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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.M.S.GIRIDHAR
Course Name & Code : POWER SYSTEM-II & 20EE12
L-T-P Structure :2-1-0 **Credits:** 3
Program/Sem/Sec : B.TECH/V/A-SEC **A.Y.:** 2023-24

PREREQUISITE: Power Systems-I, Electrical Circuit Analysis.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to learn performance of transmission lines, the voltage control and reactive power compensation methods of transmission lines. It also deals with importance of per unit representation of power system, symmetrical components, short circuit studies and protective devices

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

CO1	Analyze transmission line performance **(Apply-L3)**
CO2	Apply shunt compensation techniques to control reactive power of the transmission line **(Understand-L2)**
CO3	Determine the fault currents for symmetrical and unsymmetrical faults**(Apply-L3)**
CO4	Illustrate the protective relays and circuit breakers in power system protection. **(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	PSO4
CO1	3	2										1	3			
CO2	3	2										1	3			2
CO3	3	2	2									2	3			
CO4	2	2										2	3			
CO5	3	2										1	3			
1 - Low						**2** –Medium						**3** - High				

TEXTBOOKS:

T1 John J.Grainger & W.D.Stevenson,“ Power System Analysis”, McGraw Hill International, 2017.

T2 D.P.Kothari and I.J.Nagrath, “Modern Power System Analysis”, Tata McGraw-Hill Pub.Co., NewDelhi, Fourth Edition, 2011.

REFERENCE BOOKS:

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

R2 Hadi Saadat, “Power System Analysis”, Tata Mc Graw Hill Pub.Co.2002.

R3 VKMehta & Rohit Mehta, "Principles of Power Systems" (Multicolor Edition), S.Chand Publishing, fourth edition, 2006

R4 W.D.Stevenson, "Elements of Power system Analysis", McGraw Hill International Student Edition, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: PERFORMANCE OF TRANSMISSION LINES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Representation of lines	1	03-07-2023			
2.	Short transmission lines	2	04-07-2023 07-07-2023			
3.	Medium length lines, nominal-**T** and **π**-representations	2	10-07-2023 11-07-2023			
4.	Long transmission lines. The equivalent circuit representation of a long Line	2	14-07-2023 15-07-2023			
5.	A, B, C, D constants, Ferranti Effect	2	17-07-2023 18-07-2023			
6.	Power flow through a transmission line	1	21-07-2023			
7.	Receiving end power circle diagram.	2	22-07-2023 24-07-2023			
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: VOLTAG ECONTROL IN POWERSYSTEM

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Introduction, methods of voltage control	1	25-07-2023			
9.	Shunt and series capacitors/Inductors	2	28-07-2023 31-07-2023			
10.	Tap-changing Transformers, synchronous phase-modifiers.	1	01-08-2023			
11.	Introduction-Concepts of Load compensation,	1	04-08-2023			
12.	Lodability characteristics of over head lines	2	05-08-2023 07-08-2023			
13.	Uncompensated transmission line	2	08-08-2023 11-08-2023			
14.	Symmetrical line Radial line with asynchronous load, Compensation of lines.	2	12-08-2023 14-08-2023			
No. of classes required to complete UNIT-II:11				**No. of classes taken:**		

UNIT-III: SYMMETRICAL FAULT ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Per Unit Representation of Power Systems	2	18-08-2023 19-08-2023			
16.	Symmetrical Fault (LLL) Analysis: Short circuit of synchronous machine unloaded	2	21-08-2023 22-08-2023			
17.	Short circuit of loaded synchronous machine	1	25-08-2023			
18.	Calculation of symmetrical short circuit currents for simple systems	2	26-08-2023 04-09-2023			
19.	Short circuit current computation through Thevenin's theorem.	2	05-09-2023 08-09-2023			
20.	Reactors and their location, short circuit capacity of a bus	2	09-09-2023 11-09-2023			
21.	Computation of circuit breaker capacities	1	12-09-2023			
22.	Short circuit current and MVA Calculations, Numerical Problems.	2	15-09-2023 16-09-2023			
No. of classes required to complete UNIT-III: 14				**No. of classes taken:**		

UNIT-IV: UNSYMMETRICAL FAULT CALCULATIONS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Significance of positive, negative and zero sequence components	1	19-09-2023			
24.	Average 3-phase power in terms of symmetrical components	1	22-09-2023			
25.	Sequence impedances and sequence networks of power systems.	2	23-09-2023 25-09-2023			
26.	Unsymmetrical Fault Analysis: LG, LL, LLG faults without fault impedance, Numerical Problems	3	26-09-2023 29-09-2023 30-09-2023			
27.	Unsymmetrical Fault Analysis: LG, LL, LLG faults with fault impedance, Numerical Problems	3	03-10-2023 06-10-2023 07-10-2023			
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: FUNDAMENTALS OF POWER SYSTEM PROTECTION

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.	Need for protective systems	1	09-10-2023			
29.	Nature and causes of faults, zones of protection, primary and backup protection	2	10-10-2023 13-10-2023			
30.	Essential qualities of protection	1	14-10-2023			
31.	Classification of Protective Relays based on technology and function	1	16-10-2023			
32.	Over current relays	2	17-10-2023 20-10-2023			

33.	Distance relays, Impedance, reactance and MHO relays	2	21-10-2023 24-10-2023			
34.	Bucholz relay, differential relays	2	27-10-2023 28-10-2023			
35.	Classification of circuit breakers	1	06-11-2023			
36.	Principle of operation of air blast circuit breakers.	1	07-11-2023			
37.	Principle of operation of vacuum, SF_6 circuit breakers.	2	10-11-2023 11-11-2023			
No. of classes required to complete UNIT-V: 15				**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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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	Dr.M.S.Giridhar	Dr.M.S.Giridhar	Dr.P.Sobharani	Dr.J.Sivavaraprasad
Signature				

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.M.S.GIRIDHAR
Course Name & Code **:** POWER SYSTEM-II & 20EE12
L-T-P Structure **: 2-1-0** **Credits:** 3
Program/Sem/Sec : **B.TECH/V/B-SEC** **A.Y.:** 2023-24

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COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to learn performance of transmission lines, the voltage control and reactive power compensation methods of transmission lines. It also deals with importance of per unit representation of power system, symmetrical components, short circuit studies and protective devices

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

CO1	Analyze transmission line performance **(Apply-L3)**
CO2	Apply shunt compensation techniques to control reactive power of the transmission line **(Understand-L2)**
CO3	Determine the fault currents for symmetrical and unsymmetrical faults**(Apply-L3)**
CO4	Illustrate the protective relays and circuit breakers in power system protection. **(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	PSO4
CO1	3	2										1	3			
CO2	3	2										1	3			2
CO3	3	2	2									2	3			
CO4	2	2										2	3			
CO5	3	2										1	3			
1 - Low						**2** –Medium						**3** - High				

TEXTBOOKS:

T1 John J.Grainger & W.D.Stevenson,“ Power System Analysis”, McGraw Hill International, 2017.

T2 D.P.Kothari and I.J.Nagrath, “Modern Power System Analysis”, Tata McGraw-Hill Pub.Co., NewDelhi, Fourth Edition, 2011.

REFERENCE BOOKS:

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

R2 Hadi Saadat, "Power System Analysis", Tata Mc Graw Hill Pub.Co.2002.

R3 VKMehta & Rohit Mehta, "Principles of Power Systems" (Multicolor Edition), S.Chand Publishing, fourth edition, 2006

R4 W.D.Stevenson, "Elements of Power system Analysis", McGraw Hill International Student Edition, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: PERFORMANCE OF TRANSMISSION LINES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Representation of lines	1	03-07-2023			
2.	Short transmission lines	2	04-07-2023 06-07-2023			
3.	Medium length lines, nominal-**T** and π-representations	2	10-07-2023 11-07-2023			
4.	Long transmission lines. The equivalent circuit representation of a long Line	2	08-07-2023 13-07-2023			
5.	A, B, C, D constants, Ferranti Effect	2	15-07-2023 17-07-2023			
6.	Power flow through a transmission line	1	18-07-2023			
7.	Receiving end power circle diagram.	2	20-07-2023 22-07-2023			
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: VOLTAG ECONTROL IN POWERSYSTEM

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Introduction, methods of voltage control	1	24-07-2023			
9.	Shunt and series capacitors/Inductors	2	25-07-2023 27-07-2023			
10.	Tap-changing Transformers, synchronous phase-modifiers.	1	31-07-2023			
11.	Introduction-Concepts of Load compensation,	1	01-08-2023			
12.	Lodability characteristics of over head lines	2	03-08-2023 05-08-2023			
13.	Uncompensated transmission line	2	07-08-2023 08-08-2023			
14.	Symmetrical line Radial line with asynchronous load, Compensation of lines.	2	10-08-2023 12-08-2023			
No. of classes required to complete UNIT-II:11				**No. of classes taken:**		

UNIT-III: SYMMETRICAL FAULT ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Per Unit Representation of Power Systems	2	14-08-2023 17-08-2023			
16.	Symmetrical Fault (LLL) Analysis: Short circuit of synchronous machine unloaded	2	19-08-2023 21-08-2023			
17.	Short circuit of loaded synchronous machine	1	22-08-2023			
18.	Calculation of symmetrical short circuit currents for simple systems	2	24-08-2023 26-08-2023			
19.	Short circuit current computation through Thevenin's theorem.	2	04-09-2023 05-09-2023			
20.	Reactors and their location, short circuit capacity of a bus	2	07-09-2023 09-09-2023			
21.	Computation of circuit breaker capacities	1	11-09-2023			
22.	Short circuit current and MVA Calculations, Numerical Problems.	2	12-09-2023 14-09-2023			
No. of classes required to complete UNIT-III: 14				**No. of classes taken:**		

UNIT-IV: UNSYMMETRICAL FAULT CALCULATIONS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Significance of positive, negative and zero sequence components	1	16-09-2023			
24.	Average 3-phase power in terms of symmetrical components	1	19-09-2023			
25.	Sequence impedances and sequence networks of power systems.	2	21-09-2023 23-09-2023			
26.	Unsymmetrical Fault Analysis: LG, LL, LLG faults without fault impedance, Numerical Problems	3	25-09-2023 26-09-2023 30-09-2023			
27.	Unsymmetrical Fault Analysis: LG, LL, LLG faults with fault impedance, Numerical Problems	3	03-10-2023 05-10-2023 07-10-2023			
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: FUNDAMENTALS OF POWER SYSTEM PROTECTION

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.	Need for protective systems	1	09-10-2023			
29.	Nature and causes of faults, zones of protection, primary and backup protection	2	10-10-2023 12-10-2023			
30.	Essential qualities of protection	1	14-10-2023			
31.	Classification of Protective Relays based on technology and function	1	16-10-2023			
32.	Over current relays	2	17-10-2023 19-10-2023			
33.	Distance relays**,** Impedance, reactance and MHO relays	2	21-10-2023 24-10-2023			

34.	Bucholz relay, differential relays	2	26-10-2023 28-10-2023			
35.	Classification of circuit breakers	1	06-11-2023			
36.	Principle of operation of air blast circuit breakers.	1	07-11-2023			
37.	Principle of operation of vacuum, SF6 circuit breakers.	2	09-11-2023 11-11-2023			
No. of classes required to complete UNIT-V: 13				**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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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	Dr.M.S.Giridhar	Dr.M.S.Giridhar	Dr.P.Sobharani	Dr.J.Sivavaraprasad
Signature				

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.T.Nagadurga
Course Name & Code **:** ELECTRICAL MACHINES-II – 20EE13
L-T-P Structure **: 2-1-0** **Credits:** 3
Program/Sem/Sec : B.Tech/V/A **A.Y.:** 2023-24

Pre-requisites: Electrical Circuit Analysis and Electrical Machines-I

Course Educational Objectives: This course enables the student to understand the analysis and performance of single phase and poly phase Induction motors which are the major part of domestic appliances, control systems, drives and agricultural pump sets . It also deals with detailed analysis of synchronous generators and motors which are the prime sources of electrical power generation.

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

CO1	Analyze the performance of poly phase Induction motors **Apply-L3)**
CO2	Illustrate the operation of single phase induction motor **(Understand-L2)**
CO3	Examine the performance of the synchronous generator. **(Apply-L3)**
CO4	Analyze the performance of the synchronous motor. **(Apply-L3)**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3	PSO4
CO1	3	2	2											3		2
CO2	2	2												3		
CO3	3	2	2											3		
CO4	2	2	2											3		2

TEXT BOOKS:

1. P.S. Bimbra, “Electrical Machinery”, Khanna Publishers, 7th Edition, 2014
2. I.J.Nagrath & D.P.Kothari, “Electric Machines”, Tata Mc Graw Hill, 5th Edition.2017

REFERENCE:

1. M.G. Say ,”Alternating Current Machines”, John Wiley & Sons, 1976.
2. A. E. Fitzgerald, C. Kingsley and S. Umans, “Electric Machinery”, Mc Graw-Hill Companies, 6th edition 2017.
3. Ashfaq Husain ,”Electric Machines”, Dhanapati Rai&Co, New Delhi, 3rd edition , 2017.
4. Soft Starter Handbook, ABB Group.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: THREE PHASE INDUCTION MOTORS

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 Subject & Course Outcomes	1	4/7/23		TLM1	
2.	Stator construction, Rotor construction details	1	6/7/23		TLM1	
3.	Types of three phase induction motor	1	7/7/23		TLM1	
4.	Working principle of three phase IM	1	8/7/23		TLM1	
5.	Production of rotating magnetic field, Synchronous speed, Slip equation	1	11/7/23		TLM1	
6.	Rotor emf and rotor frequency	1	13/7/23		TLM1	
7.	**Tutorial-I**	1	14/7/23		TLM3	
8.	Rotor reactance, rotor current and power factor	1	15/7/23		TLM1	
9.	Phasor diagram of three phase IM	1	18/7/23		TLM1	
10.	Equivalent circuit of three phase IM	1	20/7/23		TLM1	
11.	**Tutorial-II**	1	21/7/23		TLM3	
12.	Crawling and cogging	1	22/7/23		TLM1	
13.	Revision	1	25/7/23		TLM1	
14.	**Quiz-I /ASSIGNMENT-I**	1	27/7/23			
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: PERFORMANCE OF INDUCTION MOTORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Power stages -Rotor power input, rotor copper loss	1	28/7/23		TLM1	
16.	Mechanical power developed and their inter relation	1	1/8/23		TLM1	
17.	Torque equation- expressions for starting torque and running torque-condition for maximum torque	1	3/8/23		TLM1	
18.	Torque-slip characteristics	1	4/8/23		TLM1	
19.	Losses and efficiency	1	5/8/23		TLM1	
20.	Starting methods of Three Phase IM	1	8/8/23		TLM1	
21.	No load and blocked rotor tests –equivalent circuit	1	10/8/23		TLM1	
22.	**Tutorial-III**	1	11/8/23		TLM3	
23.	Circle Diagram	1	12/8/23		TLM1	
24.	Circle Diagram Numerical	1	17/8/23		TLM1	
25.	Operation of induction motor as induction generator	1	18/8/23		TLM1	

26.	**Tutorial-IV**	1	19/8/23		TLM3	
27.	Revision	1	22/8/23		TLM1	
28.	**Quiz-II/ ASSIGNMENT-II**	1	24/8/23			
No. of classes required to complete UNIT-II: 14				**No. of classes taken:**		

UNIT-III: SINGLE PHASE INDUCTION MOTORS

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.	Principle,operation - Double revolving field theory	1	25/8/23		TLM1	
30.	Split phase induction motor	1	26/8/23		TLM1	
31.	Capacitor start and run induction motors	1	5/9/23		TLM1	
32.	Shaded pole induction motor	1	7/9/23		TLM1	
33.	Equivalent circuit	1	8/9/23		TLM1	
34.	Revision	1	9/9/23		TLM1	
35.	**Quiz-III/ ASSIGNMENT-III**	1	12/9/23			
36.	**Tutorial-V**	1	14/9/23		TLM3	
No. of classes required to complete UNIT-III: 8				**No. of classes taken:**		

UNIT-IV: SYNCHRONOUS GENERATORS

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.	Construction of synchronous generators & Types of rotor	1	15/9/23		TLM1	
38.	Working principle & EMF equation	1	16/9/23		TLM1	
39.	Types of Rotors	1	19/9/23		TLM1	
40.	Armature reaction	2	21/9/23		TLM1	
41.	Phasor diagram of alternator	1	22/9/23		TLM1	
42.	Regulation Methods– EMF Method,MMF Method	1	23/9/23		TLM1	
43.	ZPF method	1	26/9/23		TLM1	
44.	**Tutorial-VI**	1	29/9/23		TLM3	
45.	Synchronizing to infinite bus bars	1	30/9/23		TLM1	
46.	Two reaction theory	1	3/10/23		TLM1	
47.	Parallel operation of synchronous generators	1	5/10/23		TLM1	
48.	**Tutorial-VII**		6/10/23		TLM3	
49.	Synchronous Machine constants		7/10/23		TLM1	
50.	Revision		10/10/23		TLM1	
51.	**Quiz-IV/ASSIGNMENT-III**		12/10/23			
No. of classes required to complete UNIT-IV: 16				**No. of classes taken:**		

UNIT-V: SYNCHRONOUS MOTORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
52.	Constructional features, principle of operation	1	13/10/23		TLM1	
53.	Methods of starting	1	14/10/23		TLM1	
54.	Power developed, Effect of increased load with constant excitation	1	17/10/23		TLM1	
55.	**Tutorial-VIII**	1	19/10/23		TLM3	
56.	Synchronous motor with different excitations	1	21/10/23		TLM1	
57.	Effect of changing excitation constant load & Torque equation	1	24/10/23		TLM1	
58.	V curve and inverted V curve – hunting	1	26/10/23		TLM1	
59.	**Tutorial-IX**	1	27/10/23		TLM3	
60.	**Quiz-V/ ASSIGNMENT-V**		28/10/23			
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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr.T.Nagadurga**	**Dr.T.Nagadurga**	**Mr.P.Deepak Reddy**	**Dr.J.SIVAVARA PRASAD**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.K.NAGALINGA CHARY
Course Name & Code **:** ELECTRICAL MACHINES-II – 20EE13
L-T-P Structure **: 2-1-0** **Credits:** 3
Program/Sem/Sec : B.Tech/V/B **A.Y.:** 2023-24

Pre-requisites: Electrical Circuit Analysis and Electrical Machines-I

Course Educational Objectives: This course enables the student to understand the analysis and performance of single phase and poly phase Induction motors which are the major part of domestic appliances, control systems, drives and agricultural pump sets . It also deals with detailed analysis of synchronous generators and motors which are the prime sources of electrical power generation.

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

CO1	Analyze the performance of poly phase Induction motors (**Apply-L3)**
CO2	Illustrate the operation of single phase induction motor **(Understand-L2)**
CO3	Examine the performance of the synchronous generator. **(Apply-L3)**
CO4	Analyze the performance of the synchronous motor. **(Apply-L3)**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3	PSO4
CO1	3	2	2											3		2
CO2	2	2												3		
CO3	3	2	2											3		
CO4	2	2	2											3		2

TEXT BOOKS:

1. P.S. Bimbra, “Electrical Machinery”, Khanna Publishers, 7th Edition, 2014
2. I.J.Nagrath & D.P.Kothari, “Electric Machines”, Tata Mc Graw Hill, 5th Edition.2017

REFERENCE:

1. M.G. Say ,”Alternating Current Machines”, John Wiley & Sons, 1976.
2. A. E. Fitzgerald, C. Kingsley and S. Umans, “Electric Machinery”, Mc Graw-Hill Companies, 6th edition 2017.
3. Ashfaq Husain ,”Electric Machines”, Dhanapati Rai&Co, New Delhi, 3rd edition , 2017.
4. Soft Starter Handbook, ABB Group.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: THREE PHASE INDUCTION MOTORS

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 Subject & Course Outcomes	1	11-07-2023		TLM1	
2.	Stator construction, Rotor construction details	1	13-07-2023		TLM1	
3.	Types of three phase induction motor	1	14-07-2023		TLM1	
4.	Working principle of three phase IM	1	18-07-2023		TLM1	
5.	Production of rotating magnetic field, Synchronous speed, Slip equation	1	20-07-2023		TLM1	
6.	Rotor emf and rotor frequency	1	21-07-2023		TLM1	
7.	Rotor reactance, rotor current and power factor	1	22-07-2023		TLM1	
8.	Phasor diagram of three phase IM	1	25-07-2023		TLM1	
9.	**Tutorial-I**	1	27-07-2023		TLM3	
10.	Equivalent circuit of three phase IM	1	28-07-2023		TLM1	
11.	Crawling and cogging	1	01-08-2023		TLM1	
12.	**Tutorial-II**	1	03-08-2023		TLM3	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: PERFORMANCE OF INDUCTION MOTORS

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.	Power stages -Rotor power input, rotor copper loss	1	04-08-2023		TLM1	
14.	Mechanical power developed and their inter relation	1	05-08-2023		TLM1	
15.	Torque equation- expressions for starting torque and running torque-condition for maximum torque	1	08-08-2023		TLM1	
16.	Torque-slip characteristics	1	10-08-2023		TLM1	
17.	Losses and efficiency	1	11-08-2023		TLM1	
18.	**Tutorial-III**	1	17-08-2023		TLM3	
19.	Starting methods of Three Phase IM	1	18-08-2023		TLM1	
20.	No load and blocked rotor tests –equivalent circuit	1	19-08-2023		TLM1	
21.	Circle Diagram	1	22-08-2023		TLM1	

22.	**Tutorial-IV**	1	24-08-2023		TLM3	
23.	Circle Diagram Numerical	1	25-08-2023		TLM1	
24.	Operation of induction motor as induction generator	1	26-08-2023		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: SINGLE PHASE INDUCTION MOTORS

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.	Principle,operation - Double revolving field theory	1	05-09-2023		TLM1	
26.	Split phase induction motor	1	07-09-2023		TLM1	
27.	**Assignment-I**	1	08-09-2023			
28.	Capacitor start and run induction motors	1	12-09-2023		TLM1	
29.	Shaded pole induction motor	1	14-09-2023		TLM1	
30.	Equivalent circuit	1	15-09-2023		TLM1	
31.	**Tutorial-V**	1	16-09-2023		TLM3	
No. of classes required to complete UNIT-III: 7				**No. of classes taken:**		

UNIT-IV: SYNCHRONOUS GENERATORS

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.	Construction of synchronous generators & Types of rotor	1	19-09-2023		TLM1	
33.	Working principle & EMF equation	1	21-09-2023		TLM1	
34.	Types of Rotors	1	22-09-2023		TLM1	
35.	Armature reaction, Phasor diagram of alternator	1	23-09-2023		TLM1	
36.	**Tutorial-VI**	1	26-09-2023		TLM3	
37.	Regulation Methods– EMF Method	1	29-09-2023		TLM1	
38.	MMF Method	1	30-09-2023			
39.	ZPF method	1	03-10-2023		TLM1	
40.	Synchronizing to infinite bus bars	1	05-10-2023		TLM1	
41.	Two reaction theory	1	06-10-2023		TLM1	
42.	Parallel operation of synchronous generators	1	07-10-2023		TLM1	
43.	Synchronous Machine constants	1	10-10-2023		TLM1	
44.	**Tutorial-VII**		12-10-2023		TLM3	
No. of classes required to complete UNIT-IV: 13				**No. of classes taken:**		

UNIT-V: SYNCHRONOUS MOTORS

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.	Constructional features, principle of operation	1	13-10-2023		TLM1	
46.	Methods of starting	1	17-10-2023		TLM1	
47.	Power developed, Effect of increased load with constant excitation	1	19-10-2023		TLM1	
48.	Synchronous motor with different excitations	1	20-10-2023		TLM1	
49.	Effect of changing excitation constant load & Torque equation	1	21-10-2023		TLM1	
50.	**Tutorial-VIII**	1	24-10-2023		TLM3	
51.	V curve and inverted V curve – hunting	1	26-10-2023		TLM1	
52.	**Tutorial-IX**	1	27-10-2023		TLM3	
53.	**ASSIGNMENT-II**	1	28-10-2023			
54.	Contend Beyond Syllabus		28-10-2023			
No. of classes required to complete UNIT-V: 9				**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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr.K.NAGALINGA CHARY**	**Dr.T.NAGA DURGA**	**Mr.P.DEEPAK REDDY**	**Dr.J.SIVAVARA PRASAD**
Signature				

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

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. J.Sivavara Prasad
Course Name & Code : Power Electronics-20EE14
L-T-P Structure : 2-1-0 Credits : 3
Program/Sem/Sec : B.Tech., EEE., V-Sem., Section- A&B A.Y : 2023-24

PRE-REQUISITE: Electronics circuits and Devices (20EE01),Electrical Circuit Analysis(20EE05)

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to study the characteristics of power semiconductor devices and to familiarize the principle of operation & performance of various power electronic converters.

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

CO1: Understand the characteristics of various power semiconductor devices. **(Understand- L2)**
CO2: Analyze the operating principles for single-phase and three phase thyristor based rectifiers **(Apply-L3)**
CO3: Analyze operation of dc-dc converters in steady state in continuous and discontinuous modes **(Apply-L3)**
CO4: Interpret the operation of ac voltage controllers and cyclo converters **(Understand-L2)**
CO5: Understand the operation and performance of inverters **(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	PSO4
CO1	2	2											2			2
CO2	2	2											1	2	2	2
CO3	2	2										1	2		2	2
CO4	2	2										2	2		2	
CO5	2	2										2			2	

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

TEXT BOOKS:
1. Md.H.Rashid "Power Electronics", Pearson Education fourth Edition, first Indian Reprint-2014.
2. Dr.P.S. Bhimbra, "Power Electronics", Khanna Publishers, 5th Edition, 2012.

REFERENCES:
1. Ned Mohan, T.M. Undeland and William P.Robbins, "Power Electronic Converters-Applications", John Wiley & Sons, 3rd Edition, , 2009
2. M D Singh, K B Khanchandani "Power Electronics", Tata MC Graw Hill Publishers,2nd edition 2006.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): A Section

UNIT-I:POWER SEMI-CONDUCTOR DEVICES

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 Course and COs	1	04.07.2023		TLM1	
2.	Introduction to Power semiconductor switches, Thyristor family	1	05.07.2023		TLM1	
3.	SCR operation& Characteristics of SCR	1	06.07.2023		TLM2	
4.	Two transistor model	1	11.07.2023		TLM1	
5.	Static and dynamic characteristics	1	12.07.2023		TLM1	
6.	Turn on and Turn off methods	1	13.07.2023		TLM2	
7.	**TUTORIAL-1**	1	15.07.2023		TLM3	
8.	Series and Parallel operation of thyristors	1	18.07.2023		TLM1	
9.	Gate triggering circuits	1	19.07.2023		TLM1	
10.	Protection	1	20.07.2023		TLM1	
11.	Snubber circuits, Characteristics of GTO & IGBT	1	22.07.2023		TLM1	
12.	**TUTORIAL-2**	1	25.07.2023		TLM3	
No. of classes required to complete UNIT-I:12				No. of classes taken:		

UNIT-II: COMMUTATIONS & PHASE-CONTROLLED RECTIFIERS

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.	Natural commutation, Forced commutation circuits	1	26.07.2023		TLM1	
2.	Self, Impulse and complimentary commutations	1	27.07.2023		TLM1	
3.	Single phase Half wave bridge controlled rectifiers with R and RL loads–continuous and discontinuous modes	1	01.07.2023		TLM2	
4.	Numericals on single phase half wave bridge controlled rectifiers	1	02.08.2023		TLM1	
5.	**TUTORIAL-3**	1	03.08.2023		TLM3	
6.	Full wave bridge controlled rectifiers with R and RL loads–continuous and discontinuous modes	1	05.08.2023		TLM2	
7.	Numericals on full wave bridge controlled rectifiers	1	08.08.2023		TLM1	
8.	effect of freewheeling diode	1	09.08.2023		TLM1	
9.	Dual converters-single phase	1	10.08.2023		TLM1	
10.	Dual converters- three phase	1	16.08.2023		TLM1	
11.	Effect of Source impedance	1	17.08.2023		TLM1	

12.	**TUTORIAL-4**	1	19.08.2023		TLM3	
13.	Problems	1	22.08.2023		TLM1	
No. of classes required to complete UNIT-II:13				No. of classes taken:		

UNIT-III: AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS

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.	Single phase ac voltage controller with R and RL loads continuous and discontinuous modes	1	23.08.2023		TLM1	
2.	Problems on single phase ac voltage controller with R and RL loads	1	24.08.2023		TLM2	
3.	Three phase ac voltage controller with R and RL loads continuous and discontinuous modes	1	26.08.2023		TLM1	
4.	Problems on Three phase ac voltage controller with R and RL loads	1	05.09.2023		TLM2	
5.	**TUTORIAL-5**	1	07.09.2023		TLM3	
6.	Principle of operation of Cyclo-converter	1	12.09.2023		TLM1	
7.	Single phase to single phase cyclo converters-Midpoint type	1	13.09.2023		TLM1	
8.	Single phase to single phase cyclo converters-Bridge type	1	14.09.2023		TLM1	
9.	Problems on Single phase to single phase cyclo converters	1	16.09.2023			
10.	Problems	1	19.09.2023			
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

UNIT-IV : DC TO DC CONVERTERS

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.	Principle of operation dc to dc converters	1	20.09.2023		TLM1	
2.	Step-up and step-down chopper	1	21.09.2023		TLM2	
3.	Control Strategies of dc to dc converters	1	23.09.2023		TLM1	
4.	Derivation of average load voltage, load current for continuous current operation	1	26.09.2023		TLM1	
5.	Numericals on step up chopper	1	27.09.2023		TLM1	
6.	**TUTORIAL-6**	1	30.09.2023		TLM3	
7.	Derivation of average load voltage, load current for discontinuous current operation	1	03.10.2023		TLM1	
8.	Analysis of Class A chopper	1	04.10.2023		TLM2	
9.	**TUTORIAL-7**	1	05.10.2023		TLM3	
10.	**Problems**		07.10.2023			
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V : INVERTERS

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.	Single phase Voltage Source Inverter	1	10.10.2023		TLM1	
2.	Single phase Current source inverters	1	11.10.2023		TLM1	
3.	Comparison between VSI and CSI	1	12.10.2023		TLM1	
4.	Analysis with R & RL loads	1	17.10.2023		TLM2	
5.	3-phase inverters–180 and 120 degree mode of operation	1	18.10.2023		TLM1	
6.	**TUTORIAL-8**	1	19.10.2023		TLM3	
7.	Single Pulse Width Modulation	1	21.10.2023		TLM1	
8.	Multiple Pulse Width Modulation	1	24.10.2023		TLM1	
9.	Sinusoidal PWM	1	25.10.2023		TLM2	
10.	Single phase Current source inverters with ideal switches	1	26.10.2023		TLM1	
11.	**Content beyond syllabus**	1	28.10.2023		TLM2	
No. of classes required to complete UNIT-V:11				No. of classes taken:		

COURSE DELIVERY PLAN (LESSON PLAN): B- Section

UNIT-I:POWER SEMI-CONDUCTOR DEVICES

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 Course and COs	1	05.07.2023		TLM1	
2.	Introduction to Power semiconductor switches, Thyristor family	1	06.07.2023		TLM1	
3.	SCR operation& Characteristics of SCR	1	07.07.2023		TLM2	
4.	Two transistor model	1	10.07.2023		TLM1	
5.	Static and dynamic characteristics	1	12.07.2023		TLM1	
6.	Turn on and Turn off methods	1	13.07.2023		TLM2	
7.	**TUTORIAL-1**	1	14.07.2023		TLM3	
8.	Series and Parallel operation of thyristors	1	17.07.2023		TLM1	
9.	Gate triggering circuits	1	19.07.2023		TLM1	
10.	Protection	1	20.07.2023		TLM1	
11.	Snubber circuits, Characteristics of GTO & IGBT	1	21.07.2023		TLM1	
12.	**TUTORIAL-2**	1	24.07.2023		TLM3	
No. of classes required to complete UNIT-I:12				No. of classes taken:		

UNIT-II: COMMUTATIONS & PHASE-CONTROLLED RECTIFIERS

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.	Natural commutation, Forced commutation circuits	1	26.07.2023		TLM1	
2.	Self, Impulse and complimentary commutations	1	27.07.2023		TLM1	
3.	Single phase Half wave bridge controlled rectifiers with R and RL loads–continuous and discontinuous modes	1	28.07.2023		TLM2	
4.	Numericals on single phase half wave bridge controlled rectifiers	1	31.07.2023		TLM1	
5.	**TUTORIAL-3**	1	02.08.2023		TLM3	
6.	Full wave bridge controlled rectifiers with R and RL loads–continuous and discontinuous modes	1	03.08.2023		TLM2	
7.	Numericals on full wave bridge controlled rectifiers	1	04.08.2023		TLM1	
8.	effect of freewheeling diode	1	07.08.2023		TLM1	
9.	Dual converters-single phase	1	09.08.2023		TLM1	
10.	Dual converters- three phase	1	10.08.2023		TLM1	
11.	Effect of Source impedance	1	11.08.2023		TLM1	
12.	**TUTORIAL-4**	1	14.08.2023		TLM3	
13.	Problems	1	16.08.2023		TLM1	
No. of classes required to complete UNIT-II:13				No. of classes taken:		

UNIT-III: AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS

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.	Single phase ac voltage controller with R and RL loads continuous and discontinuous modes	1	17.08.2023		TLM1	
2.	Problems on single phase ac voltage controller with R and RL loads	1	18.08.2023		TLM2	
3.	Three phase ac voltage controller with R and RL loads continuous and discontinuous modes	1	21.08.2023		TLM1	
4.	Problems on Three phase ac voltage controller with R and RL loads	2	23.08.2023 24.08.2023		TLM2	
5.	**TUTORIAL-5**	1	25.08.2023		TLM3	
6.	Principle of operation of Cyclo-converter	1	04.09.2023		TLM1	
7.	Single phase to single phase cyclo converters-Midpoint type	1	07.09.2023		TLM1	
8.	Single phase to single phase cyclo converters-Bridge type	1	08.09.2023		TLM1	
9.	Problems on Single phase to single phase cyclo converters	1	11.09.2023			
10.	Problems	1	13.09.2023			
No. of classes required to complete UNIT-III: 11				No. of classes taken:		

UNIT-IV : DC TO DC CONVERTERS

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.	Principle of operation dc to dc converters	1	14.09.2023		TLM1	
2.	Step-up and step-down chopper	1	15.09.2023		TLM2	
3.	Control Strategies of dc to dc converters	1	20.09.2023		TLM1	
4.	Derivation of average load voltage, load current for continuous current operation	1	21.09.2023		TLM1	
5.	Numericals on step up chopper	1	22.09.2023		TLM1	
6.	**TUTORIAL-6**	1	25.09.2023		TLM3	
7.	Derivation of average load voltage, load current for discontinuous current operation	1	27.09.2023		TLM1	
8.	Analysis of Class A chopper	2	29.09.2023 04.10.2023		TLM2	
9.	**TUTORIAL-7**	1	05.10.2023		TLM3	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V : INVERTERS

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.	Single phase Voltage Source Inverter	1	06.10.2023		TLM1	
2.	Single phase Current source inverters	1	09.10.2023		TLM1	
3.	Comparison between VSI and CSI	1	11.10.2023		TLM1	
4.	Analysis with R & RL loads	1	12.10.2023		TLM2	
5.	3-phase inverters–180 and 120 degree mode of operation	1	13.10.2023		TLM1	
6.	**TUTORIAL-8**	1	16.10.2023		TLM3	
7.	Single Pulse Width Modulation	1	18.10.2023		TLM1	
8.	Multiple Pulse Width Modulation	1	19.10.2023		TLM1	
9.	Sinusoidal PWM	1	20.10.2023		TLM2	
10.	Single phase Current source inverters with ideal switches	1	25.10.2023 26.10.2023		TLM1	
11.	**Content beyond syllabus**	1	27.10.2023		TLM2	
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 (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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Mr. R.ANJANEYULU NAIK
Course Name & Code : Linear and Digital IC Applications – 20EE16
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/V SEM, A SEC **A.Y.:** 2023-24

Pre-requisites: Digital Electronics.

Course Educational Objectives: This course enables the student to understand the linear and digital integrated circuits and their applications.

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

CO1	Analyze linear ICs for engineering applications **(Apply-L3)**
CO2	Design various Filters using their frequency bands**(Apply-L3)**
CO3	Design all combinational and Sequential circuits using Digital ICs **(Apply-L3)**
CO4	Compare various memory devices **(Understand-L2)**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3	PSO4
CO1	3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2
CO4	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2

TEXT BOOKS:

T1 D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd.

T2 John F. Wakerly, "Digital Design: Principles and Practices", Pearson education, 5th edition, 2017.

REFERENCE:

R1 R.F. Coughlin and Fredrick F Driscoll, "Operational Amplifiers and Linear Integrated Circuits", PHI.

R2 Denton J. Daibey, "Operational Amplifiers and Linear Integrated Circuits: Theory and Applications", TMH.

R3 Serigo Franco, "Design with Operational amplifiers and Analog Integrated circuits", McGraw Hill.

R4 Thomas L. Floyd, "Digital Fundamentals", Pearson Education, 10th edition, 2011.

R5 Ramakanth A. Gayakwad, "Op-Amp & Linear ICs", PHI.

Part - B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Operational Amplifier

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 subject and awareness on COs	1	10-07-2023		**TLM2**	
2.	Introduction to Unit-I: Basic Information of Op-Amp, Ideal and practical Op-Amp	1	11-07-2023		**TLM2**	
3.	Op-Amp AC&DC characteristics	1	12-07-2023		**TLM2**	
4.	741 Op-Amp and its features, Modes of operation-inverting, non inverting, differential	1	13-07-2023		**TLM2**	
5.	APPLICATIONS:Summer, subtractor, IA	1	17-07-2023		**TLM2**	
6.	Log and anti log amplifiers, Sample and hold circuits, multipliers	1	18-07-2023		**TLM2**	
7.	Dividers, differentiators Integrators	1	19-07-2023		**TLM3**	
8.	Comparators	1	20-07-2023		**TLM2**	
9.	Comparators	1	24-07-2023		**TLM2**	
10.	Schmitt trigger, multivibrators	1	25-07-2023		**TLM2**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-II: Active Filers and Oscillators

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.	Introduction to Unit-II: 1st order low pass filter, high pass filter	1	26-07-2023		**TLM2**	
12.	Band pass filter Band reject filter, All pass filter	1	27-07-2023		**TLM2**	
13.	Oscillators types and principle of operation	1	1-08-2023		**TLM2**	
14.	Oscillators types and principle of operation	1	2-08-2023		**TLM3**	
15.	RC phase shift oscillator	1	3-08-2023		**TLM2**	

16.	Wein and Quadrature Oscillators	1	7-08-2023		**TLM2**	
17.	Wave form generators-triangular, sawtooth	1	8-08-2023		**TLM2**	
18.	Wave form generators-Square	1	9-08-2023		**TLM2**	
No. of classes required to complete : 8				**No. of classes taken:**		

UNIT-III: Timers & A/D-D/A Converters

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Introduction to Unit-III: 555 Timer, functional diagram	1	14-08-2023		**TLM2**	
20.	Monostable and Astable operations and Applications	1	16-08-2023		**TLM2**	
21.	VCO	1	17-08-2023		**TLM3**	
22.	PLL-introduction, block schematic	1	21-08-2023		**TLM2**	
23.	Introduction to converters, Basic DAC techniques	1	22-08-2023		**TLM2**	
24.	Weighted resistor and R-2R ladder DAC	1	23-08-2023		**TLM2**	
25.	Inverted R-2R DAC , IC 1408 DAC, Types of ADCs: Parallel comparator type ADC	1	24-08-2023		**TLM2**	
	I MID EXAMS 28-08-2023 TO 02-09-2023					
26.	Counter type, successive approximation ADC	1	04-09-2023		**TLM2**	
27.	Dual slop ADC,	1	05-09-2023		**TLM3**	
28.	specifications of DAC and ADC	1	07-09-2023		**TLM2**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-IV: Logic Families and Combinational Circuits

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Classification of integrated circuits,	1	12-09-2023		**TLM2**	
30.	Comparision of various logic families	1	13-09-2023		**TLM2**	

31.	Standard TTL NAND gate, analysis & Charecteristics	1	14-09-2023		**TLM2**	
32.	TTL open collector O/Ps, tristate TTL,	1	19-09-2023		**TLM2**	
33.	IC interfacing-TTL driving CMOS	1	20-09-2023		**TLM2**	
34.	CMOS driving TTL	1	21-09-2023		**TLM3**	
35.	MOS and CMOS open drain and tristate outputs, CMOS transmission gate	1	25-09-2023		**TLM2**	
36.	Design using TTL-74XX decoders, demux, Decoders & drivers for LED & LCD display, encoder	1	26-09-2023		**TLM2**	
37.	Priority encoder, multiplexers & their applications Parity generator /checker circuits	1	27-09-2023		**TLM2**	
38.	Parallel binary adder/subtractor circuit using 2's complement system and Digital comparator circuit	1	03-10-2023		**TLM2**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-V: Sequential Circuits and Memories

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.	74XX series of counters	1	04-10-2023		**TLM2**	
40.	ROM architecture	1	05-10-2023		**TLM2**	
41.	ROM TYPES	1	06-10-2023		**TLM2**	
42.	ROM Applications	1	09-10-2023		**TLM2**	
43.	RAM architecture	1	10-10-2023		**TLM2**	
44.	Static & Dynamic RAM	1	11-10-2023		**TLM2**	
45.	Synchronous DRAMs	1	12-10-2023		**TLM2**	
BEYOND THE SYLLABUS						

46.	Stability of op-amp	1	16-10-2023		**TLM2**	
47.	Projects with ICs	1	17-10-2023		**TLM2**	
48.	REVISION		18-10-2023 19-10-2023			
No. of classes required to complete : 09				**No. of classes taken:**		

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 OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. B.Pangedaiah**	**Mr. B.Pangedaiah**	**Dr. G.Nageswararao**	**Dr.J.S.V.PRASAD**
Signature				

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Mr. R.ANJANEYULU NAIK
Course Name & Code : Linear and Digital IC Applications – 20EE16
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/V SEM, B SEC **A.Y.:** 2023-24

Pre-requisites: Digital Electronics.

Course Educational Objectives: This course enables the student to understand the linear and digital integrated circuits and their applications.

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

CO1	Analyze linear ICs for engineering applications **(Apply-L3)**
CO2	Design various Filters using their frequency bands**(Apply-L3)**
CO3	Design all combinational and Sequential circuits using Digital ICs **(Apply-L3)**
CO4	Compare various memory devices **(Understand-L2)**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3	PSO4
CO1	3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2
CO4	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2

TEXT BOOKS:

T1 D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd.

T2 John F. Wakerly, "Digital Design: Principles and Practices", Pearson education, 5th edition, 2017.

REFERENCE:

R1 R.F. Coughlin and Fredrick F Driscoll, "Operational Amplifiers and Linear Integrated Circuits", PHI.

R2 Denton J. Daibey, "Operational Amplifiers and Linear Integrated Circuits: Theory and Applications", TMH.

R3 Serigo Franco, "Design with Operational amplifiers and Analog Integrated circuits", McGraw Hill.

R4 Thomas L. Floyd, "Digital Fundamentals", Pearson Education, 10th edition, 2011.

R5 Ramakanth A. Gayakwad, "Op-Amp & Linear ICs", PHI.

Part - B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Operational Amplifier

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	03-07-2023 TO 08-07-203 CSP PROJECT					
1.	Introduction to subject and awareness on COs	1	10-07-2023		**TLM2**	
2.	Introduction to Unit-I: Basic Information of Op-Amp, Ideal and practical Op-Amp	1	11-07-2023		**TLM2**	
3.	Op-Amp AC&DC characteristics	1	12-07-2023		**TLM2**	
4.	741 Op-Amp and its features, Modes of operation-inverting, non inverting, differential	1	15-07-2023		**TLM2**	
5.	APPLICATIONS:Summer, subtractor, IA	1	17-07-2023		**TLM2**	
6.	Log and anti log amplifiers, Sample and hold circuits, multipliers	1	18-07-2023		**TLM2**	
7.	Dividers, differentiators Integrators	1	19-07-2023		**TLM3**	
8.	Comparators	1	22-07-2023		**TLM2**	
9.	Comparators	1	24-07-2023		**TLM2**	
10.	Schmitt trigger, multivibrators	1	25-07-2023		**TLM2**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-II: Active Filers and Oscillators

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.	Introduction to Unit-II: 1st order low pass filter, high pass filter	1	26-07-2023		**TLM2**	
12.	Band pass filter Band reject filter, All pass filter	1	1-08-2023		**TLM2**	
13.	Oscillators types and principle of operation	1	2-08-2023		**TLM2**	
14.	Oscillators types and principle of operation	1	5-08-2023		**TLM3**	

15.	RC phase shift oscillator	1	7-08-2023		**TLM2**	
16.	Wein and Quadrature Oscillators	1	8-08-2023		**TLM2**	
17.	Wave form generators-triangular, sawtooth	1	9-08-2023		**TLM2**	
18.	Wave form generators-Square	1	14-08-2023		**TLM2**	
No. of classes required to complete : 9				**No. of classes taken:**		

UNIT-III: Timers & A/D-D/A Converters

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Introduction to Unit-III: 555 Timer, functional diagram	1	16-08-2023		**TLM2**	
20.	Monostable and Astable operations and Applications	1	17-08-2023		**TLM2**	
21.	VCO	1	21-08-2023		**TLM3**	
22.	PLL-introduction, block schematic	1	22-08-2023		**TLM2**	
23.	Introduction to converters, Basic DAC techniques	1	23-08-2023		**TLM2**	
24.	Weighted resistor and R-2R ladder DAC	1	26-08-2023		**TLM2**	
25.	Inverted R-2R DAC , IC 1408 DAC, Types of ADCs: Parallel comparator type ADC	1	04-09-2023		**TLM2**	
	I MID EXAMS 28-08-2023 TO 02-09-2023					
26.	Counter type, successive approximation ADC	1	05-09-2023		**TLM2**	
27.	Dual slop ADC,	1	11-09-2023		**TLM3**	
28.	specifications of DAC and ADC	1	12-09-2023		**TLM2**	
29.	Assignment/Quiz-III	1	13-09-2023		**TLM6**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-IV: Logic Families and Combinational Circuits

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly

30.	Classification of integrated circuits,	1	16-09-2023		**TLM2**	
31.	Comparision of various logic families	1	13-09-2023		**TLM2**	
32.	Standard TTL NAND gate, analysis & Charecteristics	1	19-09-2023		**TLM2**	
33.	TTL open collector O/Ps, tristate TTL,	1	20-09-2023		**TLM2**	
34.	IC interfacing-TTL driving CMOS	1	23-09-2023		**TLM2**	
35.	CMOS driving TTL	1	25-09-2023		**TLM3**	
36.	MOS and CMOS open drain and tristate outputs, CMOS transmission gate	1	26-09-2023		**TLM2**	
37.	Design using TTL-74XX decoders, demux, Decoders & drivers for LED & LCD display, encoder	1	27-09-2023		**TLM2**	
38.	Priority encoder, multiplexers & their applications Parity generator /checker circuits	1	30-09-2023		**TLM2**	
39.	Parallel binary adder/subtractor circuit using 2's complement system and Digital comparator circuit	1	03-10-2023		**TLM2**	
No. of classes required to complete : 10				**No. of classes taken:**		

UNIT-V: Sequential Circuits and Memories

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.	74XX series of counters	1	04-10-2023		**TLM2**	
41.	ROM architecture	1	05-10-2023		**TLM2**	
42.	ROM TYPES	1	07-10-2023		**TLM2**	
43.	ROM Applications	1	09-10-2023		**TLM2**	
44.	RAM architecture	1	10-10-2023		**TLM2**	
45.	Static & Dynamic RAM	1	11-10-2023		**TLM2**	

46.	Synchronous DRAMs	1	16-10-2023		**TLM2**	
BEYOND THE SYLLABUS						
47.	Stability of op-amp	1	17-10-2023		**TLM2**	
48.	Projects with ICs	1	18-10-2023		**TLM2**	
49.	REVISION	1	21-10-2023			
31-10-2023 TO 04-11-2023 II MID EXAMS						
No. of classes required to complete : 09				**No. of classes taken:**		

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 OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. B.Pangedaiah**	**Mr. B.Pangedaiah**	**Dr. G.Nageswararao**	**Dr.J.S.V.PRASAD**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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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: Mrs M. Hema latha
Course Name & Code : OOP Through JAVA, 20IT81
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-EEE / V SEM / A
A.Y. : 2023-24

PREREQUISITE : **Programming for Problem solving using C**

COURSE OBJECTIVE: Concentrates on the methodological and technical aspects of software design and programming based on Object Oriented Programming (OOP). Acquire the basic knowledge and skills necessary to implement Object-Oriented Programming Techniques in software development through JAVA.

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

CO 1	Understand Object Oriented Programming Concepts through constructs of JAVA. **(Understand- L2)**
CO 2	Apply the concept of inheritance and polymorphism on real-world applications. **(Apply-L3)**
CO 3	Implement reusability using interface and packages. **(Understand- L2)**
CO 4	Construct robust applications using exception handling. **(Apply – L3)**
CO 5	Understand multi-threading concepts. **(Understand- L2)**

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

CO	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	1										
CO2	3	2										3
CO3	3	1										3
CO4	3	1										3
CO5	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).

TEXTBOOKS:

1. Java Fundamentals–A comprehensive Introduction, Herbert Schildt and Dale Skrien,TMH.

REFERENCE BOOKS:

1. The Java™ Programming Language: Ken Arnold, James Gosling, Pearson.
2. Introduction to Java Programming 7/e, Brief version, Y.Daniel Liang, Pearson
3. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Introduction to OOP and JAVA

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction : History Of JAVA, Advantages	1	11-07-23		TLM1		
2.	JAVA buzz words/features	1	12-07-23		TLM1		
3.	OOP Concepts	1	13-07-23		TLM1		
4.	Data types, variables and Keywords	1	15-07-23		TLM1		
5.	Operators	2	18-07-23		TLM1		
6.	Expressions	1	19-07-23		TLM1		
7.	Control Statements	2	20-07-23		TLM1		
8.	Methods & Recursion	1	22-07-23		TLM1		
9.	sample programs	1	25-07-23		TLM4		
10.	Java Objects and references	1	26-07-23		TLM1		
11.	Constructors , this keyword	1	27-07-23		TLM1		
12.	Arrays	2	01-08-23		TLM1		
13.	String	1	02-08-23		TLM1		
14.	StringBuffer, String Tokenizer	1	03-08-23		TLM1		
15.	Rivision & Assignment Unit-I	1	05-08-23		TLM3		
No. of classes required to complete UNIT-I			18	No. of classes taken:			

UNIT-II: Extending Classes and Reusability

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
16.	Inheritance introduction, derived Classes	1	08-08-23		TLM1	CO2	
17.	Types Of Inheritance	1	09-08-23		TLM1	CO2	
18.	Member Accessibility	1	10-08-23		TLM1	CO2	
19.	Overriding, super keyword	1	12-08-23		TLM4	CO2	
20.	Abstract Classes and Methods	1	16-08-23		TLM1	CO2	
21.	Final Keyword, Final Method, Final Classes	1	17-08-23		TLM1	CO2	
22.	Dynamic Binding	1	19-08-23		TLM2	CO2	
23.	Polymorphism	1	22-08-23		TLM1	CO2	
24.	Rivision & Assignment Unit-II	1	23-08-23		TLM3		
No. of classes required to complete UNIT-II		9	No. of classes taken:				

UNIT-III: Interfaces & Packages

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
25.	Difference between classes and interfaces	1	24-08-23		TLM1	CO3	
26.	Defining an Interface	1	26-08-23		TLM1	CO3	
27.	implementing an Interface	1	05-09-23		TLM4		
28.	Variables in interfaces	1	07-09-23		TLM1		
29.	Extending Interfaces	1	09-09-23		TLM1		
30.	Packages : Built-in and user-defined	1	12-09-23		TLM1	CO3	
31.	Creating and Accessing Packages	1	13-09-23		TLM4	CO3	
32.	Importing Packages	1	14-09-23		TLM1	CO3	
33.	Access Controls in packages	1	16-09-23		TLM1	CO3	
34.	Wrapper Classes	1	20-09-23		TLM1	CO3	
35.	Rivision & Assignment Unit-III	1	21-09-23		TLM3	CO3	
No. of classes required to complete UNIT-III		11	No. of classes taken:				

UNIT-IV: Exception Handling

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
36.	Concepts of Exception Handling	1	23-09-23		TLM1	CO4	
37.	Benefits of Exception Handling	1	26-09-23		TLM1	CO4	
38.	Usage of try, catch, throw, throws, finally	2	27,28-09-23		TLM1	CO4	
39.	Built in exceptions	1	30-09-23		TLM2	CO4	
40.	Creating own exception	1	03-10-23		TLM4	CO4	
41.	Rivision & Assignment Unit-IV	1	04-10-23		TLM3	CO4	
No. of classes required to complete UNIT-IV		7	No. of classes taken:				

UNIT-V: Multithreading

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
42.	Thread Life Cycle	2	05,07-10-23		TLM2	CO5	
43.	Creating Threads	2	10,11-10-23		TLM1	CO5	
44.	Synchronizing	1	12-10-23		TLM1	CO5	
45.	Intercommunication of threads	2	14,17-10-23		TLM4	CO5	
46.	Rivision & Assignment Unit-V	1	18-10-23		TLM3	CO5	
No. of classes required to complete UNIT-V		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	Learning Outcome COs	HOD Sign Weekly
47.	Introduction to AWT	2	25,26-10-23		TLM2	CO5	

Teaching Learning Methods

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	03-07-2023	26-08-2023	8 W
I Mid Examinations	08-08-2023	02-09-2023	1 W
II Phase of Instructions	04-09-2023	28-10-2023	8 W
II Mid Examinations	30-10-2023	04-11-2023	1W
Preparation and Practicals	06-11-2023	11-11-2023	1 W
Semester End Examinations	13-11-2023	25-11-2023	2 W

PART-C

EVALUATION PROCESS:

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs M. Hema latha
Course Name & Code : OOP Through JAVA, 20IT81
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-EEE / V SEM / B
A.Y. : 2023-24

PREREQUISITE : **Programming for Problem solving using C**

COURSE OBJECTIVE: Concentrates on the methodological and technical aspects of software design and programming based on Object Oriented Programming (OOP). Acquire the basic knowledge and skills necessary to implement Object-Oriented Programming Techniques in software development through JAVA.

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

CO 1	Understand Object Oriented Programming Concepts through constructs of JAVA. **(Understand- L2)**
CO 2	Apply the concept of inheritance and polymorphism on real-world applications. **(Apply-L3)**
CO 3	Implement reusability using interface and packages. **(Understand- L2)**
CO 4	Construct robust applications using exception handling. **(Apply – L3)**
CO 5	Understand multi-threading concepts. **(Understand- L2)**

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

CO	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	1										
CO2	3	2										3
CO3	3	1										3
CO4	3	1										3
CO5	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).

TEXTBOOKS:

1. Java Fundamentals–A comprehensive Introduction, Herbert Schildt and Dale Skrien,TMH.

REFERENCE BOOKS:

1. The Java™ Programming Language: Ken Arnold, James Gosling, Pearson.
2. Introduction to Java Programming 7/e, Brief version, Y.Daniel Liang, Pearson
3. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Introduction to OOP and JAVA

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction : History Of JAVA, Advantages	1	11-07-23		TLM1		
2.	JAVA buzz words/features	1	12-07-23		TLM1		
3.	OOP Concepts	1	14-07-23		TLM1		
4.	Data types, variables and Keywords	1	15-07-23		TLM1		
5.	Operators	2	18-07-23		TLM1		
6.	Expressions	1	19-07-23		TLM1		
7.	Control Statements	2	21-07-23		TLM1		
8.	Methods & Recursion	1	22-07-23		TLM1		
9.	sample programs	1	25-07-23		TLM4		
10.	Java Objects and references	1	26-07-23		TLM1		
11.	Constructors , this keyword	1	28-07-23		TLM1		
12.	Arrays	2	01-08-23		TLM1		
13.	String	1	02-08-23		TLM1		
14.	StringBuffer, String Tokenizer	1	04-08-23		TLM1		
15.	Rivision & Assignment Unit-I	1	05-08-23		TLM3		
No. of classes required to complete UNIT-I			18	No. of classes taken:			

UNIT-II: Extending Classes and Reusability

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
16.	Inheritance introduction, derived Classes	1	08-08-23		TLM1	CO2	
17.	Types Of Inheritance	1	09-08-23		TLM1	CO2	
18.	Member Accessibility	1	11-08-23		TLM1	CO2	
19.	Overriding, super keyword	1	12-08-23		TLM4	CO2	
20.	Abstract Classes and Methods	1	16-08-23		TLM1	CO2	
21.	Final Keyword, Final Method, Final Classes	1	18-08-23		TLM1	CO2	
22.	Dynamic Binding	1	19-08-23		TLM2	CO2	
23.	Polymorphism	1	22-08-23		TLM1	CO2	
24.	Rivision & Assignment Unit-II	1	23-08-23		TLM3		
No. of classes required to complete UNIT-II		9	No. of classes taken:				

UNIT-III: Interfaces & Packages

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
25.	Difference between classes and interfaces	1	25-08-23		TLM1	CO3	
26.	Defining an Interface	1	26-08-23		TLM1	CO3	
27.	implementing an Interface	1	05-09-23		TLM4		
28.	Variables in interfaces	1	08-09-23		TLM1		
29.	Extending Interfaces	1	09-09-23		TLM1		
30.	Packages : Built-in and user-defined	1	12-09-23		TLM1	CO3	
31.	Creating and Accessing Packages	1	13-09-23		TLM4	CO3	
32.	Importing Packages	1	15-09-23		TLM1	CO3	
33.	Access Controls in packages	1	16-09-23		TLM1	CO3	
34.	Wrapper Classes	1	20-09-23		TLM1	CO3	
35.	Rivision & Assignment Unit-III	1	22-09-23		TLM3	CO3	
No. of classes required to complete UNIT-III		11	No. of classes taken:				

UNIT-IV: Exception Handling

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
36.	Concepts of Exception Handling	1	23-09-23		TLM1	CO4	
37.	Benefits of Exception Handling	1	26-09-23		TLM1	CO4	
38.	Usage of try, catch, throw, throws, finally	2	27,29-09-23		TLM1	CO4	
39.	Built in exceptions	1	30-09-23		TLM2	CO4	
40.	Creating own exception	1	03-10-23		TLM4	CO4	
41.	Rivision & Assignment Unit-IV	1	04-10-23		TLM3	CO4	
No. of classes required to complete UNIT-IV		7	No. of classes taken:				

UNIT-V: Multithreading

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
42.	Thread Life Cycle	2	06,07-10-23		TLM2	CO5	
43.	Creating Threads	2	10,11-10-23		TLM1	CO5	
44.	Synchronizing	1	13-10-23		TLM1	CO5	
45.	Intercommunication of threads	2	14,17-10-23		TLM4	CO5	
46.	Rivision & Assignment Unit-V	1	18-10-23		TLM3	CO5	
No. of classes required to complete UNIT-V		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	Learning Outcome COs	HOD Sign Weekly
47.	Introduction to AWT	2	20,21-10-23		TLM2	CO5	

Teaching Learning Methods

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	03-07-2023	26-08-2023	8 W
I Mid Examinations	08-08-2023	02-09-2023	1 W
II Phase of Instructions	04-09-2023	28-10-2023	8 W
II Mid Examinations	30-10-2023	04-11-2023	1W
Preparation and Practicals	06-11-2023	11-11-2023	1 W
Semester End Examinations	13-11-2023	25-11-2023	2 W

PART-C

EVALUATION PROCESS:

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

Part - A

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

ACADEMIC YEAR : 2022-23

COURSE NAME & CODE : Control Systems Lab – 20EE58

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

COURSE CREDITS : 1

COURSE INSTRUCTOR :**Mr.A.Imran/Mr.R.A.Naik/Mr.P. Deepak Reddy**

COURSE COORDINATOR : Dr.P.Sobha Rani

Prerequisite: Control Systems

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Course Educational Objective: This laboratory course enables the student to implement the mathematical techniques used in linear control systems to solve real world problems through experimentation and simulation tools.

Course Outcomes: At the end of the course, the student will be able to:
CO1. Simulate the physical control system for stability studies **(Apply-L3)**
CO2. Demonstrate feedback controllers **(Understand-L2)**
CO3. Develop logic gates using PLC **(Apply-L3)**

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	2		2	2			2	2	2						
CO2	2	2		2				2	2	2						2
CO3	2	2	2	2	2			2	2	2					2	2

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

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

Day: Monday Batches : 20761A0231,21761A0201-230

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
	Tentative date	03/7/23	10/7/23	17/7/23	24/7/23	07/8/23	14/8/23	21/8/23	04/9/23	11/9/23	25/9/23	9/10/23	16/10/23
	Actual date												
B-1	20761A0231 21761A0201 21761A0211 21761A0221	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS & INTERNAL EXAM
B-2	21761A0202 21761A0212 21761A0222	DEMO	2	3	4	5	1	7	8	9	10	6	
B-3	21761A0203 21761A0213 21761A0223	DEMO	3	4	5	1	2	8	9	10	6	7	
B-4	21761A0204 21761A0214 21761A0224	DEMO	4	5	1	2	3	9	10	6	7	8	
B-5	21761A0205 21761A0215 21761A0225	DEMO	5	1	2	3	4	10	6	7	8	9	
B-6	21761A0206 21761A0216 21761A0226	DEMO	1	2	3	4	5	6	7	8	9	10	
B-7	21761A0207 21761A0217 21761A0227	DEMO	2	3	4	5	1	7	8	9	10	6	
B-8	21761A0208 21761A0218 21761A0228	DEMO	3	4	5	1	2	8	9	10	6	7	
B-9	21761A0209 21761A0219 21761A0229	DEMO	4	5	1	2	3	9	10	6	7	8	
B-10	21761A0210 21761A0220 21761A0230	DEMO	5	1	2	3	4	10	6	7	8	9	

DAY : Thursday

Batches : 21761A0231-248,22765A0201-214

B.NO.	H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week
	Tentative date	13/7/23	20/7/23	27/7/23	03/8/23	10/8/23	17/8/23	24/8/23	07/9/23	14/9/23	21/9/23	5/10/23	12/10/23	19/10/23	26/10/23
	Actual date														
B-1	21761A0231 21761A0241 22765A0201 22765A0211	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	21761A0232 21761A0242 22765A0202	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0233 21761A0243 22765A0203	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0234 21761A0244 22765A0204	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0235 22765A0205 22765A0212	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0236 21761A0246 22765A0206	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0237 21761A0247 22765A0207	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0238 21761A0248 22765A0208	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0239 22765A0209 22765A0213	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0240 22765A0210 22765A0214	DEMO	5	1	2	3	4	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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

A.Imran/R.A.Naik/P. Deepak Reddy	Dr.P.SOBHA RANI	Mr.P.DEEPAK REDDY	Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. **Mr Ch.Rajesh, Dr P Sobha Rani, Mr V Prabakar Reddy**

Course Name & Code : ELECTRICAL MACHINES-II LAB & 20EE59
L-T-P Structure : **0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/B **A.Y.:** 2023-24
PRE-REQUISITES : CONTROL SYSTEMS

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Course Educational Objective: This laboratory course enables the student to implement the mathematical techniques used in linear control systems to solve real world problems through experimentation and simulation tools.

Course Outcomes: At the end of the course, the student will be able to:
CO1. Simulate the physical control system for stability studies **(Apply-L3)**
CO2. Demonstrate feedback controllers **(Understand-L2)**
CO3. Develop logic gates using PLC**(Apply-L3)**

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	2		2	2			2	2	2						
CO2	2	2		2				2	2	2						2
CO3	2	2	2	2	2			2	2	2					2	2

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

LIST OF EXPERIMENTS

1. Modeling of Physical Systems (Mechanical and Electrical systems).
2. Block Diagram Reduction of Linear Systems
3. Time response analysis of Linear Systems for impulse and step inputs
4. Frequency response analysis of Linear Systems
5. Stability and relative stability analysis of Linear Systems Using (Root Locus, Bode and Nyquist plot).
6. Time Response analysis of Second Order System.
7. Study the effect of P, PD, PI, PID controllers on second order systems.
8. Magnitude and phase plot of Lag and lead compensators.
9. Determination of transfer function and effect of feedback on DC servo motor.
10. Study of logic gates using PLC

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

DAY : TUESDAY

Batches : 20761A0279,20H71A0211,21761A0249-279

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 Wee
	Tentative date	12/7/23	19/7/23	26/7/23	02/8/23	09/8/23	16/8/23	23/8/23	13/9/23	20/9/23	27/9/23	04/10/23	11/10/23	18/10/23	25/10/23
	Actual date														
B-1	21761A0250 21761A0260 21761A0270	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	21761A0251 21761A0261 20761A0279	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0252 21761A0262 21761A0272	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0253 21761A0263 21761A0273	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0254 21761A0264 21761A0274	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0255 21761A0265 21761A0275	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0256 21761A0276 20H71A0211	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0257 21761A0267 21761A0277	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0258 21761A0268 21761A0278	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0249 21761A0269 21761A0279	DEMO	5	1	2	3	4	10	6	7	8	9			

DAY : WEDNESDAY

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
	Tentative date	11/7/23	18/7/23	25/7/23	01/8/23	08/8/23	22/8/23	05/9/23	12/9/23	19/9/23	26/9/23	3/10/23	10/10/23	17/10/23	24/10/23
	Actual date														
B-1	21761A0280 21761A0290 22765A0215	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	21761A0281 21761A0291 22765A0216	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0282 21761A0292 22765A0217	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0283 21761A0293 22765A0218	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0284 21761A0294 22765A0219	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0285 22765A0220 22765A0221	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0286 22765A0222 22765A0223	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0287 22765A0224 22765A0225	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0288 22765A0226 22765A0227	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0289 22765A0228	DEMO	5	1	2	3	4	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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Mr Ch.Rajesh, Dr P Sobha Rani, Mr V Prabakar Reddy	Dr P Sobha Rani,	Dr.K.R.L.Prasad	Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Smt.G.Tabita / Dr.T.Naga Durga
Course Name & Code **:** ELECTRICAL MACHINES-II LAB & 20EE59
L-T-P Structure **: 0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/A **A.Y.:** 2022-23
PRE-REQUISITES : Electrical Machines-II
COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to know the operation of various ac machines and give practical exposure on the performance of various AC machines like induction motors and synchronous machines.

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

CO1	Analyze the performance of single phase transformer and induction motor **(Apply-L3)**
CO2	Examine the performance of three phase induction motor **(Apply-L3)**
CO3	Evaluate the performance parameters of synchronous machines **(Apply-L3)**
CO4	Analyze the performance of AC machines using simulation tools **(Apply-L3)**

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

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

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

DAY : Monday Batches : 21761A0231-248,22765A0201-214

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
	Tentative date	03/7/23	10/7/23	17/7/23	24/7/23	07/8/23	14/8/23	21/8/23	04/9/23	11/9/23	25/9/23	9/10/23	16/10/23
	Actual date												
B-1	21761A0231 21761A0241 22765A0201 22765A0211	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS & **INTERNAL EXAM**
B-2	21761A0232 21761A0242 22765A0202	DEMO	2	3	4	5	1	7	8	9	10	6	
B-3	21761A0233 21761A0243 22765A0203	DEMO	3	4	5	1	2	8	9	10	6	7	
B-4	21761A0234 21761A0244 22765A0204	DEMO	4	5	1	2	3	9	10	6	7	8	
B-5	21761A0235 22765A0205 22765A0212	DEMO	5	1	2	3	4	10	6	7	8	9	
B-6	21761A0236 21761A0246 22765A0206	DEMO	1	2	3	4	5	6	7	8	9	10	
B-7	21761A0237 21761A0247 22765A0207	DEMO	2	3	4	5	1	7	8	9	10	6	
B-8	21761A0238 21761A0248 22765A0208	DEMO	3	4	5	1	2	8	9	10	6	7	
B-9	21761A0239 22765A0209 22765A0213	DEMO	4	5	1	2	3	9	10	6	7	8	
B-10	21761A0240 22765A0210 22765A0214	DEMO	5	1	2	3	4	10	6	7	8	9	

DAY : Thursday

Batches : 20761A0231,21761A0201-230

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	XIV Week
	Tentative date	13/7/23	20/7/23	27/7/23	03/8/23	10/8/23	17/8/23	24/8/23	07/9/23	14/9/23	21/9/23	5/10/23	12/10/23	19/10/23	26/10/23
	Actual date														
B-1	20761A0231 21761A0201 21761A0211 21761A0221	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	21761A0202 21761A0212 21761A0222	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0203 21761A0213 21761A0223	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0204 21761A0214 21761A0224	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0205 21761A0215 21761A0225	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0206 21761A0216 21761A0226	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0207 21761A0217 21761A0227	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0208 21761A0218 21761A0228	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0209 21761A0219 21761A0229	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0210 21761A0220 21761A0230	DEMO	5	1	2	3	4	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	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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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
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Smt.G.Tabita Dr.T.Naga Durga	Dr.T.Naga Durga	Mr.P.DEEPAK REDDY	Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.K.NAGALINGA CHARY /Smt.G.Tabita / Mr.Imran abdul
Course Name & Code **:** ELECTRICAL MACHINES-II LAB & 20EE59
L-T-P Structure **: 0-0-3** **Credits: 1.5**
Program/Sem/Sec : B.Tech/III/B **A.Y.:** 2022-23
PRE-REQUISITES : Electrical Machines-II
COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to know the operation of various ac machines and give practical exposure on the performance of various AC machines like induction motors and synchronous machines.

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CO3	Evaluate the performance parameters of synchronous machines **(Apply-L3)**
CO4	Analyze the performance of AC machines using simulation tools **(Apply-L3)**

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

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

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

DAY : WEDNESDAY

Batches : 20761A0279,20H71A0211,21761A0249-279

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
	Tentative date	12/7/23	19/7/23	26/7/23	02/8/23	09/8/23	16/8/23	23/8/23	13/9/23	20/9/23	27/9/23	04/10/23	11/10/23	18/10/23	25/10/23
	Actual date														
B-1	21761A0250 21761A0260 21761A0270	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	21761A0251 21761A0261 20761A0279	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0252 21761A0262 21761A0272	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0253 21761A0263 21761A0273	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0254 21761A0264 21761A0274	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0255 21761A0265 21761A0275	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0256 21761A0276 20H71A0211	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0257 21761A0267 21761A0277	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0258 21761A0268 21761A0278	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0249 21761A0269 21761A0279	DEMO	5	1	2	3	4	10	6	7	8	9			

DAY : TUESDAY

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
	Tentative date	11/7/23	18/7/23	25/7/23	01/8/23	08/8/23	22/8/23	05/9/23	12/9/23	19/9/23	26/9/23	3/10/23	10/10/23	17/10/23	24/10/23
	Actual date														
B-1	21761A0280 21761A0290 22765A0215	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
B-2	21761A0281 21761A0291 22765A0216	DEMO	2	3	4	5	1	7	8	9	10	6			
B-3	21761A0282 21761A0292 22765A0217	DEMO	3	4	5	1	2	8	9	10	6	7			
B-4	21761A0283 21761A0293 22765A0218	DEMO	4	5	1	2	3	9	10	6	7	8			
B-5	21761A0284 21761A0294 22765A0219	DEMO	5	1	2	3	4	10	6	7	8	9			
B-6	21761A0285 22765A0220 22765A0221	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	21761A0286 22765A0222 22765A0223	DEMO	2	3	4	5	1	7	8	9	10	6			
B-8	21761A0287 22765A0224 22765A0225	DEMO	3	4	5	1	2	8	9	10	6	7			
B-9	21761A0288 22765A0226 22765A0227	DEMO	4	5	1	2	3	9	10	6	7	8			
B-10	21761A0289 22765A0228	DEMO	5	1	2	3	4	10	6	7	8	9			

PART-C

EVALUATION PROCESS (R20 Regulations):

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PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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Mr.K.Nagalinga Chary Smt.G.Tabita Mr.Imran Abdul	Dr.T.Naga Durga	Mr.P.DEEPAK REDDY	Dr.J.SIVAVARA PRASAD
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