1.S.S Rao, “ Engineering Optimization-Theory and Practice” , John Wiley & Sons,5th edition 2019.

T2. KWang Y.Lee , Mohamed A.E1-Sharkawi , “ Modern Heuristic Optimization Teechniques-Theory and Application to power systems” John Wiley & Sons,2008.

REFERENCE BOOKS:

- R1:** K.V. Mittal and C Mohan, "Optimization Methods in Operations Research and Systems Analysis", New Age International Publishers, New Delhi, 3rd edition 2005.
- R2:** Kalyanmoy Deb, "Optimization for Engineering Design - Algorithms and Examples", PHI Learning Private Ltd, New Delhi, 2nd edition, 2012.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN): Section - A****UNIT-I: INTRODUCTION TO OPTIMIZATION**

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, Over View of optimization Problem	1	06-12-2023		TLM1	
2	Concepts and terms related to optimization	1	07-12-2023		TLM1	
3	Necessary and sufficient conditions for a multivariable function	1	08-12-2023		TLM1	
4	Necessary and sufficient conditions for a multivariable function	1	09-12-2023		TLM1	
5	Effects of scaling or adding a constant to an objective function,	1	13-12-2023		TLM1	
6	Understanding of constrained and unconstrained optimization problems	1	14-12-2023		TLM1	
7	Local & global optima	1	15-12-2023		TLM1	
8	Properties of convex function,	1	20-12-2023		TLM1	

	Definiteness of a matrix					
9	Test for concavity of a Function	1	21-12-2023		TLM1	
10	Numerical examples.	1	22-12-2023		TLM3	
11	Numerical examples.	1	23-12-2023		TLM3	
No. of classes required to complete UNIT-I		11				

UNIT-II : LINEAR PROGRAMMING (LP)

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
11	Simplex method	1	27-12-2023		TLM1		
12	Simplex method	1	28-12-2023		TLM1		
13	matrix form of simplex method	1	29-12-2023		TLM1		
14	solution of linear programming problems in tabular form via simplex method	1	30-12-2023		TLM1		
15	solution of linear programming problems in tabular form via simplex method	1	03-01-2024		TLM1		
16	Two-Phase simplex method	1	04-01-2024		TLM1		
17	Two-Phase simplex method	1	05-01-2024		TLM1		
18	Duality in simplex method	1	06-01-2024		TLM1		
19	Sensitivity analysis	1	10-01-2024		TLM2		
20	Numerical examples.	1	11-01-2024		TLM3		
21	Numerical examples.	1	12-02-2024		TLM3		
No. of classes required to complete UNIT-II		11					

UNIT-III : NON-LINEAR PROGRAMMING-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
22	Lagrange multipliers	1	18-01-2024		TLM1	
23	Gradient descent method	1	19-01-2024		TLM1	
25	Steepest descent method	1	20-01-2024		TLM1	
26.	Numerical Examples	1	24-01-2024			
27.	Newton's method	1	25-01-2024		TLM1	
29.	Newton's method	1	27-01-2024		TLM1	

30.	Davison-Fletcher-Powell method	1	07-02-2024		TLM1	
31	Exterior point method	1	08-02-2024		TLM1	
26.	Exterior point method	1	09-02-2024		TLM1	
32	Numerical examples.	1	14-02-2024		TLM1	
33.	Numerical examples.	1	15-02-2024		TLM1	
No. of classes required to complete UNIT-III		11				

UNIT-IV : NON-LINEAR PROGRAMMING-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
34	Karush-Kuhn-Tucker (KKT) conditions	1	16-02-2024		TLM1	
35	Karush-Kuhn-Tucker (KKT) conditions	1	17-02-2024		TLM1	
36	Convex optimization	1	21-02-2024		TLM1	
37	Quadratic optimization	1	22-02-2024		TLM1	
38	Numerical examples	1	23-02-2024		TLM1	
39	Dynamic programming	1	24-02-2024		TLM1	
40	Dynamic programming	1	28-02-2024		TLM2	
41	Principle of optimality	1	29-02-2024		TLM1	
42	Concept of optimal control	1	01-03-2024		TLM1	
43	Mathematical formulation of Optimal problem	1	02-03-2024		TLM1	
44	Numerical examples	1	06-03-2024		TLM3	
No. of classes required to complete UNIT-IV		11				

UNIT-V: HEURISTIC METHODS

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	Introduction	1	07-03-2024		TLM1	
46	Modern heuristic search techniques	1	13-03-2024		TLM1	
47	Introduction to genetic algorithms	1	14-03-2024		TLM1	
48	Encoding	1	15-03-2024		TLM1	
49	Fitness function	1	16-03-2024		TLM1	
50	Basic operators	1	20-03-2024		TLM2	
51	Numerical Example	1	21-03-2024			
52	Introduction to particle swarm optimization	1	22-03-2024		TLM2	

53	Variations of particle swarm optimization-discrete PSO	1	23-03-2024	TLM2
54	Variations of particle swarm optimization-discrete PSO	1	27-03-2024	TLM2
No. of classes required to complete UNIT-V		10		

CONTENT BEYOND SYLLABUS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1	Introduction to Ant Colony optimization	1	28-03-24 30-03-2024		TLM2

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 ring 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	Head of the Department
Name of the Faculty	Imran Abdul	Imran Abdul	Dr.M.S.Giridhar	Dr.J.S.Vara Prasad
Signature				



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

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COURSE HANDOUT

Part-A

PROGRAM : B.Tech, VI-Sem(B), EEE
ACADEMIC YEAR : 2023-24
COURSE NAME & CODE : Intelligent Control Systems – 20EE21
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Mr. J.V.Pavan Chand
COURSE COORDINATOR : Mr. J.V.Pavan Chand
PRE-REQUISITE: Control Systems

COURSE OBJECTIVES (CEOs):

This Course enables the student to familiarize fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its application. It also introduce concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems and fuzzy logic control .

COURSE OUTCOMES (Cos)

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

- **CO1:** Comprehend the concepts of biological neurons and artificial neurons. (Understand-L2)
- **CO2:** Analyze the feed-forward and feedback neural networks and their learning algorithms.(Apply-L3)
- **CO3:** Comprehend the neural network training and design concepts (Apply-L3)
- **CO4:** Comprehend the concept of fuzziness involved in various systems, fuzzy set theory, member ship functions and their Implementation methods and fuzzy logic (Apply-L3)
- **CO5:** Apply fuzzy logic to real world problems. (Apply-L3)

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
CO1	2	2										1			1	1
CO2	2	2	2												1	1
CO3	2	2	2												1	1
CO4	2	2													1	1
CO5	2	2	2									2	1	1	1	1

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

BOS APPROVED TEXT BOOKS:

- T1** Jecak M.Zurada, Introduction to Artificial Neural System”, Jaico Publishing House, 1999
T2 Timothy J Ross, “Fuzzy Logic With Engineering Application”, Wiley publication, Third Edition, 2010.

BOS APPROVED REFERENCE BOOKS:

- R1** James A Freeman and Davis Skapura, “Neural Network”, Pearson Education, 2003
R2 Rajasekharan and Pai, “Neural Network , Fuzzy logic, Genetic Algorithms: Synthesis and Applications”, PHI Publication,2003
R3 Samir Roy, Udit Chakraborty, “Introduction of Soft Computing: Neuro Fuzzy & Genetic Algorithms, Pearson Publications.
R4 S.N.Sivanandam, S.Sumathi, S.N.Deepa, “ Introduction to Neural Networks Using MATLAB 6.0, TMH,2008 Edition

Part – B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: ARCHITECTURE OF NEURAL NETWORKS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject and CO's	1	04/12/23		TLM1	1	T1 &R1	
2.	Architectures: motivation for the development of natural networks	1	07/12/23		TLM1	1	T1 &R1	
3.	artificial neural networks- biological neural networks	1	08/12/23		TLM1	1	T1 &R1	
4.	Potential Applications of ANN	1	9/12/23		TLM1	1	T1 &R1	
5.	typical Architecture-setting weights-common activations functions,	1	11/12/23		TLM1	1	T1 &R1	
6.	Historical Developments	1	14/12/23		TLM1	1	T1 &R1	
7.	Mcculloch-Pitts neuron- Architecture, algorithm, applications	1	15/12/23		TLM1	1,4	T1 &R1	
8.	single layer net for pattern classification- Biases and thresholds, linear separability -	1	16/12/23		TLM3	1	T1 &R1	
9.	Learning Strategy (Supervised, Unsupervised, Reinforcement),	1	18/12/23		TLM1	1	T1 &R1	
10.	Learning Rules	1	21/12/23		TLM1	1	T1 &R1	
11.	Hebb's rule	1	22/12/23		TLM1	1,4	T1 &R1	
12.	perceptron rule	1	23/12/23		TLM3	1	T1 &R1	
13.	Delta Rule	1	28/12/23		TLM1	1,2	T1 &R1	
14.	Numerical Problems	1	29/12/23		TLM1	1,2	T1 &R1	
15.	Numerical Problems	1	30/12/23		TLM6	1,2,4	T1 &R1	
No. of classes required to complete		15			No. of classes taken:			

UNIT-I				
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UNIT-II: BASIC NEURAL NETWORK TECHNIQUES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
16.	Supervised Learning Neural Network : Perceptron Model, , - architecture -	1	4/1/24		TLM1	1,2	T1 &R1	
17.	Adaline Model, M-adaline Model	1	5/1/24		TLM1	2	T1 &R1	
18.	Back propagation neural net standard back propagation	1	6/1/24		TLM1	2	T1 &R1	
19.	algorithm	1	8/1/24		TLM1	2	T1 &R1	
20.	derivation of learning rulesnumber of hidden layers	1	11/1/24		TLM1	2	T1 &R1	
21.	Basic problems	1	12/1/24		TLM3	2	T1 &R1	
22.	Unsupervised Learning Neural Network :Radial Basis Function networks	1	18/1/24		TLM1	2	T1 &R1	
23.	Topology, learning algorithm;	1	19/1/24		TLM1	1,2	T1 &R1	
24.	Kohenen's self-organising network:	1	20/1/24		TLM1	1,2	T1 &R1	
25.	Topology, learning algorithm-	1	20/1/24		TLM1	1,2	T1 &R1	
26.	Discrete Hopfield networks, Baisc Rules	1	22/1/24		TLM1	1,2	T1 &R1	
No. of classes required to complete UNIT-II		11			No. of classes taken:			

UNIT-III: NEURAL MEMORY UNIT & RECURRENT NEURAL NETWORK

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
27.	Neural Memory unit: associative and other neural networks-	1	25/1/24		TLM1	1	T1 &R1	
28.	hetro associative memory	1	27/1/24		TLM1	1	T1 &R1	
29.	neural net, auto associative net	1	27/1/24		TLM1	1	T1 &R1	
30.	Bidirectional associative memory applications	1	5/2/24		TLM1	1	T1 &R1	
31.	Hopfield nets	1	8/2/24		TLM1	1	T1 &R1	

32.	Boltzman machine	1	9/2/24		TLM1	1	T1 &R1	
33.	Recurrent neural networks: Basic concepts.	1	10/2/24		TLM3	1	T1 &R1	
34.	Architecture and training algorithms	1	12/2/24		TLM1	1	T1 &R1	
35.	Applications; Hopfield network: Topology, learning algorithm,	1	15/2/24		TLM1	1	T1 &R1	
36.	Long Short Term Memory	1	16/2/24		TLM1	1	T1 &R1	
37.	Gated Recurrent Units	1	17/2/24		TLM1	1	T1 &R1	
38.	Bidirectional LSTMs, Bidirectional RNNs	1	19/2/24		TLM1	1	T1 &R1	
No. of classes required to complete UNIT-III		12	22/2/24		No. of classes taken:			

UNIT-IV: INTRODUCTION TO FUZZY LOGIC SYSTEM

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
39.	UNIT 4 INTRODUCTION	1	23/2/24		TLM1	3	T2 &R2	
40.	Classical sets - relations and cardinalities, Crisp set operations, properties	1	24/2/24		TLM1	3	T2 &R2	
41.	Fuzzy sets - relations and cardinalities, Fuzzy membership functions- different types	1	26/2/24		TLM1	3	T2 &R2	
42.	Fuzzification, Membership value assignment	1	29/2/24		TLM1	3	T2 &R2	
43.	Development of rule base and Implication methods	1	1/3/24		TLM1	3	T2 &R2	
44.	Defuzzification methods, Defuzzification to crisp sets	1	2/3/24		TLM1	3	T2 &R2	
45.	Fuzzy integrals, Fuzziness and fuzzy resolutions,	1	4/3/24		TLM3	3	T2 &R2	
46.	Fuzziness and fuzzy resolutions	1	7/3/24					
47.	Fuzzy Arithmetic	1	9/3/24					
48.	Composition and inference	1	11/3/24		TLM1	3	T2 &R2	
No. of classes required to complete UNIT-IV		10			No. of classes taken:			

UNIT-V: APPLICATIONS OF FUZZY LOGIC AND FUZZY SYSTEMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
49.	UNIT-V: Basic structure and operation of fuzzy logic	1	14/3/24			3	T2 &R4	

	control systems;							
50.	Design methodology;	1	15/3/24			3	T2 &R4	
51.	Applications of fuzzy controllers control of phase controlled dc motor drive by using fuzzy logic controllers	1	16/3/24			3,4	T2 &R4	
52.	Simple applications of fuzzy knowledge based controllers like washing machine	1	18/3/24			3	T2 &R4	
53.	home heating system, and train break control.	1	21/3/24			3,4	T2 &R4	
54.	Revision	1	22/3/24			3	T2 &R4	
55.	Revision	1	23/3/24			3	T2 &R4	
56.	Revision	1	28/3/24			3	T2 &R4	
57.	Revision	1	30/3/24			3,4	T2 &R4	
No. of classes required to complete UNIT-V		09				No. of classes taken:		

Contents beyond the Syllabus:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Neural Networks in Electrical Engineering	1	30/3/24		TLM2	1,2,4	T1 & R1	
2.	Fuzzy Logic in Electrical Engineering	1	30/3/24		TLM2	3,4	T2 & R2	

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

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)

- a:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- e:** 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.
- 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.
- 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.
- h:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- i:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 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.
- k:** Project management and finance: Demonstrate knowledge and understanding of the ring 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.

- 1:** 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.

Signature				
	Name of the faculty	Name of the Course Co-ordinator	Name of the Module Co-ordinator	HOD
	Mr. J.V.Pavan Chand	Mr. J.V.Pavan Chand	Dr.K.R.L.Prasad	Dr.J.Siva Vara Prasad



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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 Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. PHANEENDRA KANAKAMEDALA
 Course Name & Code : CYBER SECURITY AND DIGITAL FORENSICS & 201T84
 L-T-P Structure : 3-0-0 Credits: 03
 Program/Sem/Sec : B.Tech-EEE – A / VI SEM
 A.Y. : 2023-24

PRE-REQUISITE: Understanding of digital logic, operating system concepts, Computer hardware knowledge.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The Objective of the course is to provide the basic concepts of cybersecurity and digital Forensics which help to protect ourselves from various kinds of cyber-attacks. Digital forensics is a branch of forensics science encompassing the recovery and investigation of material found in digital devices, often in relation to computer crime. It enables students to gain experience to do independent study and research

CO1	Understand the implementation of cybercrime. (Understand - L2)
CO2	Identify key Tools and Methods used in Cybercrime. (Remember- L1)
CO3	Under the Concepts of Cyber Forensics. (Understand- L2)
CO4	Apply Cyber Forensics in collection of digital evidence and sources of evidence (Apply- L3)
CO5	Analyze the cyber forensics tools for present and future(Analyze- L4)

Course Articulation Matrix (Correlation between COs &POs, PSOs):

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

TEXT BOOKS:

- Dejey, Dr.Murugan, "cyber Forensics", Oxford University Press, India, 2018
- Sunit Belapure Nina Godbole "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", WILEY,2011

REFERENCE BOOKS:

1. Michael Simpson, Kent Blackman and James e. Corley, “Hands on Ethical Hacking and Network Defense”, Cengage, 2019
2. Computer Forensics, Computer Crime Investigation by John R.Vacca, Firewall Media, New Delhi
3. Alfred Basta, Nadine Basta, Mary Brown and Ravindra Kumar “Cyber Security and Cyber Laws”, Cengage, 2018

Part-B**COURSE DELIVERY PLAN (LESSON PLAN): SECTION A****UNIT-I: Introduction to Cybercrime**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Introduction to CSDF	1	04-12-2023		TLM2	CO1	
2	Cybercrime definition and origins of the word	1	07-12-2023		TLM2	CO1	
3	Cybercrime and Information Security	1	08-12-2023		TLM2	CO1	
4	Cybercriminals	1	11-12-2023		TLM2	CO1	
5	Classifications of Cybercrime	1	13-12-2323		TLM2	CO1	
6	Cyberstalking Cybercafé and Cybercrime	2	14-12-2023 15-12-2023		TLM2	CO1	
7	Botnets Security Challenges Posed by Mobile	2	18-12-2023 20-12-2023		TLM2	CO1	
8	Attacks on Mobile/Cell Phones Network and Computer Attacks	2	21-12-2023 22-12-2023		TLM2	CO1	
9	Unit-I Assignment Test	1	27-12-2023		TLM2	CO1	
No. of classes required to complete UNIT-I		12	No. of classes taken:				

UNIT-II: Tools and Methods

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly	
10	Proxy Servers and Anonymizers	1	28-12-2023		TLM2	CO2		
11	Phishing, Password Cracking	2	29-12-2023 03-01-2024		TLM2	CO2		
12	Key loggers and Spywares Virus and Worms	1	04-01-2024		TLM2	CO2		
13	Trojan Horses and Backdoors Steganography	1	05-01-2024		TLM2	CO2		
14	Sniffers, Spoofing, session Hijacking Buffer Overflow Identity Theft	2	08-01-2024 10-01-2024		TLM1	CO2		
15	Dos and DDos Attacks SQL Injection Port Scanning	1	11-01-2024		TLM2	CO2		
16	Unit-II Assignment Test	1	12-01-2024		TLM2	CO2		
No. of classes required to complete UNIT-2		09	No. of classes taken:					

UNIT – III: Cyber Forensics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
17	Cyber Forensics Definition	1	18-01-2024		TLM2	CO3	
18	Disk Forensics	2	19-01-2024 22-01-2024		TLM	CO3	
19	Network Forensics	1	24-01-2024		TLM2	CO3	
20	Wireless Forensics	1	25-01-2024		TLM2	CO3	
21	Database Forensics	2	05-02-2024		TLM2	CO3	
22	Malware Forensics	1	07-02-2024		TLM2	CO3	

23	Mobile Forensics	1	08-02-2024		TLM2	CO3	
24	Email Forensics	1	09-02-2024		TLM1	CO3	
25	Unit-III Assignment Test	1	12-02-2024		TLM2	CO3	
No. of classes required to complete UNIT-3		11	No. of classes taken:				

UNIT-IV: Digital Evidence

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly	
26	Introduction to Digital Evidence and Evidence Collection procedure	2	14-02-2024 15-02-2024		TLM2	CO4		
27	Source of Evidence Operating systems and their Boot Processes	2	16-02-2024 19-02-2024		TLM2	CO4		
28	File System Windows Registry	2	21-02-2024 22-02-2024		TLM1	CO4		
29	Windows Artifacts Browser Artifact	2	23-02-2024 26-02-2024		TLM2	CO4		
30	Linux Artifact	2	28-02-2024 01-03-2024		TLM1	CO4		
31	Digital evidence on the internet	2	04-03-2024 06-03-2024		TLM2	CO4		
32	Impediments to collection of Digital Evidence	1	07-03-2024		TLM1	CO4		
33	Challenges with Digital Evidence	2	08-03-2024 11-03-2024		TLM2	CO4		
34	Unit-III Assignment Test	1	13-03-2024		TLM2	CO4		
No. of classes required to complete UNIT-4		16	No. of classes taken:					

UNIT-V: Cyber Forensics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
35	The Present and The Future Forensics Tools	1	14-03-2024		TLM2	CO5	
36	Cyber Forensics suite Imaging and Validation Tools	1	15-03-2024		TLM2	CO5	
37	Tools for Integrity Verification and Hashing	1	18-03-2024		TLM2	CO5	
38	Forensics Tools for Data Recovery Encryption/decryption	1	20-03-2024		TLM2	CO5	
39	Forensics tools for Password Recovery Analyzing network	2	21-03-2024 22-03-2024		TLM1	CO5	
40	Forensics Tools for Email Analysis	1	25-03-2024		TLM2	CO5	
41	Unit -5 Assignment test.	1	27-03-2024		TLM2	CO5	
No. of classes required to complete UNIT-5		8	No. of classes taken:				

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign
1.	Using AI/ML to Analyze Cyber Threats	1	28-03-2024		TLM2	
2.	Cloud Security	1	29-03-2024		TLM2	

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:

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	03-07-2022		
I Phase of Instructions	04-12-2023	27-01-2024	8W
I Mid Examinations	29-01-2024	03-02-2024	1W
II Phase of Instructions	05-02-2024	30-03-2024	8W
II Mid Examinations	01-04-2024	06-04-2024	1W
Preparation and Practical's	08-04-2024	13-04-2024	1W
Semester End Examinations	15-04-2023	27-04-2024	2W
Internship	29-04-2024	22-06-2024	8W

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- PEO 1** Pursue a successful career in the area of Information Technology or its allied fields.
- PEO 2** Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.
- PEO 3** Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.
- PEO 4** Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication and team work and leadership skills in their job.

PROGRAMME OUTCOMES (POs):

- PO1** **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2** **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.
- PO3** **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4** **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5** **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.
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- PO7** **Environment and sustainability:** Understand the impact of the professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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- PO10 Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11 Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12 Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- PSO1** Organize, Analyze and Interpret the data to extract meaningful conclusions.
- PSO2** Design, Implement and Evaluate a computer-based system to meet desired needs.
- PSO3** Develop IT application services with the help of different current engineering tools.

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



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 Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. PHANEENDRA KANAKAMEDALA
 Course Name & Code : CYBER SECURITY AND DIGITAL FORENSICS & 201T84
 L-T-P Structure : 3-0-0 Credits: 03
 Program/Sem/Sec : B.Tech-EEE – B / VI SEM
 A.Y. : 2023-24

PRE-REQUISITE: Understanding of digital logic, operating system concepts, Computer hardware knowledge.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The Objective of the course is to provide the basic concepts of cybersecurity and digital Forensics which help to protect ourselves from various kinds of cyber-attacks. Digital forensics is a branch of forensics science encompassing the recovery and investigation of material found in digital devices, often in relation to computer crime. It enables students to gain experience to do independent study and research

CO1	Understand the implementation of cybercrime. (Understand - L2)
CO2	Identify key Tools and Methods used in Cybercrime. (Remember- L1)
CO3	Under the Concepts of Cyber Forensics. (Understand- L2)
CO4	Apply Cyber Forensics in collection of digital evidence and sources of evidence (Apply- L3)
CO5	Analyze the cyber forensics tools for present and future(Analyze- L4)

Course Articulation Matrix (Correlation between COs &POs, PSOs):

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

TEXT BOOKS:

- Dejey, Dr.Murugan, "cyber Forensics", Oxford University Press, India, 2018
- Sunit Belapure Nina Godbole "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", WILEY,2011

REFERENCE BOOKS:

1. Michael Simpson, Kent Blackman and James e. Corley, “Hands on Ethical Hacking and Network Defense”, Cengage, 2019
2. Computer Forensics, Computer Crime Investigation by John R.Vacca, Firewall Media, New Delhi
3. Alfred Basta, Nadine Basta, Mary Brown and Ravindra Kumar “Cyber Security and Cyber Laws”, Cengage, 2018

Part-B**COURSE DELIVERY PLAN (LESSON PLAN): SECTION A****UNIT-I: Introduction to Cybercrime**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Introduction to CSDF	1	04-12-2023		TLM2	CO1	
2	Cybercrime definition and origins of the word	1	07-12-2023		TLM2	CO1	
3	Cybercrime and Information Security	1	11-12-2023		TLM2	CO1	
4	Cybercriminals	1	12-12-2023		TLM2	CO1	
5	Classifications of Cybercrime	1	13-12-2323		TLM2	CO1	
6	Cyberstalking Cybercafé and Cybercrime	2	14-12-2023 18-12-2023		TLM2	CO1	
7	Botnets Security Challenges Posed by Mobile	2	19-12-2023 20-12-2023		TLM2	CO1	
8	Attacks on Mobile/Cell Phones Network and Computer Attacks	2	21-12-2023 26-12-2023		TLM2	CO1	
9	Unit-I Assignment Test	1	27-12-2023		TLM2	CO1	
No. of classes required to complete UNIT-I		12	No. of classes taken:				

UNIT-II: Tools and Methods

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly	
10	Proxy Servers and Anonymizers	1	28-12-2023		TLM2	CO2		
11	Phishing, Password Cracking	2	02-01-2023 03-01-2024		TLM2	CO2		
12	Key loggers and Spywares Virus and Worms	1	04-01-2024		TLM2	CO2		
13	Trojan Horses and Backdoors Steganography	1	08-01-2024		TLM2	CO2		
14	Sniffers, Spoofing, session Hijacking Buffer Overflow Identity Theft	2	09-01-2024 10-01-2024		TLM1	CO2		
15	Dos and DDos Attacks SQL Injection Port Scanning	1	11-01-2024		TLM2	CO2		
16	Unit-II Assignment Test	1	18-01-2024		TLM2	CO2		
No. of classes required to complete UNIT-2		09	No. of classes taken:					

UNIT – III: Cyber Forensics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
17	Cyber Forensics Definition	1	22-01-2024		TLM2	CO3	
18	Disk Forensics	2	23-01-2023 24-01-2024		TLM	CO3	
19	Network Forensics	1	25-01-2024		TLM2	CO3	
20	Wireless Forensics	1	05-02-2024		TLM2	CO3	
21	Database Forensics	2	06-02-2024		TLM2	CO3	
22	Malware Forensics	1	07-02-2024		TLM2	CO3	

23	Mobile Forensics	1	08-02-2024		TLM2	CO3	
24	Email Forensics	1	12-02-2024		TLM1	CO3	
25	Unit-III Assignment Test	1	13-02-2024		TLM2	CO3	
No. of classes required to complete UNIT-3		11	No. of classes taken:				

UNIT-IV: Digital Evidence

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly	
26	Introduction to Digital Evidence and Evidence Collection procedure	2	14-02-2024 15-02-2024		TLM2	CO4		
27	Source of Evidence Operating systems and their Boot Processes	2	19-02-2024 20-02-2024		TLM2	CO4		
28	File System Windows Registry	2	21-02-2024		TLM1	CO4		
29	Windows Artifacts Browser Artifact	2	22-02-2024 26-02-2024		TLM2	CO4		
30	Linux Artifact	2	27-02-2024 28-02-2024		TLM1	CO4		
31	Digital evidence on the internet	2	04-03-2024 05-03-2024		TLM2	CO4		
32	Impediments to collection of Digital Evidence	1	06-03-2024		TLM1	CO4		
33	Challenges with Digital Evidence	2	07-03-2024 11-03-2024		TLM2	CO4		
34	Unit-III Assignment Test	1	12-03-2024		TLM2	CO4		
No. of classes required to complete UNIT-4		16	No. of classes taken:					

UNIT-V: Cyber Forensics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
35	The Present and The Future Forensics Tools	1	13-03-2024		TLM2	CO5	
36	Cyber Forensics suite Imaging and Validation Tools	1	14-03-2024		TLM2	CO5	
37	Tools for Integrity Verification and Hashing	1	18-03-2024		TLM2	CO5	
38	Forensics Tools for Data Recovery Encryption/decryption	1	19-03-2024		TLM2	CO5	
39	Forensics tools for Password Recovery Analyzing network	2	20-03-2024 21-03-2024		TLM1	CO5	
40	Forensics Tools for Email Analysis	1	25-03-2024		TLM2	CO5	
41	Unit -5 Assignment test.	1	26-03-2024		TLM2	CO5	
No. of classes required to complete UNIT-5		8	No. of classes taken:				

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign
1.	Using AI/ML to Analyze Cyber Threats	1	27-03-2024		TLM2	
2.	Cloud Security	1	28-03-2024		TLM2	

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:

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	03-07-2022		
I Phase of Instructions	04-12-2023	27-01-2024	8W
I Mid Examinations	29-01-2024	03-02-2024	1W
II Phase of Instructions	05-02-2024	30-03-2024	8W
II Mid Examinations	01-04-2024	06-04-2024	1W
Preparation and Practical's	08-04-2024	13-04-2024	1W
Semester End Examinations	15-04-2023	27-04-2024	2W
Internship	29-04-2024	22-06-2024	8W

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- PEO 1** Pursue a successful career in the area of Information Technology or its allied fields.
- PEO 2** Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.
- PEO 3** Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.
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PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- PSO1** Organize, Analyze and Interpret the data to extract meaningful conclusions.
- PSO2** Design, Implement and Evaluate a computer-based system to meet desired needs.
- PSO3** Develop IT application services with the help of different current engineering tools.

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

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Phone: 08659-222933, Fax: 08659-222931



DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. O.VENKATA SIVA

Course Name & Code : Operating Systems -20CSM3

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

Credits: 3

Program/Sem/Sec : III B.tech/VI-sem/EEE

A.Y.: 2023-24

PREREQUISITE: Knowledge of Computer fundamentals & Data structures & algorithms

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objective of the course is to provide basic knowledge of computer operating system structure and functioning. Students able to understand how Operating Systems evolved with advent of computer architecture. Comprehend the different CPU scheduling algorithms, page replacement algorithms, and identify best one.

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

CO1	Demonstrate the underlying principles and techniques of operating system (Understand-L2)
CO2	Interpret scheduling and communication methods of processes handled by operating systems (Understand-L2)
CO3	Distinguish the process synchronization methods and deadlock handling approaches employed in operating systems (Understand-L2)
CO4	Classify memory management techniques and virtual memory mechanisms (Understand-L2)
CO5	Interpret the strategies of disk scheduling algorithms and file system architecture (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	2														
CO2		2	1												
CO3		2	1												
CO4		2	1												
CO5		2	1												
		1 - Low			2 -Medium				3 - High						

TEXTBOOKS:

T1 Silberschatz & Galvin, —Operating System Concepts||, Wiley, 7th edition, 2007.

REFERENCE BOOKS:

- R1 William Stallings, —Operating Systems, PHI, 5th Edition, 2004.
 R2 B.A.Forounz & R.F. Giberg,---Unix and shell programming,Thomson,first Edition,New Delhi,2003
 R3 <http://codex.cs.yale.edu/avi/os-book/os9/slide-dir/index.html>
 R4 http://swayam.gov.in/ndl_noc19_cs50/preview

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Operating 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.	Introduction to Operating systems	1	5-12-2023		TLM2	
2.	Introduction to Operating systems	1	7-12-2023		TLM2	
3.	Introduction to Operating systems	1	9-12-2023		TLM2	
4.	Introduction to Operating systems	1	12-12-2023		TLM2	
5.	Operating system services and user operating system interfaces	1	14-12-2023		TLM2	
6.	System calls and types of system calls	1	16-12-2023		TLM2	
7.	System programs, OS design and implementation	1	19-12-2023		TLM2	
8.	OS structure and Virtual Machine	1	21-12-2023		TLM2	
9.	OS generation and System Boot	1	23-12-2023		TLM2	
No. of classes required to complete UNIT-I: 9				No. of classes taken:		

UNIT-II: Process 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
10.	Concepts and process scheduling	1	26-12-2023		TLM2	
11.	Operations on process	1	28-12-2023		TLM2	
12.	IPC and examples on IPC	1	30-12-2023		TLM2	
13.	Communication in client server systems	1	02-01-2024		TLM2	
14.	Treads overview, Multithreading Models,	1	04-01-2024		TLM2	
15.	Thread libraries and Thread issues	1	06-01-2024		TLM2	
16.	Scheduling Criteria	1	09-01-2024		TLM2	
17.	Scheduling algorithms	1	11-01-2024		TLM2	
18.	Scheduling algorithms	1	13-01-2024		TLM2	
19.	Multi-Processor Scheduling	1	16-01-2024		TLM2	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	The Critical section problem, Peterson's solutions	1	18-01-2024		TLM1	
21.	Synchronization hardware	1	20-01-2024		TLM1	
22.	Semaphores, Classic problems of	1	23-01-2024		TLM1	

	Synchronization				
23.	Monitors, Synchronization examples	1	25-01-2024		TLM1
24.	atomic transactions	1	27-01-2024		TLM1
25.	System model and deadlock characterization	1	06-02-2024		TLM1
26.	Methods for Handling deadlocks and deadlock prevention	1	08-02-2024		TLM1
27.	Deadlock Avoidance	1	10-02-2024		TLM1
28.	Deadlock detection	1	13-02-2024		TLM1
29.	Recovery from deadlock	1	15-02-2024		TLM1
No. of classes required to complete UNIT-III: 10					

UNIT-IV: Memory mangement

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Swapping	1	17-02-2024		TLM1	
31.	Contiguous Memory Allocation	1	20-02-2024		TLM1	
32.	Paging and structure of a page table	1	22-02-2024		TLM1	
33.	Segmentation	1	24-02-2024		TLM1	
34.	Demand paging	1	27-02-2024		TLM1	
35.	Page replacement	1	29-02-2024		TLM1	
36.	Allocation of frames	1	02-03-2024		TLM1	
37.	Thrashing	1	05-03-2024		TLM1	
38.	Memory mapped files	1	07-03-2024		TLM1	
39.	Allocating kernel memory	1	09-03-2024		TLM1	
No. of classes required to complete UNIT-IV: 10				No. of classes taken:		

UNIT-V: File System 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
40.	Overview of Mass storage structure	1	12-03-2024		TLM2	
41.	Disk structure	1	14-03-2024		TLM2	
42.	Disk Attachment	1	16-03-2024		TLM2	
43.	Disk Scheduling	1	19-03-2024		TLM2	
44.	Disk Management	1	21-03-2024		TLM2	
45.	The Concept of a file and access methods	1	23-03-2024		TLM2	
46.	File System structure	1	26-03-2024		TLM2	
47.	File system implementation	1	28-03-2024		TLM2	
48.	Directory implementation	1	28-03-2024		TLM2	
49.	Allocation methods	1	28-03-2024		TLM2	
50.	Free space management	1	30-03-2024		TLM2	
51.	Efficiency and	1	30-03-2024		TLM2	

performance,recovery					
No. of classes required to complete UNIT-V: 12			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 (R19 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	The ability to apply Software Engineering practices and strategies in software development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web application and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Ms.O.V.SIVA	Dr.DEVIPRIYA	Dr.D.VENKATA SUBBAIAH	Dr.D.VEERAAIAH
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & 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 Information Technology

COURSE HANDOUT

PART-A

Name of Course Instructor : **Dr. K.Venu Gopal.**
Course Name & Code : **WEB DESIGN USING DJANGO (20ITM6)**
L-T-P Structure : **3-1-0** Credits : 3
Program/Sem/Sec : **B.Tech. –ASE,ECE,EEE,MECH / VI-Sem (Minor Course)**
Academic Year : **2023 – 24**

PRE-REQUISITE: NIL.

COURSE EDUCATIONAL OBJECTIVE (CEO): The Objective of the course is to implement web applications using python and Django frame work

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

CO1	Identify basic building blocks of python to solve mathematical problems. (Understand- L2)
CO2	Demonstrate concepts about built in data structures, regular expressions, and file handling. (Understand - L2)
CO3	Understand the basic Web deployment and Django Frame Work (Understand - L2)
CO4	Demonstrate the usage of Http Mechanisms and Http Modelling (Apply - L3)
CO5	Demonstrate the usage of Templates and Form Processing (Apply - L3)

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

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

TEXTBOOK:

TEXTBOOK(S):

T1. Python Programming Using Problem Solving Approach, By Reema Thareja, Oxford Publication
T2. Django: Web Development with Python, By Samuel Dazon, Aidas Bendoraitis, Arun Ravindran-Packt Publishing.

REFERENCE BOOKS:

R1. Python Web Development with Django, By Jeff Forcier, Paul Bissex, Wesley J Chun. Pearson Education
R2. Beginning Django Web Application Development and Deployment with Python By Daniel Rubio - Apress Publishing.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): 4/12/2023 -27/01/2024

UNIT – I: Introduction to Python:

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.	Usage of Python interpreter, Python Shell,	1	05/12/2023		TLM1,2	
2.	Indentation, Python Built-in types,	1	07/12/2023		TLM1,2	
3.	I/P-O/P Statements, Identifiers & Literals.	1	09/12/2023		TLM1,2	
4.	Python basic Operators,	1	12/12/2023		TLM1,2	
5.	Python Membership Operators (in & not in),	1	14/12/2023		TLM1,2	
6.	Python Identity Operators (is & is not)	1	16/12/2023		TLM1,2	
7.	Control flow: Conditional Statements - if, if-else,	1	16/12/2023		TLM1,2	
8.	Nested if-else.	1	21/12/2023		TLM1,2	
9.	Loops-While, For.	2	23/12/2023		TLM1,2	
10.	Continue, break, and pass.	2	26/12/2023		TLM1,2	
No. of classes required to complete UNIT – I: 12				No. of classes taken:		

UNIT – II: Built in data Structures, Regular Expressions& Files :

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Creating and Accessing Elements in Lists, Tuples, their built-in functions	2	30/12/2023		TLM1,2	
12.	Creating and Accessing Elements in Sets and Dictionaries, their built-in functions	3	06/01/2024		TLM1,2	
13.	Regular Expression Operations: Using Special Characters,	1	09/01/2024		TLM1,2	
14.	Regular Expression Methods,	1	11/01/2024		TLM1,2	
15.	Named Groups in Python Regular Expressions, Regular Expression with glob Module.	2	18/01/2024		TLM1,2	
16.	Files: Introduction to files,	1	20/01/2024		TLM1,2	
17.	file operations- Read, write, and search	2	25/01/2024		TLM1,2	
No. of classes required to complete UNIT – II: 10				No. of classes taken:		

UNIT – III: Dynamic web site basics & Introduction, Django Frame Work

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.	<i>Dynamic web site basics:</i> Communication: Http, Urls, Requests, Responses,	1	27/01/2024		TLM1,2	
19.	rendering templets into html and other formats,	2	27/01/2024		TLM1,2	
20.	Understanding MVC Architecture.	1	06/02/2024		TLM1,2	
21.	Introduction to Dijango frame work	1	08/02/2024		TLM1,2	
22.	overall Dijango Architecture	2	13/02/2024		TLM1,2	
23.	loose coupling and flexibility	1	15/02/2024		TLM1,2	
24.	Rapid development	1	17/02/2024		TLM1,2	
No. of classes required to complete UNIT – III: 11				No. of classes taken:		

UNIT – IV: URL, Http Mechanisms and Views

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.	Introduction to URL confs,	1	20/02/2024		TLM1,2	
26.	replacing tuples with URL,	1	22/02/2024		TLM1,2	
27.	Using Multiple pattern Objects,	2	24/02/2024		TLM1,2	
28.	Function Objects, Vs Function-Names,	1	27/02/2024		TLM1,2	
29.	Http Modelling: Request Objects,	2	29/02/2024		TLM1,2	
30.	Response Objects,	1	02/03/2024		TLM1,2	
31.	Middleware	1	05/03/2024		TLM1,2	
No. of classes required to complete UNIT – IV: 13				No. of classes taken:		

UNIT – V: Templates and Form Processing

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.	Templates- Understanding Contexts,	1	07/03/2024		TLM1,2	
33.	Template Language syntax.	1	12/03/2024		TLM1,2	
34.	Defining Forms,	2	16/03/2024		TLM1,2	
35.	Filling out Forms,	2	21/03/2024		TLM1,2	
36.	Validation and cleaning	2	23/03/2024		TLM1,2	
37.	Form Display	2	28/03/2024		TLM1,2	
No. of classes required to complete UNIT – V:15				No. of classes taken:		

Content Beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	Intro NumPy frame work	1	30/3/2024		TLM1,2	

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):

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr.K.VenuGopal	Dr S Naganjaneyulu	Dr.K.Phaneendra	Dr B.Srinivasa Rao
Signature				



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. M.KISHORE KUMAR

Course Name & Code : Machine Learning(20ADM3)

L-T-P Structure : 3-1-0

Credits: 4

Program/Sem/Sec : B.Tech VI Sem EEE/ECE/ASE

A.Y.: 2023-24

PREREQUISITE: Probability and Statistics

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to provide the basic concepts and techniques of Machine Learning and help to use recent machine learning approaches for solving practical problems. It enables students to gain experience to do independent study and research.

CO1	Identify the characteristics of machine learning.(Understand- L2)
CO2	Summarize the Model building and evaluation approaches.(Understand- L2)
CO3	Demonstrate Bayesian learning and regression algorithms for real-world Problems.(Apply- L3)
CO4	Demonstrate supervised learning algorithms to solve real-world Problems.(Apply- L3)
CO5	Demonstrate unsupervised learning algorithms for real-world data.(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	-	-	-	-	-	-	-	-	-	-	-	-	3	
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3	
CO3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3	
CO4	-	2	1	-	-	-	-	-	-	-	-	-	-	-	3	
CO5	2	3	1	-	-	-	-	-	-	-	-	-	-	-	3	
	1 - Low			2 -Medium					3 - High							

TEXTBOOKS:

T1 Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India ,1st edition,2015

T2 Tom M. Mitchell, "Machine Learning", MGH, 1997

REFERENCE BOOKS:

R1 Shai Shalev-Shwartz, ShaiBen David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge.

R2 Peter Harington, "Machine Learning in Action", Cengage, 1st edition, 2012.

R3 Peter Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge university Press, 2012.

R4 Jason Brownlee, "Machine Learning Mastery with Python Understand Your Data, Create accurate Models and Work Projects End-To-End", Edition: v1.4, 2011.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction To Machine Learning & Preparing to Model

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 Machine Learning - Introduction	1	05/12/2023		1 & 2	
2.	What is Human Learning?	1	07/12/2023		1 & 2	
3.	Types of Human Learning	1			1 & 2	
4.	What is Machine Learning? Types of Machine Learning	1	09/12/2023		1 & 2	
5.	Problems Not To Be Solved Using Machine Learning	1	09/12/2023		1 & 2	
6.	Applications of Machine Learning	1	09/12/2023		1 & 2	
7.	Preparing to Model- Introduction	1	12/12/2023		1 & 2	
8.	Machine Learning Activities	1	14/12/2023		1 & 2	
9.	Basic Types of Data in Machine Learning	1	16/12/2023		1 & 2	
10.	Exploring Structure of Data,	4	16/12/2023- 21/12/2023		1 & 2	
11.	Data Quality and Remediation	1	23/12/2023		1 & 2	
12.	Data Pre-Processing	1	26/12/2023		1 & 2	
No. of classes required to complete UNIT-I: 15				No. of classes taken:		

UNIT-II: Modeling & Evaluation, Basics of Feature Engineering

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
13.	Modeling & Evaluation- Introduction,	1	28/12/2023		1 & 2		
14.	Selecting a Model	1	30/12/2023		1 & 2		
15.	Training a Model (for Supervised Learning)	1	02/01/2024		1 & 2		
16.	Model Representation and Interpretability	1	04/01/2024		1 & 2		
17.	Evaluating Performance of a Model.	4	06/01/2024 - 11/01/2024		1 & 2		
18.	Basics of Feature Engineering- Introduction	1	18/01/2024		1 & 2		
19.	Feature Transformation - Feature Construction	2	20/01/2024		1 & 2		
20.	Feature Subset Selection	2	23/01/2024		1 & 2		
No. of classes required to complete UNIT-II: 13				No. of classes taken:			

UNIT-III: Bayesian Concept Learning and Regression

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.	Bayesian Concept Learning - Introduction	1	25/01/2024		1 & 2	
22.	Why Bayesian Methods are important? Bayes Theorem	1	25/01/2024		1 & 2	
23.	Bayes Theorem and Concept Learning	1	27/01/2024		1 & 2	
24.	Bayesian Belief Network	1	27/01/2024		1 & 2	
25.	Regression - Introduction	1	06/02/2024		1 & 2	
26.	Regression Algorithms - Simple linear regression	1	08/02/2024		1 & 2	
27.	Multiple linear regression	1	10/02/2024		1 & 2	
28.	Polynomial Regression Model	1	10/02/2024		1 & 2	
29.	Logistic Regression	1	13/02/2024		1 & 2	
30.	Maximum Likelihood Estimation.	1	15/02/2024		1 & 2	
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

UNIT-IV: Supervised Learning

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Supervised Learning: Classification-Introduction	1	17/02/2024		1 & 2	
29.	Ensemble Learning Introduction	1	17/02/2024		1 & 2	
30.	Example of Supervised Learning	1	17/02/2024		1 & 2	
31.	Classification Model	1	20/02/2024		1 & 2	
32.	Classification Model	1	22/02/2024		1 & 2	
33.	Classification Learning Steps.	1	24/02/2024		1 & 2	
34.	Common Classification Algorithms- kNN	1	24/02/2024		1 & 2	
35.	Decision Tree	1	27/02/2024 29/02/2024		1 & 2	
36.	Random Forest model	1	02/03/2024		1 & 2	
37.	Support vector machines	1	02/03/2024		1 & 2	
38.	Ensemble Learning- Boosting, Bagging.	1	05/03/2024		1 & 2	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: Unsupervised Learning

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Introduction, Unsupervised vs Supervised Learning	1	07/03/2024		1 & 2	
40.	Application of Unsupervised Learning	1	09/03/2024		1 & 2	
41.	Clustering – Clustering as a Machine Learning task	1	09/03/2024		1 & 2	
42.	Different types of clustering techniques	1	12/03/2024		1 & 2	
43.	Partitioning methods	1	14/03/2024		1 & 2	
44.	Hierarchical clustering	1	16/03/2024		1 & 2	
45.	Density-based methods: DBSCAN	1	19/03/2024		1 & 2	

46.	Finding Pattern using Association Rule	1	21/03/2024		1 & 2
47.	Association rule	1	22/03/2024		1 & 2
48.	Apriori algorithm	2	26/03/2024 - 28/03/2024		1 & 2
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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	M.KISHORE KUMAR	M.KISHORE KUMAR	Dr. V.SURYA NARAYANA	O. RAMA DEVI
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(An Autonomous Institution Since 2010)

Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified

Department of Electrical and Electronics Engineering

Accredited by NBA under Tier-I

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr.P.Deepak Reddy / Dr.T.Naga Durga
Course Name & Code : POWER ELECTRONICS AND DRIVES LAB &20EE60
L-T-P Structure : 0-0-3 **Credits: 1.5**
Program/Sem/Sec : B.Tech/VI/A **A.Y.: 2023-24**

PRE-REQUISITES : Power Electronics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The course enables the student to provide practical exposure to converter circuits, hardware modules and software tools to simulate various power electronic converters and drives.

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

CO1	Examine the characteristics of power electronic devices (Understand-L2)
CO2	Analyze the performance of different power converters and drives using trainer kits. (Apply-L3)
CO3	Evaluate the performance of different power converters and drives using simulation tools(Apply-L3)

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

COs/POs	a	b	c	d	e	f	g	h	i	j	k	l	PSO1	PSO2	PSO3	PSO4
CO1	3	2			3				3	3		3	1	2	1	
CO2	2			2	3				3	3			2	2	3	
CO3	3	3		3	3	2		3	3	3		3	2	2	2	
	1 - Low			2 -Medium					3 - High							

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

DAY : FRIDAY

Batches : 2061A0231,21761A0201-230

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	8/12	15/12	22/12	29/12	5/1	19/1	9/2	16/2	23/2	1/3/3	15/3	22/3	29/3
	Actual date													
B-1	2061A0231,21761A0201,202,203	DEMO	1	2	3	4	5	1	2	3	4	5	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	21761A0206,204,205	DEMO	2	3	4	5	1	2	3	4	5	1		
B-3	21761A0209,207,208	DEMO	3	4	5	1	2	3	4	5	1	2		
B-4	21761A0211,210,211	DEMO	4	5	1	2	3	4	5	1	2	3		
B-5	21761A0215,213,214	DEMO	5	1	2	3	4	5	1	2	3	4		
B-6	21761A0218,216,217	DEMO	6	7	8	9	10	6	7	8	9	10		
B-7	21761A0221,219,220	DEMO	7	8	9	10	6	7	8	9	10	6		
B-8	21761A0224,222,223	DEMO	8	9	10	6	7	8	9	10	6	7		
B-9	21761A0227,225,226	DEMO	9	10	6	7	8	9	10	6	7	8		
B-10	2161A0228,229,230	DEMO	10	6	7	8	9	10	6	7	8	9		

DAY : SATURDAY

Batches :

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	9/12	16/1 2	23/1 2	30/ 12	6/1	20/1	27/1	17/2	24/2	2/3	16/3	23/3	30/3
	Actual date													
B-1	21761A0231,232,233	DEMO	1	2	3	4	5	1	2	3	4	5	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	21761A0234,235,236	DEMO	2	3	4	5	1	2	3	4	5	1		
B-3	21761A0237,238,239	DEMO	3	4	5	1	2	3	4	5	1	2		
B-4	21761A0240,241,242	DEMO	4	5	1	2	3	4	5	1	2	3		
B-5	21761A0243,244,246	DEMO	5	1	2	3	4	5	1	2	3	4		
B-6	22765A0201,2161A0247,248	DEMO	6	7	8	9	10	6	7	8	9	10		
B-7	22765A0202,203,204	DEMO	7	8	9	10	6	7	8	9	10	6		
B-8	22765A0205,206,207,208	DEMO	8	9	10	6	7	8	9	10	6	7		
B-9	22765A0209,210,211,212	DEMO	9	10	6	7	8	9	10	6	7	8		
B-10	22765A0213,214,215	DEMO	10	6	7	8	9	10	6	7	8	9		

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	Ethics: 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.Deepak Reddy / Mr.P.Ratnakar Kumar/ Mrs.T.Hima Bindu	Mr.P.Deepak Reddy	Mr.P.Deepak Reddy	Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(An Autonomous Institution Since 2010)

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

Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified

Department of Electrical and Electronics Engineering

Accredited by NBA under Tier-I

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr.P.Deepak Reddy / Mr.P.Ratnakar Kumar/ Mrs.T.Hima Bindu

Course Name & Code : POWER ELECTRONICS AND DRIVES LAB &20EE60

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

Program/Sem/Sec : B.Tech/VI/B **A.Y.: 2023-24**

PRE-REQUISITES : Power Electronics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The course enables the student to provide practical exposure to converter circuits, hardware modules and software tools to simulate various power electronic converters and drives.

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

CO1	Examine the characteristics of power electronic devices (Understand-L2)
CO2	Analyze the performance of different power converters and drives using trainer kits. (Apply-L3)
CO3	Evaluate the performance of different power converters and drives using simulation tools(Apply-L3)

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

COs/POs	a	b	c	d	e	f	g	h	i	j	k	l	PSO1	PSO2	PSO3	PSO4
CO1	3	2			3				3	3		3	1	2	1	
CO2	2			2	3				3	3			2	2	3	
CO3	3	3		3	3	2		3	3	3		3	2	2	2	
	1 - Low			2 -Medium					3 - High							

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

DAY : TUESDAY

Batches : 20H71A0211,20-279,21-249 TO 279

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	5/12	12/12	19/12	26/12	2/1	9/1	23/1	6/2	13/2	20/2	27/2	5/3	12/3	19/3	26/3
	Actual date															
B-1	20H71A0211, 20761A0279, 21761A0249	DEMO	1	2	3	4	5	1	2	3	4	5	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	21761A0250,251,252	DEMO	2	3	4	5	1	2	3	4	5	1				
B-3	21761A0253,254,255	DEMO	3	4	5	1	2	3	4	5	1	2				
B-4	21761A0256,257,258	DEMO	4	5	1	2	3	4	5	1	2	3				
B-5	21761A0260,261,262	DEMO	5	1	2	3	4	5	1	2	3	4				
B-6	21761A0263,264,265	DEMO	6	7	8	9	10	6	7	8	9	10				
B-7	21761A0267,268,269	DEMO	7	8	9	10	6	7	8	9	10	6				
B-8	21761A0270,273,274	DEMO	8	9	10	6	7	8	9	10	6	7				
B-9	21761A0275,276,277	DEMO	9	10	6	7	8	9	10	6	7	8				
B-10	21761A0278,279	DEMO	10	6	7	8	9	10	6	7	8	9				

DAY : THURSDAY

Batches :21761A0280-294, 22765A0215-228

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	XVI WEEK
	Tentative date	7/12	14/12	21/12	28/12	4/1	11/1	18/1	25/1	8/2	15/2	22/2	29/2	7/3	14/3	21/3	28/3
	Actual date																
B-1	21761A0280,281,282	DEMO	1	2	3	4	5	1	2	3	4	5	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	21761A0283,284,285	DEMO	2	3	4	5	1	2	3	4	5	1					
B-3	21761A0286,287,288	DEMO	3	4	5	1	2	3	4	5	1	2					
B-4	21761A0289,290,291	DEMO	4	5	1	2	3	4	5	1	2	3					
B-5	21761A0292,293,294	DEMO	5	1	2	3	4	5	1	2	3	4					
B-6	22765A0215,216,217	DEMO	6	7	8	9	10	6	7	8	9	10					
B-7	22765A0218,219,220	DEMO	7	8	9	10	6	7	8	9	10	6					
B-8	22765A0221,222,223	DEMO	8	9	10	6	7	8	9	10	6	7					
B-9	22765A0224,225,226	DEMO	9	10	6	7	8	9	10	6	7	8					
B-10	22765A0227,228, 20761A0226	DEMO	10	6	7	8	9	10	6	7	8	9					

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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PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
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Mr.P.Deepak Reddy / Mr.P.Ratnakar Kumar/ Mrs.T.Hima Bindu	Mr.P.Deepak Reddy	Mr.P.Deepak Reddy	Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD



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(AUTONOMOUS)

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

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

Part - A

PROGRAM : B.Tech., VI-Sem., EEE
ACADEMIC YEAR : 2021-22
COURSE NAME & CODE : Microprocessors and Microcontrollers Lab –20EE61
L-T-P STRUCTURE : 0-0-2
COURSE CREDITS : 1
COURSE INSTRUCTOR : Dr.J. Sivavara Prasad ,Mrs. K.S.L.Lavanya ,Mrs.G.Tabita
COURSE COORDINATOR : Dr. J. Sivavara Prasad

Prerequisite: Microprocessors and Microcontrollers

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course, student will understand working of instructions by practicing programs of 8086/8051 and develop applications by interfacing devices.

Course Outcomes:

At the end of the course, the student will be able to:

- CO1:** Demonstrate program proficiency using the various instructions of the 8086 microprocessor / 8051 microcontroller.
CO2: Apply different programming techniques like loops, subroutines for various applications.
CO3: Design systems for different applications by interfacing external devices.

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	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4
CO1	2	2	3	2	2	-	-	-	-	-	-	-	-	2	-	
CO2	3	2	2	2	2	-	-	-	-	-	-	-	-	3	-	
CO3	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).

Part - B

COURSE DELIVERY PLAN (LESSON PLAN)
SECTION-A SCHEDULE

Day:Monday(5,6,7 Hours)

	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	04-12-2023	11-12-2023	18-12-2023	08-01-2024	22-02-2024	05-02-2024	12-02-2024	19-02-2024	26-02-2024	04-03-2024	11-03-2024	11-03-2024	18-03-2024
Actual date													
	Demo	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	REVISION OF EXPERIMENTS	INTERNAL EXAM

Batches:20761A0231,21761A0201-21761A0248,22765A0201-22765A0214

Day: Saturday(5,6,7 Hours)

Batches:21761A0249-21761A0294,22765A0215-22765A0228

H.T. No.s	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	09-12-23	16-12-23	23-12-23	30-12-23	06-01-24	20-01-24	27-01-24	17-02-24	24-02-24	2-03-24	16-03-24	23-03-24	30-03-24
Actual date													
	Dem o	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	REVISION OF EXPERIMENTS	INTERNAL EXAM

Teaching Learning Methods

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	04-12-2023	27-01-2024	8W
I Mid Examinations	29-01-2024	03-02-2024	1 W
II Phase of Instructions + CRT Classes	05-02-2024	30-03-2024	8 W
II Mid Examinations	01-04-2024	06-04-2024	1 W
Preparation and Practicals	08-04-2024	13-04-2024	1W
Semester End Examinations	15-04-2024	27-04-2024	2W
	29-04-2024	22-06-2024	8W

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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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.

Dr.J. Sivavara Prasad ,Mrs. K.S.L.Lavanya & Mrs.G.Tabita	Dr.J. Sivavara Prasad	Dr.J.Siva Vara Prasad	Dr.J.Siva Vara Prasad
Course Instructors	Course Coordinator	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)

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New Delhi & Certified by ISO 9001:2015, <http://www.lbrce.ac.in>

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PROGRAM	: B.Tech. VI-Sem, EEE (A)
ACADEMIC YEAR	: 2023-24
COURSE NAME & CODE	: Power Systems Lab & 20EE62
L-T-P STRUCTURE	: 0-0-3
COURSE CREDITS	: 1.5
COURSE INSTRUCTOR	: Dr.M.S.Giridhar/Dr.P.Sobha Rani/Dr. G.Nageswara Rao
COURSE COORDINATOR	: Dr.P.Sobha Rani
PRE-REQUISITE	: Power Systems-II
COURSE OUTCOMES (CO):	

- CO1 Analyze transmission systems under steady state and transient conditions
- CO2 Perform fault calculation and network protection
- CO3 Understand the performance of renewable energy systems

LIST OF EXPERIMENTS

1. Determination of Receiving end quantities and the line performance of a medium/long transmission line using simulation tool.
2. Using Computer code determine:
 - (i) Bus admittance matrix by inspection method for a 3-bus power system and obtain
 - (ii) Power flow solution by Newton-Raphson method.
3. Determination of Sequence components (Positive, Negative and Zero) of an alternator using simulation tool.
4. Transient analysis of a Single Machine Infinite Bus (SMIB) system using simulation tool.
5. Simulation of LG, LL, LLG and LLL faults on a simple power system.
6. Determine steady state frequency error and frequency deviation response for an
 - (i) Isolated power system and (ii) Interconnected power system.
7. Plot the Swing curve for a simple 3 or 4 bus power system using Simulation Tool.
8. Study the Over current protection scheme using numerical relay.
9. Determination of ABCD parameters and performance of a transmission line
10. Determination of Positive, Negative and Zero sequence reactance for a 3-phase alternator

Additional Experiments

1. Plot V-I characteristics of Solar panel at various levels of insolation.
2. Study the performance of a Wind turbine system at different wind speeds and plot the characteristics.
3. Determination of Earth resistance in humid and dry earth conditions.

SECTION-A SCHEDULE

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

DAY: SATURDAY

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	9/12/23	16/12/23	23/12/23	30/12/23	6/1/24	13/1/24	20/1/24	27/1/24	03/2/24	10/2/24	17/2/24	24/2/24	02/3/24	09/3/24	16/3/24
	Actual Date															
B-1	20761A0231, 21761A0201,202	Demo	1	2	3	4	5	6	7	8	9	10	11	12	Repetition	INTERNAL TEST
B-2	21761A0203,204, 205	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-3	21761A0206,207, 208	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-4	21761A0209,210, 211	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-5	21761A0212,213, 214	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-6	21761A0215,216, 217	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-7	21761A0218,219, 220	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-8	21761A0221,222, 223	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-9	21761A0224,225, 226	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-10	21761A0227,228, 229	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-11	21761A0230,231	Demo	1	2	3	4	5	6	7	8	9	10	11	12		

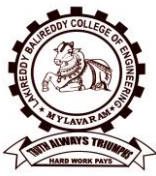
COURSE DELIVERY PLAN (LESSON PLAN): Section-A

DAY: FRIDAY

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	8/12/23	15/12/23	22/12/23	29/12/23	5/1/24	12/1/24	19/1/24	26/1/24	02/2/24	09/2/24	16/2/24	23/2/24	01/3/24	08/3/24	15/3/24
	Actual Date															
B-1	21761A0232, 233, 234	Demo	1	2	3	4	5	6	7	8	9	10	11	12	Repetition	INTERNAL TEST
B-2	21761A025, 236, 237	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-3	21761A0238, 239, 240	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-4	21761A0241, 242, 243	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-5	21761A0244, 246, 247	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-6	21761A0248, 22765A0201, 202	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-7	22765A0203, 204 205	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-8	22765A0206, 207, 208	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-9	22765A0209, 210, 211	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-10	22765A0212, 213	Demo	1	2	3	4	5	6	7	8	9	10	11	12		
B-11	22765A0214, 21655A0204	Demo	1	2	3	4	5	6	7	8	9	10	11	12		

LAB INCHARGE

HEAD OF THE DEPARTMENT



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)

L.B. Reddy Nagar, Mylavaram-521230. Andhra Pradesh, INDIA
Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi
NAAC Accredited with "A" grade, Accredited by NBA,
New Delhi & Certified by ISO 9001:2015, <http://www.lbrce.ac.in>

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PROGRAM	: B.Tech. VI-Sem, EEE (B)
ACADEMIC YEAR	: 2023-24
COURSE NAME & CODE	: Power Systems Lab& 20EE62
L-T-P STRUCTURE	: 0-0-3
COURSE CREDITS	: 1.5
COURSE INSTRUCTOR	: Dr.P.Sobha Rani/Dr.M.S.Giridhar/ Mr. Imran Abdul
COURSE COORDINATOR	: Dr. P.Sobha Rani
PRE-REQUISITE	: Power Systems-II
COURSE OUTCOMES (CO):	

- CO1 Analyze transmission systems under steady state and transient conditions
- CO2 Perform fault calculation and network protection
- CO3 Understand the performance of renewable energy systems

LIST OF EXPERIMENTS

1. Determination of Receiving end quantities and the line performance of a medium/long transmission line using simulation tool.
2. Using Computer code determine:
 - (i) Bus admittance matrix by inspection method for a 3-bus power system and obtain
 - (ii) Power flow solution by Newton-Raphson method.
3. Determination of Sequence components (Positive, Negative and Zero) of an alternator using simulation tool.
4. Transient analysis of a Single Machine Infinite Bus (SMIB) system using simulation tool.
5. Simulation of LG, LL, LLG and LLL faults on a simple power system.
6. Determine steady state frequency error and frequency deviation response for an
 - (i) Isolated power system and (ii) Interconnected power system.
7. Plot the Swing curve for a simple 3 or 4 bus power system using Simulation Tool.
8. Study the Over current protection scheme using numerical relay.
9. Determination of ABCD parameters and performance of a transmission line
10. Determination of Positive, Negative and Zero sequence reactance for a 3-phase alternator

Additional Experiments

1. Plot V-I characteristics of Solar panel at various levels of insolation.
2. Study the performance of a Wind turbine system at different wind speeds and plot the characteristics.
3. Determination of Earth resistance in humid and dry earth conditions.

SECTION-B SCHEDULE

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

DAY: Tuesday

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		5/12/23	12/12/23	19/12/23	26/12/23	2/1/24	9/1/24	23/1/24	6/2/24	13/2/24	20/2/24	27/2/24	5/3/24	12/3/24	19/3/24	26/3/24
Actual Date																
B-1	21761A0 280,81,82	Demo	1	2	3	4	5	6	7	8	9	10	Repetition	Repetition	INTERNAL TEST	Revision
B-2	283,84,85	Demo	1	2	3	4	5	6	7	8	9	10				
B-3	286,87,88	Demo	1	2	3	4	5	6	7	8	9	10				
B-4	289,90,91	Demo	1	2	3	4	5	6	7	8	9	10				
B-5	292,93,94	Demo	1	2	3	4	5	6	7	8	9	10				
B-6	22765A0 215,16,17	Demo	1	2	3	4	5	6	7	8	9	10				
B-7	218,19,20	Demo	1	2	3	4	5	6	7	8	9	10				
B-8	221,22,23	Demo	1	2	3	4	5	6	7	8	9	10				
B-9	224,25,26	Demo	1	2	3	4	5	6	7	8	9	10				
B-10	227,228	Demo	1	2	3	4	5	6	7	8	9	10				

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

DAY: Thursday

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	XI V Week	XV Week	XVI Week	XVI Week
Tentative Date		7/12/23	14/12/23	21/12/23	28/12/23	4/1/24	11/1/24	18/1/24	25/1/24	1/2/24	8/2/24	15/2/24	22/2/24	29/2/24	7/3/24	14/3/24	21/3/24	28/3/24
Actual Date																		
B-1	20226,279,20H11		1	2	3	4	5	6	7	8	9	10	Repetition	Repetition	Repetition	INTERNAL TEST	Revision	Revision
B-2	21249,50,51	Demo	1	2	3	4	5	6	7	8	9	10						
B-3	252,53,54	Demo	1	2	3	4	5	6	7	8	9	10						
B-4	255,56,57	Demo	1	2	3	4	5	6	7	8	9	10						
B-5	258,60,61	Demo	1	2	3	4	5	6	7	8	9	10						
B-6	262,63,64	Demo	1	2	3	4	5	6	7	8	9	10						
B-7	265,67,68	Demo	1	2	3	4	5	6	7	8	9	10						
B-8	269,70,73	Demo	1	2	3	4	5	6	7	8	9	10						

B-9	274,75,7 6	Demo	1	2	3	4	5	6	7	8	9	10						
B-10	277,78,7 9	Demo	1	2	3	4	5	6	7	8	9	10						

LAB INCHARGE

HEAD OF THE DEPARTMENT

List of Activities:

1. Personality Development Skills

Role of language in Personality – How language reflects, impacts Personality – Using gender- neutral language in MNCs – being Culturally-Sensitive-Personality Traits - Grooming & Dress code

Activities: Group Discussion/Role play/Presentations (authentic materials: Newspapers, pamphlets and News Clippings)

2. Impactful Communication

Activities: Extempore / Story Telling/ Group Discussion (Case studies/Current affairs etc.)/ Elocution on Interpretation of given quotes/ Critical Appreciation and Textual Analysis/ Writing reviews on short story/videos/book/Social Media profiling/ Pronunciation Practice

3. Professional Skills:

Career Planning- job vs. career- goal setting- SWOT Analysis-Time management – self-management – stress-management.

Activities: SWOT analysis of the self/Goal Setting-Presentation/Writing Report/Listening exercises/Effective Resume-Writing and presentation/ Interview Skills: Mock interviews/Video samples.

REFERENCES:

1. Edward Holffman, “Ace the Corporate Personality”, McGraw Hill, 2001
2. Adrian Furnham, Personality and Intelligence at Work, Psyc 2. hology Press, 2008.
3. M.Ashraf Rizvi, “Effective Technical Communication”, 1 st edition, Tata cGrawHill, 2005.
4. Ace of Soft skills Gopalaswamy Ramesh, Pearson Education India, 2018
5. Soft Skills for the Workplace, Good heart - Willcox Publisher · 2020.
6. How to Win Friends and Influence People, Dale Carnegie · 2020

Software: Walden InfoTech

COURSE DELIVERY PLAN (LESSON PLAN)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign weekly
1.	Activity-1: Role of language in Personality- How language reflects, impacts Personality – Using gender	1+2	07-12-23		TLM-1, 2 & 6.	
2.	Neutral language in MNCs – being Culturally-Sensitive- Personality Traits - Grooming & Dress code & Role-play	1+2	14-12-23		TLM-1, 2 & 6.	

3.	Group Discussion	1+2	21-12-23		TLM-1, 2& 6.	
4.	Group Discussion	1+2	28-12-24		TLM-1, 2& 6.	
5.	Presentations	1+2	04-01-24		TLM-1, 2& 6.	
6.	Activity-2: Impactful Communication Extempore - Story Telling	1+2	11-01-24		TLM-1, 2& 6.	
7.	Extempore -Group Discussion	1+2	18-01-24		TLM-1, 2& 6.	
8.	Elocution on Interpretation of given quotes/ Critical Appreciation and Textual Analysis/ Writing	1+2	25-01-24		TLM-1, 2& 6.	
9.	reviews on short story/videos/book/Social Media profiling/ Pronunciation Practice	1+2	08-02-24		TLM-1, 2& 6.	
10.	Activity-3: Professional Skills: Career planning- job vs. career-goal setting	1+2	15-02-24		TLM-1, 2& 6.	
11.	SWOT Analysis	1+2	22-02-24		TLM-1, 2& 6.	
12.	Time management – self-management – stress-management.	1+2	29-02-24		TLM-1, 2& 6.	
13.	Presentation/Writing Report/Listening exercises	1+2	07-03-24		TLM-1, 2& 6.	
14.	Effective Resume-Writing and presentation	1+2	14-03-24		TLM-1, 2& 6.	
15.	Interview Skills: Mock interviews/Video samples.	1+2	21-03-24		TLM-1, 2& 6.	
16.	Interview Skills: Mock interviews/Video samples.	1+2	28-03-24		TLM-1, 2& 6.	
No. of classes required to complete Syllabus: 48						

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

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.

	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. B. Sreenivasa Reddy	Dr. R. Padma Venkat	Dr. R. Padma Venkat	Dr. A. Ramireddy
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING, (AUTONOMOUS)

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

COURSE HANDOUT

PART-A

Name of Course Instructor: ANURADHA M
Course Name & Code : Soft Skills & 20HSS1
L-T-P Structure : 1-0-2
Program/Sem/Sec : B. Tech- VI SEM EEE B
Academic Year : 2023-24

Credits: 02

PREREQUISITE: NIL

Course Educational Objectives:

The Soft Skills Laboratory course equips students with required behavioral, interpersonal & Intrapersonal skills, communication skills, leadership skills etc. It aims at training undergraduate students on soft skills leading to enhanced self-confidence, esteem, and acceptability in professional circles.

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

CO1	To Develop self-awareness and personality traits for professional growth.	L2
CO2	Work effectively in multi-disciplinary and heterogeneous teams through knowledge of teamwork, Inter-personal relationships, conflict management and leadership quality.	L3
CO3	Communicate through verbal/oral communication with good listening skills and empathy.	L3
CO4	Apply skills required to qualify in recruitment tests, Interviews & other professional assignments.	L3

COURSE ARTICULATION MATRIX

(Correlation between COs & POs)

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

List of Activities:

1. Personality Development Skills

Role of language in Personality – How language reflects, impacts Personality – Using gender- neutral language in MNCs – being Culturally-Sensitive-Personality Traits - Grooming & Dress code

Activities: Group Discussion/Role play/Presentations (authentic materials: Newspapers, pamphlets and News Clippings)

2. Impactful Communication

Activities: Extempore / Story Telling/ Group Discussion (Case studies/Current affairs etc.)/ Elocution on Interpretation of given quotes/ Critical Appreciation and Textual Analysis/ Writing reviews on short story/videos/book/Social Media profiling/ Pronunciation Practice

3. Professional Skills:

Career Planning- job vs. career- goal setting- SWOT Analysis-Time management – self-management – stress-management.

Activities: SWOT analysis of the self/Goal Setting-Presentation/Writing Report/Listening exercises/Effective Resume-Writing and presentation/ Interview Skills: Mock interviews/Video samples.

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3. M.Ashraf Rizvi, “Effective Technical Communication”, 1 st edition, Tata cGrawHill, 2005.
4. Ace of Soft skills Gopaldaswamy Ramesh, Pearson Education India, 2018
5. Soft Skills for the Workplace, Good heart - Willcox Publisher · 2020.
6. How to Win Friends and Influence People, Dale Carnegie · 2020

Software: Walden InfoTech

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.	Activity-1:Role of language in Personality- How language reflects, impacts Personality – Using gender	1+2	8/12/2023		
2.	neutral language in MNCs – being Culturally-Sensitive- Personality Traits - Grooming & Dress code& Role-play	1+2	15/12/2023		

3.	Group Discussion	1+2	22/12/2023		
4.	Presentations	1+2	29/12/2023		
5.	Activity-2: Impactful Communication Extempore - Story Telling	1+2	05/01/2024		
6.	Extempore -Group Discussion	1+2	12/01/2024		
7.	Elocution on Interpretation of given quotes/ Critical Appreciation and Textual Analysis/ Writing	1+2	19/01/2024		
8.	reviews on short story/videos/book/Social Media profiling/ Pronunciation Practice	1+2	16/02/2024		
9.	Activity-3: Professional Skills: Career Planning- job vs. career-goal setting	1+2	23/02/2024		
10.	SWOT Analysis	1+2	01/03/2024		
11.	Time management – self-management – stress-management.	1+2	08/03/2024		
12.	Presentation/Writing Report/Listening exercises	1+2	15/03/2024		
13.	Effective Resume-Writing and presentation	1+2	22/03/2024		
14.	Interview Skills: Mock interviews/Video samples.	1+2	29/03/2024		
15.	Interview Skills: Mock interviews/Video samples	1+2	05/04/2024		
No. of classes required to complete Syllabus:45					

Signature of Faculty

Signature of HoD

