BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date of Meet: 23-09-2023 VENUE: EEE Department

Time: 02:00PM

AGENDA for 1st BOS Meeting of BR23 Regulations

1. Welcome address by BOS chairperson.
2. Discussion on proposed course structure of I-B.Tech I & II semester of Electrical and Electronics Engineering (EEE) and ratification of the same.
3. Discussion on proposed syllabus of Basic Electrical and Electronics Engineering both theory and laboratory and ratification of the same for all branches of I-B.Tech.
4. Discussion on proposed syllabus of Electrical Circuits both theory and laboratory and ratification of the same for I-B.Tech (EEE)
5. Discussion on proposed syllabus of Network Analysis both theory and laboratory and ratification of the same for I-B.Tech-ECE.
6. Discussion on course structure and syllabus of M.Tech-Power Electronics and ratification of the same.
7. Discussion on academic regulations of UG&PG and ratification of the same.
8. Discussion on proposed model papers for internal and external examinations of both theory and laboratory courses.
9. Any other item.

Chairman BOS

Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

VENUE: EEE Department

Date of Meet: 23-09-2023

Time: 02:00PM

Minutes of meeting for 1st BOS Meeting of BR23 Regulations

Chairman of Board of studies (BOS) welcome all the members of the BOS. Following are the Minutes of meeting of the BOS in the E.E.E Department held on 23-09-2023 through virtual mode (online) from 02.00 p.m-03.30p.m.

1. Proposed course structure of I-B.Tech I & II semester of Electrical and Electronics Engineering (EEE) and ratification of the same.
2. Discussion on proposed syllabus of Basic Electrical and Electronics Engineering both theory and laboratory for all branches of I-B.Tech and ratification of the same after incorporating suggested changes.
3. Discussion on proposed syllabus of Electrical Circuits both theory and laboratory for I-B.Tech (EEE) and ratification of the same after incorporating suggested changes.
4. Discussion on proposed syllabus of Network Analysis both theory and laboratory for I-B.Tech-ECE and ratification of the same after incorporating suggested changes.
5. Chairman BOS explained the course structure and syllabus of M.Tech-Power Electronics will be same with the JNTUK-R23 curriculum and ratification of the same.
6. Discussion on academic regulations of UG&PG and ratification of the same.
7. Model papers prepared for different type of courses as per academic regulations are presented and they were ratified by the BOS members.

Finally the chairman of BOS thanked the members present for the successful conduction of BOS meeting

Chairman BOS
EEE Department

Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2023-2024 (BR23Regulations)

I B.Tech. - I Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23HM1T01	HM	Communicative English	2	0	0	2
2	23BS1T01	BS	Linear Algebra & Calculus	3	0	0	3
3	23BS1T02	BS	Engineering Physics	3	0	0	3
4	23ES1T02	ES	Basic Electrical & Electronics Engineering	3	0	0	3
5	23ES1T04	ES	Introduction to Programming	3	0	0	3
6	23HM1L01	HM	Communicative English Lab	0	0	2	1
7	23BS1L01	BS	Engineering Physics Lab	0	0	2	1
8	23ES1L01	ES	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	23ES1L04	ES	Computer Programming Lab	0	0	3	1.5
10	23BS1L04	BS	Health & Wellness, Yoga & Sports	0	0	1	0.5
Total credits							**19.5**

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

I B.Tech. - II Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23BS2T03	BS	Chemistry	3	0	0	3
2	23BS2T01	BS	Differential Equations & Vector Calculus	3	0	0	3
3	23ES2T01	ES	Basic Civil & Mechanical Engineering	3	0	0	3
4	23ES2T03	ES	Engineering Graphics	1	0	4	3
5	23EE2T01	PC	Electrical Circuits	3	0	0	3
6	23BS2L02	BS	Chemistry Lab	0	0	2	1
7	23ES2L02	ES	Engineering Workshop	0	0	3	1.5
8	23ES2L03	ES	IT Workshop	0	0	2	1.0
9	23EE2L01	PC	Electrical Circuits Lab	0	0	3	1.5
10	23BS2L05	BS	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
Total credits							**20.5**

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to all branches of engineering)

Subject Code: 23ES1T02
Subject Code: 23ES2T02

Course Objectives
To expose to the field of Electrical & Electronics Engineering, laws and principles of electrical/electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes: After the completion of the course students will be able to

- Understand the basic electrical circuits, AC machines.
- Analyze different electrical circuits, performance of AC machines.
- Explain the theory, construction, and operation of electronic devices.
- Apply the concept of science and mathematics to explain the working of diodes, transistors, and their applications.
- Analyze different number systems and logic gates.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.
AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor(for sine wave), Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) Single Phase Transformer, (ii) Three Phase Induction Motor and (iii) Alternator, Applications of electrical machines.
Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel & Solar power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthling and its types, Safety Precautions to avoid shock.

Textbooks:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

Reference Books:

1. Principles of Power Systems by V.K. Mehtha, S.Chand Technical Publishers, 2020.
2. A textbook of Electrical Technology by B.L. Theraja, S. Chand and Company, reprint edition, 2014.
3. S. K. Bhatacharya, Basic Electrical and Electronics Engineering, Second Edition, Person Publications, 2018.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

PART B: BASIC ELECTRONICS ENGINEERING

UNIT I Semiconductor Devices

Introduction - Characteristics of PN Junction Diode - Zener Diode and its Characteristics. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics.

UNIT II Basic Electronic Circuits And Instrumentation

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), RC Coupled amplifier.

Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III Digital Electronics

Overview of binary number system, BCD codes, Excess-3 code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and simple Logic Gates including Universal Gates - AND,OR,NOT, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders.

Textbooks:

1. R.L.Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, PearsonEducation, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. Switching Theory and Logic Design by A.Anand Kumar,PHI Learning, 3rd Edition.

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S.Chand& Co,2010.
2. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India,2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,Pearson Education,2009.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

(Common to All branches of Engineering)

Subject Code: 23ES1L01
Subject Code: 23ES2L01

Course Objectives:

- To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
- To impart knowledge on the principles of digital electronics and fundamentals of electron devices.

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

- Get an exposure to common electrical& electronic components and their ratings.
- Understand the usage of common electrical& electronic measuring instruments.
- Understand the basic characteristics of electrical machines and perform energy calculations.
- Plotand discuss the characteristics of various electron devices.
- Explain the operation of a digital circuit.

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board,Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wirestripper, flux, knife/blade, soldering iron, de-soldering pump etc.
   - Provide some exercises so that hardware tools and instruments arelearned to be used by the students.

2. Familiarization of Measuring Instruments like Voltmeters, Ammeters,multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator,Frequency counter.
   - Provide some exercises so that measuring instruments are learned to beused by the students.

3. Components:
   - Familiarization/Identification of components (Resistors, Capacitors,Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour codingpackage, symbol, cost etc.

   - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with themeasured values by using instrument.

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

PART A: BASIC ELECTRICAL ENGINEERING LAB

List of experiments:

(Any 5 of the following experiments are to be conducted)

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. O.C & S.C Characteristics of Single Phase Transformer
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

References:

1.Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2.Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3.Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

PART B: BASIC ELECTRONICS ENGINEERING LAB

List of Experiments:

(Any 5 of the following experiments are to be conducted

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave with and without filter.
4. Implementation of full wave rectifier with and without filter.
5. Plot Input & Output characteristics of BJT in CE configuration.
6. Plot Input & Output characteristics of BJT in CB configuration.
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, ACVoltmeters, CROs, all the required active devices.

References:

1.R.L.Boylestad& Louis Nashlesky, Electronic Devices &Circuit Theory, PearsonEducation, 2021.
2.R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3.R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,Pearson

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
3	0	0	3

ELECTRICAL CIRCUITS
(EEE)

Subject Code: 23EE2T01

Course Objectives:

- To develop an understanding of the fundamental laws and elements of electrical circuits.
- To develop the ability to apply circuit analysis to DC and AC circuits.

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

- Examine various electrical networks in presence of active and passive elements.
- Calculate the parameters of R, L, C network with sinusoidal excitation.
- Analyze magnetic circuit with various dot conventions
- Analyze the series and parallel resonant circuit
- Solve Electrical networks by using principles of network theorems.

UNIT I Introduction to Electrical Circuits

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources., node and mesh analysis.

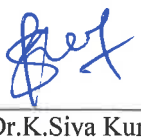
UNIT II Single Phase Circuits

Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis.

Steady state analysis of A.C circuits: series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit.

UNIT III Magnetic Circuits

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and conductively coupled equivalent circuits- problem solving.

					
Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

UNIT IV Resonance and Locus Diagrams

Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies. Parallel resonance: Q-factor, selectivity and bandwidth. Locus diagram: RL, RC, RLC with R variable.

UNIT V Network theorems (DC & AC Excitations)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem.

Textbooks:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, Mc Graw Hill Company,6th edition.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd
3. Fundamentals of Electrical Circuits by Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India)

Reference Books:

1. Linear Circuit Analysis by De Carlo, Lin, Oxford publications
2. Electric Circuits – (Schaum's outlines) by Mahmood Nahvi& Joseph Edminister, Adapted by Kuma Rao, 5th Edition – Mc Graw Hill.
3. Electric Circuits by David A. Bell, Oxford publications
4. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications.
5. Circuit Theory (Analysis and Synthesis) by A. Chakrabarthi, Dhanpat Rai & Co.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
0	0	3	1.5

ELECTRICAL CIRCUITS LAB
(EEE)

Subject Code:23EE2L01

Course Objectives:

The objective of laboratory is to impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different condition.

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

- Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.
- Examine series and parallel resonance.
- Apply Thevenin's, Norton's, Thevenin's, superposition theorem, maximum power transfer, compensation, Tellegens, reciprocity and Millman's Theorems to compare practical results obtained with theoretical calculations.

List of Experiments:

(Any 10 of the following experiments are to be conducted)

1. Verification of node and mesh analysis.
2. Verification of network reduction techniques.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series and parallel resonance
7. Verification of Superposition theorem
8. Verification of Thevenin's and Norton's Theorems
9. Verification of Maximum power transfer theorem
10. Verification of Compensation theorem
11. Verification of Tellegens theorem
12. Verification of Reciprocity and Millman's Theorems

References:

1. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, Mc Graw Hill Company,6th edition.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

L	T	P	C
3	0	0	3

NETWORK ANALYSIS
(ECE)

Subject Code: 23EE2T02

Course Objectives:

- To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
- To impart knowledge on applying appropriate theorem for electrical circuit analysis
- To explain transient behavior of circuits in time and frequency domains
- To teach concepts of resonance
- To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

Course Outcomes: At the end of this course students will demonstrate the ability to

- Understand basic electrical circuits with nodal and mesh analysis.
- Analyze the electrical circuit using Network simplification theorems.
- Analyze electrical networks in the Laplace domain and transient analysis
- Infer and evaluate Transient response and Steady state response of a network..
- Compute the parameters of a two-port network.

UNIT I Classification of Sources & Network Theorems

Classification of Sources, Source Transformation techniques, Mesh, Nodal Analysis and Star-Delta conversion.

Network Theorems (D.C circuits): Thevenin's, Norton's, Milliman's, Reciprocity, Max Power Transfer, Tellegen's theorems.

UNIT II Single phase A.C Circuits

Steady State Analysis of A.C Circuits: Impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem.

UNIT III Laplace transformation & Transient analysis

Laplace transform: Introduction to Laplace Transforms, Problem solving using Laplace transforms Partial Expansion Method (Inverse Laplace Transforms)

Transients: Definition of time constants, R-L circuit, R-C circuit and R-L-C circuit with DC excitation using differential equation approach and Laplace transform approach.

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

UNIT IV Resonance & Magnetic circuits

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance.

Coupled Circuits: Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT V Two-port networks

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h- parameters, Relationships Between parameter Sets, cascading of two port networks.

Textbooks:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.
4. Network lines and Fields by John. D. Ryder 2nd Edition, PHI

Reference Books:

1. D. Roy Choudhury, Networks and Systems, New Age InternationalPublications, 2013.
2. Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

L	T	P	C
0	0	3	1.5

NETWORK ANALYSIS & SIMULATION LABORATORY
(ECE)

Subject Code: 23EE2L02

Course Objectives:

- To gain hands on experience in verifying Kirchoff's laws and network theorems
- To analyze transient behavior of circuits
- To study resonance characteristics
- To determine 2-port network parameters

Course Outcomes:

- Verify Kirchoff's laws and network theorems.
- Measure time constants of RL & RC circuits.
- Analyze behavior of RLC circuit for different cases.
- Design resonant circuit for given specifications.
- Characterize and model the network in terms of all network parameters.

The following experiments need to be performed using both Hardware and simulation Software.

List of Experiments:

(Any 10 of the following experiments are to be conducted)

1. Verification of Network Reduction Techniques.
2. Verification of mesh and nodal analysis
3. Verification of Thevenin's & Norton theorems
4. Verification of maximum power transfer theorem
5. Verification of Reciprocity and Millimans theorems
6. Verification of Tellegen's theorem for two networks of the same topology.
7. Determination Self, Mutual Inductance and Coefficient of Coupling
8. Simulation of RL & RC networks
9. Simulation of RLC network
10. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
11. Determination of open circuit (Z) and short circuit (Y) parameters
12. Determination of hybrid (H) and transmission (ABCD) parameters

Dr. S.Srikanth Professor & HOD	Dr.T.Murali Mohan, **University Nominee**	Dr.K.Siva Kumar **Subject expert**	Dr.G.Siva Kumar **Subject expert**	Ch.Mahadev Kumar **Representative from Industry**	D.Lakshman Kumar **Alumni Member**

Hardware Requirements:

Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components

Software requirements:

Multisim/ Pspice/Equivalent simulation software tool, Computer Systems with required specifications

References:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr. T. Murali Mohan , Professor, Dept. of EEE, UCEK, JNTU Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Ch.Mahadev Kumar ,Dy. Manager Oil rigs B H E L , R C Puram Hyderabad	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date of Meet: 12-07-2024 VENUE: Conference Hall

Time: 02:00PM

AGENDA for 7th BOS Meeting

1. Welcome address by BOS chairperson.
2. Discussion on proposed course structure of II-B.Tech, I & II semester of Electrical and Electronics Engineering (EEE) and ratification of the same.
3. Discussion on proposed syllabus of II-B.Tech, I & II semester Electrical and Electronics Engineering both theory and laboratory and ratification of the same.
4. Discussion on New text books/References of II-B.Tech, I & II semester Electrical and Electronics Engineering and ratification of the same.
5. Any other item.

Chairman BOS

Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date of Meet: 12-07-2024 VENUE: Conference Hall

Time: 02:00PM

Minutes of meeting for 7th BOS Meeting

Chairman of Board of studies (BOS) welcome all the members of the BOS. Following are the Minutes of meeting of the BOS in the E.E.E Department held on 12-07-2024 through virtual mode (online) from 02.00 p.m-03.30p.m.

1. Discussion on proposed course structure of II-B.Tech, I & II semester of Electrical and Electronics Engineering (EEE) and ratification of the same.
2. Discussion on proposed syllabus of II-B.Tech, I & II semester Electrical and Electronics Engineering both theory and laboratory and ratification of the same after incorporating suggested changes.
3. Discussion on New text books/References of II-B.Tech, I & II semester Electrical and Electronics Engineering and ratification of the same after incorporating suggested changes.

Finally the chairman of BOS thanked the members present for the successful conduction of BOS meeting

Chairman BOS
EEE Department

Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II-B.Tech Course structure & Syllabus

BR23 Regulations

II B.Tech. - I Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23BS3T06	BS	Complex Variables & Numerical Methods	3	0	0	3
2	23HM3T02	HSMC	Universal human values – understanding harmony and Ethical human conduct	2	1	0	3
3	23ES3T06	ES	Electromagnetic Field Theory	3	0	0	3
4	23EE3T03	PC	Electrical Circuit Analysis-II	3	0	0	3
5	23EE3T04	PC	DC Machines & Transformers	3	0	0	3
6	23EE3L03	PC	Electrical Circuit Analysis-II and Simulation Lab	0	0	3	1.5
7	23EE3L04	PC	DC Machines & Transformers Lab	0	0	3	1.5
8	23CS3S01	SEC	Data Structures Lab	0	1	2	2
9	23AC3T01	AC	Environmental Science	2	0	0	-
Total				**16**	**2**	**8**	**20**

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Dept. of Elec. & Electronics Engg.
University College of Engineering
JNT University Kakinada
KAKINADA-533 003

II B.Tech – I SEMESTER

L	T	P	C
3	0	0	3

ELECTROMAGNETIC FIELD THEORY
(23ES3T06)

Pre-requisite: Concepts of Differential Equations, Vector Calculus and Analysis
Course Objectives:

- To study the production of electric field and potentials due to different configurations of static charges.
- To study the properties of conductors and dielectrics, calculate the capacitance of Different configurations. Understand the concept of conduction and convection current Densities.
- To study the magnetic fields produced by currents in different configurations, application of Ampere's law and the Maxwell's second and third equations.
- To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops.
- To develop the concept of self and mutual inductances and the energy stored.
- To study time varying and Maxwell's equations in different fourth equation for the induced EMF.

UNIT – I
Electrostatics (BTL-1)
Rectangular & Cylindrical Coordinate Systems, Del & Curl operators, Divergence and Stoke's theorems (definitions only). Coulomb's law and Electric field intensity (EFI), EFI due to Continuous charge distributions (line and surface charge), Electric flux density, Gauss's law (Maxwell's first equation, $\nabla . D = \rho V$), Applications of Gauss's law, Electric Potential, Work done in moving a point charge in an electrostatic field (second Maxwell's equation for static electric fields,$\nabla \times E = 0$), Potential gradient, Laplace's and Poison's equations.

UNIT - II
Conductors – Dielectrics and Capacitance (BTL-2)
Ohm's law in point form, Behavior of conductors in an electric field, Polarization, dielectric constant and strength, Continuity equation and relaxation time, Boundary conditions between conductor to dielectric, dielectric to dielectric and conductor to free space, Capacitance of parallel plate, coaxial and spherical capacitors, Energy stored and density in a static electric field.

UNIT - III
Magneto statics, Ampere's Law and Force in magnetic fields: (BTL-3)
Biot-Savart's law and its applications viz. Straight current carrying filament, circular, square, rectangle and solenoid current carrying wire – Magnetic flux density and Maxwell's second Equation ($\nabla . \vec{B} = 0$), Ampere's circuital law and its applications viz. MFI due to an infinite sheet, long filament, solenoid, toroidal current carrying conductor, point form of Ampere's circuital law, Maxwell's third equation ($\nabla \times H = J$).
Magnetic force, moving charges in a magnetic field – Lorentz force equation, force on a current element in a magnetic field, force on a straight and a long current carrying conductor in a magnetic field, force between two straight long and parallel current carrying conductors, Magnetic dipole, Magnetic torque, and moment.

UNIT - IV
Self and mutual inductance: (BTL-4)
Self and mutual inductance – determination of self-inductance of a solenoid, toroid, coaxial cable and mutual inductance between a straight long wire and a square loop wire in the same plane – Energy stored and energy density in a magnetic field.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering

UNIT - V

Time Varying Fields: (BTL-2)

Faraday's laws of electromagnetic induction, Maxwell's fourth equation ($\nabla \times \vec{E} = -db/dt$) integral and point forms of Maxwell's equations, statically and dynamically induced EMF, Displacement current, Modification of Maxwell's equations for time varying fields, Poynting theorem and Poynting vector.

Textbooks:

1."Elements of Electromagnetics" by Matthew N O Sadiku, Oxford Publications,7th edition, 2018.
2."Engineering Electromagnetics" by William.H.Hayt & John. A. Buck Mc. Graw -Hill, 7th Editon.2006.
3. "Electromagnetic Filed Theory" by U.A.Bhakshi, Late A.V Bhakshi, Technical Publications, 3rd edition, 2023.

Reference Books:

1. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition.
2. "Electromagnetic Field Theory" by Yaduvir Singh, Pearson India, 1st edition, 2011.
3. "Fundamentals of Engineering Electromagnetics" by Sunil Bhooshan, OxfordUniversity Press, 2012.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/108/106/108106073/
2. https://nptel.ac.in/courses/117103065

Course Outcomes:

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

CO1: Understand the concepts of electric fields and potentials using Coulomb's law & Gauss law/ solve Laplace's or Poisson's equations for various electric charge distributions.

CO2: Analyze the behaviour of conductors in electric fields, the capacitance and energy stored in dielectrics.

CO3: Calculate the magnetic field intensity due to current carrying conductors, understanding the application of Ampere's law, Maxwell's second and third law.

CO4: Estimate self and mutual inductances and the energy stored in the magnetic field.

CO5: Understand the concepts of Faraday's laws, Displacement current, Poynting theorem and Poynting vector.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	Dept of Elec. & Electronics Engg. University College of Engineering J.N.T University Kakinada KAKINADA-533 003
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada
KAKINADA-533 003

II B.Tech –I SEMESTER

L	T	P	C
3	0	0	3

ELECTRICAL CIRCUIT ANALYSIS-II
(23EE3T03)

Pre-requisite: Analysis of DC and Single phase AC Circuits, Concepts of differentiation and integration.

Course Objectives:

- To understand three phase circuits
- To analyse transients in electrical systems
- To evaluate network parameters of given electrical network
- To apply Fourier analysis to electrical systems
- To understand graph theory for circuit analysis and to understand the behaviour of filters

UNIT – I (BTL-2)

Analysis of three phase balanced circuits

Phase sequence, star and delta connection of sources and loads, relation between line and phase quantities, analysis of balanced three phase circuits, and measurement of active and reactive power.

Analysis of three phase unbalanced circuits:

Loop method, Star-Delta transformation technique, two-wattmeter method for measurement of three phase power.

UNIT – II (BTL-2)

Laplace transforms – Definition and Laplace transforms of standard functions– Shifting theorem – Transforms of derivatives and integrals, Inverse Laplace transforms and applications.

Transient Analysis: Transient response of series R-L, R-C and R-L-C circuits for D.C. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform approach.

UNIT – III (BTL-3)

Network Parameters: Impedance parameters, Admittance parameters, Hybrid parameters, Transmission (ABCD) parameters, conversion of Parameters from one form to other, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations- problems.

UNIT – IV (BTL-4)

Analysis of Electric Circuits with Periodic Excitation: Fourier series and evaluation of Fourier coefficients, Trigonometric and complex Fourier series for periodic waveforms, Application to Electrical Systems – Effective value and average value of non-sinusoidal periodic waveforms(square).

UNIT – V (BTL-4)

Filters: Classification of filters-Low pass, High pass, Band pass and Band Elimination filters, Constant-k filters -Low pass and High Pass. Design of basic low pass and high pass filters.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada

Textbooks:

1. Eelectrical Circuit Analysis II(network theory), U.A.Bakshi, Dr.J.S.chitode , Late A.V. Bakshi , 1st Edition,Technical publications, 2023
2. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rdEdition, Tata McGraw-Hill, 2019

Reference Books:

1. Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019.
2. Network Theory, N. C. Jagan and C. Lakshminarayana, 1st Edition, B. S. Publications, 2012.
3. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyam Mohan S. Palli, 5th Edition, Tata McGraw-Hill, 2017.
4. Engineering Network Analysis and Filter Design (Including Synthesis of One Port Networks)- Durgesh C. Kulshreshtha Gopal G. Bhise, Prem R. Chadha ,Umesh Publications 2012.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, 7th Revised Edition.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/117/106/117106108/
2. https://archive.nptel.ac.in/courses/108/105/108105159/

Course Outcomes:

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

CO1: Analyse the balanced and unbalanced 3 phase circuits for power calculations.
CO2: Analyse the transient behaviour of electrical networks in different domains.
CO3: Estimate various Network parameters.
CO4: Apply the concept of Fourier series to electrical systems.
CO5: Analyse the filter circuit for electrical circuits.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada
KAKINADA-533 003

II B.Tech – I SEMESTER

L	T	P	C
3	0	0	3

DC MACHINES & TRANSFORMERS

(23EE3T04)

Pre-requisite: Principles of Electromechanical Energy Conversion, Electromagnetic fields and Electrical Circuit Analysis.

Course Objectives:

Students will get exposure to

- Understand the characteristics and applications of DC Machines.
- Develop problem solving skills about the starting, speed control and testing of DC Machines.
- Understand the concepts of efficiency and regulation of a transformer by obtaining Equivalent circuit.
- Analyze the performance of single-phase transformers and to understand the connection diagrams of three-phase transformers

UNIT – I

DC Generators: (BTL-1)

Construction and principle of operation of DC machines – EMF equation for generator – Excitation techniques – characteristics of DC generators –applications of DC Generators,Back-EMF and torque equations of DC motor – Armature reaction and commutation.

UNIT – II

Starting, Speed Control and Testing of DC Machines (BTL-2)

Characteristics of DC motors – losses and efficiency – applications of DC motors. Necessity of a starter – starting by 3-point and 4-point starters – speed control by armature voltage and field current control – testing of DC machines – brake test, Swinburne's test –Hopkinson's test.

UNIT – III

Single-phase Transformers (BTL-3)

Introduction to single-phase Transformers (Construction and principle of operation)–EMF equation – operation on no-load and on load –lagging, leading and unity power factors loads –phasor diagrams– equivalent circuit –regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – all day efficiency.

UNIT –IV

Testing of Transformers (BTL-4)

Open Circuit and Short Circuit tests – Sumpner's test – separation of losses— Parallel operation with equal and unequal voltage ratios– auto transformer – equivalent circuit – comparison with two winding transformers.

UNIT – V

Three-Phase Transformers: (BTL-4)

Poly-phase connections- Y/Y, Y/Δ, Δ/Y, Δ/Δ, open Δ – third harmonics in phase voltages– Parallel operation–three winding transformers-off load and on load tap changing transformers–Scott connection.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada

Textbooks:

1. Electrical Machinery by Dr. P S Bimbhra, 7th edition, Khanna Publishers, New Delhi,1995.
2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.
3. Electrical machines by S.K.Sahdev Cambridge university press.

Reference Books:

1. Electrical Machines by D. P.Kothari, I .J .Nagarth, McGraw Hill Publications, 5thedition
2. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill edition 2011.
3. Generalized Theory of Electrical Machines by Dr. P S Bimbhra, 7th Edition,
4. Theory & Performance of Electrical Machines by J.B.Gupta,
5. Electric Machinery by Fitzgerald, A.E.,Kingsley, Jr.,C.,& Umans, S. D, 7th edition, McGraw-Hill Education, 2014.
6. Electrical machines-I By U.A.Bakshi and M.V.Bakshi Technical publications.

Online Learning Resources:

1. nptel.ac.in/courses/108/105/108105112
2. nptel.ac.in/courses/108/105/108105155

Course Outcomes:

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

CO1: Understand the process of voltage build-up in DC generators and characteristics.

CO2: Understand the process of torque production, starting and speed control of DC motors and illustrate their characteristics.

CO3: Study the principle and operation and obtain the equivalent circuit of single-phase transformer and determine its efficiency& regulation.

CO4: To study the performance of single phase transformer by the suitable testing methods.

CO5: Analyse various configurations of three-phase transformers.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II B.Tech – I SEMESTER

L	T	P	C
0	0	3	1.5

ELECTRICAL CIRCUIT ANALYSIS-II AND SIMULATION LAB (23EE3L03)

Course Objectives:

- To measure three phase Active and Reactive power
- To analyse transient behaviour of circuits
- To determine 2-port network parameters
- To analyse electrical circuits using simulation tools

List of Experiments

Any 10 of the following experiments are to be conducted:

1. Measurement of Active Power and Reactive Power for balanced loads.
2. Measurement of Active Power and Reactive Power for unbalanced loads.
3. Determination of Z and Y parameters.
4. Determination of ABCD and hybrid parameters
5. Verification of Kirchhoff's current law and voltage law using simulation tools.
6. Verification of mesh and nodal analysis using simulation tools.
7. Verification of super-position theorem and maximum power transfer theorems using simulation tools.
8. Verification of Reciprocity and Compensation theorems using simulation tools.
9. Verification of Thevenin's and Norton's theorems using simulation tools.
10. Verification of series and parallel resonance using simulation tools.
11. Simulation and analysis of transient response of RL, RC and RLC circuits.
12. Verification of self inductance and mutual inductance by using simulation tools.

Course Outcomes:

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

CO1: Understand the power calculations in three phase circuits.
CO2: Evaluate the time response of given network.
CO3: Evaluate two port network parameters.
CO4: Simulate and analyse electrical circuits using suitable software.

Note: Students supposed to do an Experiment beyond the syllabus/Lab oriented mini Project/Case Study and submit it for internal valuation.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II B.Tech I SEMESTER

L	T	P	C
0	0	3	1.5

DC MACHINES & TRANSFORMERS LAB
(23EE3L04)

Course Objectives:

The objectives of this course is

- To conduct the experiment and plot the characteristics and applications of DC machines.
- To perform the starting, speed control and testing methods of DC Machines.
- To determine/Predetermine efficiency and regulation of the transformer throughequivalent circuit.

List of Experiments

Any 10 of the following experiments are to be conducted:

1. Speed control of DC shunt motor by Field Current and Armature Voltage Control.
2. Brake test on DC shunt motor- Determination of performance curves.
3. Swinburne's test - Predetermination of efficiencies as DC Generator and Motor.
4. Hopkinson's test on DC shunt Machines.
5. Load test on DC compound generator-Determination of characteristics.
6. Load test on DC shunt generator-Determination of characteristics.
7. Fields test on DC series machines-Determination of efficiency.
8. Brake test on DC compound motor-Determination of performance curves.
9. OC & SC tests on single phase transformer.
10. Sumpner's test on single phase transformer.
11. Scott connection of transformers.
12. Parallel operation of Single-phase Transformers.
13. Separation of core losses of a single-phase transformer.

Online Learning Resources:

1. https://ems-iitr.vlabs.ac.in/List%20of%20experiments.html

Course Outcomes:

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

CO1: Demonstrate starting and speed control methods of DC Machines.
CO2: Apply theoretical concepts in analyzing the performance characteristics of DCMachines.
CO3: Determine the performance characteristics of DC machines using different testingmethods.
CO4: Determine the performance parameters of single-phase transformer.

Note: Students supposed to do an Experiment beyond the syllabus/Lab oriented mini Project/Case Study and submit it for internal valuation.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003.

II Year - I Semester	CODE: 23CS3S01	L	T	P	C
		0	1	2	2

DATA STRUCTURES LAB
(EEE)

Course Objectives:

- To provide the knowledge of basic data structures and their implementations
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

Course Outcomes: Students are able to

COs	Statement	Blooms Level
CO1	Identify the role of data structures in organizing and accessing data.	BL1
CO2	Apply linked lists for dynamic data storage.	BL3
CO3	Develop applications using stacks and queues.	BL3
CO4	Design and implement algorithms for operations on binary trees and binary search trees	BL3
CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.	BL3

UNIT – I

Introduction to Data Structures: Definition and importance of Data structures, Abstract data types (ADTs) and its specifications, Arrays: Introduction, 1-D, 2-D Arrays, accessing elements of array, Row Major and Column Major storage of Arrays, Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Quick sort.

Sample experiments:

1.Program to find min & max element in an array.
2.Program to implement matrix multiplication.
3.Find an element in given list of sorted elements in an array using Binary search.
4.Implement Selection and Quick sort techniques.

UNIT - II

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

Sample experiments:

1.Write a program to implement the following operations.
   a. Insert b. Deletion c. Traversal
2.Write a program to store name, roll no, and marks of students in a class using circular double linked list.
3.Write a program to perform addition of given two polynomial expressions using linked list.

Dr.N Ramakrishnaiah, Professor of CSE And Controller of Examinations UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE. IIT Patna	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Head of the
Computer Science & Engineering Dept.
BVC Engineering College, Odalarevu

UNIT - III

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

Sample experiments:

1.Implement stack operations using
   a. Arrays b. Linked list
2.Convert given infix expression into post fix expression using stacks.
3.Evaluate given post fix expression using stack.
4.Write a program to reverse given linked list using stack.

UNIT - IV

Queues: Introduction to queues: properties and operations, Circular queues, implementing queues using arrays and linked lists, Applications of queues scheduling, etc.

Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

Sample experiments:

1.Implement Queue operations using
   a. Arrays b. Linked list
2.Implement Circular Queue using
   a.Arrays b. Linked list
3.Implement Dequeue using linked list.

UNIT – V

Trees: Introduction to Trees, Binary trees and traversals, Binary Search Tree – Insertion, Deletion & Traversal

Sample experiments:

1.Implement binary tree traversals using linked list.
2.Write program to create binary search tree for given list of integers. Perform in-order traversal of the tree. Implement insertion and deletion operations.

Textbooks:

1.Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2.Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson- Freed, Silicon Press, 2008

Reference Books:

1.Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders.
2.C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft.
3.Problem Solving with Algorithms and Data Structures by Brad Miller and David Ranum.
4.Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein.
5.Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick.

N. Ramakrishnaiah, Professor of CSE And Controller of Examinations UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE. IIT Patna	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Head of the
Computer Science & Engineering Dept.
BVC Engineering College, Odalarevu

II B.Tech. - II Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23HM4T03	HSMC	Managerial Economics & Financial Analysis	2	0	0	2
2	23ES4T13	ES	Analog Circuits	3	0	0	3
3	23EE4T05	PC	Power Systems-I	3	0	0	3
4	23EE4T06	PC	Induction and Synchronous Machines	3	0	0	3
5	23EE4T07	PC	Control Systems	3	0	0	3
6	23EE4L05	PC	Induction and Synchronous MachinesLab	0	0	3	1.5
7	23EE4L06	PC	Control Systems Lab	0	0	3	1.5
8	23CS4S04	SEC	Python Programming Lab	0	1	2	2
9	23ES4L06	ES	Design Thinking & Innovation	1	0	2	2
			Total	**15**	**1**	**10**	**21**
23BS5T01 Mandatory Community Service Project of 08 Weeks duration during summer Vacation							

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada
KAKINADA-533 003

II B.Tech – II Semester

L	T	P	C
3	0	0	3

POWER SYSTEMS-I

(23EE4T05)

Course Objectives:

- To study principle of operation of different components of a hydro and thermal power stations.
- To study principle of operation of different components of a nuclear power stations.
- To study constructional and operation of different components of an Air and Gas Insulated substations.
- To study different types of cables and distribution systems.
- To study different types of load curves and tariffs applicable to consumers.

Unit I (BTL-2)

Hydroelectric Power Stations:

Selection of site, general layout of a hydroelectric power plant with brief description of major components and principle of operation

Thermal Power Stations:

Selection of site, general layout of a thermal power plant. Brief description of components: boilers, super heaters, economizers and electrostatic precipitators, steam turbines: impulse and reaction turbines, condensers, feed water circuit, cooling towers and chimney.

Unit II (BTL-2)

Nuclear Power Stations:

Location of nuclear power plant, working principle, nuclear fission, nuclear fuels, nuclear chain reaction, nuclear reactor components: moderators, control rods, reflectors and coolants,types of nuclear reactors and brief description of PWR, BWR and FBR. Radiation: radiation hazards and shielding, nuclear waste disposal.

Unit III (BTL-3)

Substations: Air Insulated Substations – indoor & outdoor substations, substations layouts of 33/11 kV showing the location of all the substation equipment. Bus bar arrangements in the sub- stations: simple arrangements like single bus bar, sectionalized single bus bar, double bus bar with one and two circuit breaker, main and transfer bus bar system with relevant diagrams.

Gas Insulated Substations (GIS): advantages of gas insulated substations, constructional aspects of GIS, comparison of air insulated substations and gas insulated substations.

Unit IV (BTL-3)

Underground Cables:

Types of cables, construction, types of insulating materials, calculation of insulation resistance, stress in insulation and power factor of cable. Capacitance of single and 3-Core belted Cables. Grading of cables capacitance grading and intersheath grading.

UNIT V (BTL-4)

Economic Aspects & Tariff: Economic Aspects-load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, loadfactor, diversity factor, plant capacity factor and plant use factor, base and peak load plants

Tariff Methods– Costs of generation and their division into fixed, semi-fixe and running costs, desirable characteristics of a tariff method, tariff methods: simple rate, flat rate, block-rate, two-part, three–part, and power factor tariff methods, Time of Day(ToD) tariff and Time of Use (ToU) tariff.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University

Text Books:

1.S. N. Singh, Electric Power Generation, Transmission and Distribution, PHI LearningPvt Ltd, New Delhi, 2nd Edition, 2010
2. J.B.Gupta, Transmission and Distribution of Electrical Power, S.K.Kataria and sons,10th Edition, 2012
3. V. K. Mehta and Rohit Mehta, Principles of Power System 4th Edition.

Reference Books:

1. I.J. Nagarath & D.P. Kothari, Power System Engineering, McGraw-Hill Education,3rd Edition, 2019.
2. C.L.Wadhwa, Generation, Distribution and Utilization of Electrical Energy, New Age International Publishers, 6th Edition, 2018.
3. Turan Gonen, Electric Power Distribution System Engineering, McGraw-Hill, 1985.
4.Handbook of switchgear, BHEL, McGraw-Hill Education, 2007.

Online Learning Resources:

1. https://nptel.ac.in/courses/108102047

Course Outcomes:

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

CO1: Understand the different types of power plants, operation of power plants.
CO2: Understand the concepts of distribution systems, underground cables, economic aspects and tariff.
CO3: Understand various substations that are located in distribution systems.
CO4: Apply the above concepts to illustrate different power generation layouts
C05: Analyze various economic aspects related to power generation and distribution.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II B.Tech – II semester

L	T	P	C
3	0	0	3

INDUCTION AND SYNCHRONOUS MACHINES
(23EE4T06)

Pre-requisite: Principles of Electromechanical Energy Conversion, Electromagnetic fields and Electrical Circuit Analysis.

Course Objectives:

Students will get exposure to understand the concepts of

- Construction and operation of three-phase induction motor.
- Characteristics, starting and testing methods of Induction Motor.
- Torque production and performance of single phase Induction Motor.
- Determining the performance and working of synchronous generators.
- Construction and operation of three-phase synchronous motor.

UNIT-I:

Three-phase induction motors: (BTL-2)
Construction of Squirrel cage and Slip ring induction motors– production of rotating magnetic field – principle of operation – rotor EMF and rotor frequency – rotor current and power factor at standstill and during running conditions– rotor power input, rotor copper loss and mechanical power developed and their inter-relationship –equivalent circuit.

UNIT-II:
Performance of 3-Phase induction motors: (BTL-3)

Torque equation – expressions for maximum torque and starting torque torque-slip Characteristics –No load and Blocked rotor tests– circle diagram for predetermination of performance- methods of starting –starting current and torque calculations -speed control of induction motor with V/f control method and rotor Resistance control - induction generator operation.

UNIT – III:
Single Phase Motors: (BTL-2)

Single phase induction motors- Constructional features, double field revolving theory – equivalent circuit- starting methods of induction motors- capacitor start, capacitor start capacitor run induction motor, split phase motor - shaded pole motors, AC series motor.

UNIT–IV:
Synchronous Generator: (BTL-3)
Constructional features of non-salient and salient pole type alternators- armature windings – distributed and concentrated windings – distribution & pitch factors- E.M.F equation –voltage regulation by synchronous impedance method, MMF method and Potier triangle method-methods of synchronization- Slip test – Parallel operation of alternators.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering

UNIT–V:
Synchronous Motor: (BTL-3)

Synchronous motor principle and theory of operation – Effect of excitation on current and power factor– synchronous condenser –expression for power developed –hunting and its suppression – methods of starting.

Text Books:

1. Electrical Machinery, Dr. P.S. Bhimbra, Khanna Publishing, 2021,First Edition.
2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.
3. Electrical machines by S.K.Sahdev Cambridge university press.

Reference Books:

1. Electrical machines, D.P. Kothari and I.J. Nagrath, McGraw Hill Education, 2017, Fifth Edition.
2. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria& Sons, 2007.
3. Electric Machinery, A.E.Fitzgerald, Charles kingsley, Stephen D.Umans, McGraw-Hill, 2020, Seventh edition.

Online Learning Resources:

1. nptel.ac.in/courses/108/105/108105131
2. https://nptel.ac.in/courses/108106072

Course Outcomes:
At the end of the course, the student will be able to,
CO1: Understand the construction and operation of three-phase induction motor.
CO2: Analyze the performance of three-phase induction motor.
CO3: Describe the working of various single-phase induction motors.
CO4: Analyze the performance of Synchronous generators.
CO5: Analyze the performance of Synchronous motors.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg
University College of Engineering
J.N.T University Kakinada
KAKINADA-533 003

II B.Tech – II Semester

CONTROL SYSTEMS

(23EE4T07)

L	T	P	C
3	0	0	3

Pre-requisite: Basic Engineering Mathematics

Course Objectives:

- To obtain the mathematical models of physical systems and derive transfer function.
- To determine the time response of systems and analyse system stability.
- To analyse system stability using frequency response methods.
- To design compensators using Bode diagrams.
- To obtain the mathematical models of physical systems using state space approach and determine the response.

UNIT - 1

Mathematical Modelling Of Control Systems (BTL-2)

Classification of control systems - open loop and closed loop control systems and their differences - transfer function of linear system, differential equations of electrical networks- translational and rotational mechanical systems. Transfer function of Armature voltage controlled DC servo motor Block diagram algebra –representation by signal flow graph – reduction using Mason's gain formula.

UNIT - 2

Time Response Analysis (BTL-3)

Standard test signals – time response of first and second order systems – time domain Specifications - steady state errors and error constants - effects of proportional (P) - proportional integral (PI) - proportional derivative (PD) proportional integral derivative (PID) systems.

Stability And Root Locus Technique

The concept of stability – Routh's stability criterion – limitations of Routh's stability, root locus concept – construction of root loci (simple problems)

UNIT - 3

Frequency Response Analysis (BTL-4)

Introduction to frequency domain specifications – Bode diagrams – stability analysis using Bode plots (phase margin and gain margin). Transfer function from the Bode diagram –Polar plots, Nyquist stability criterion.

UNIT - 4

Classical Control Design Techniques (BTL-5)

Lag, lead, lag-lead compensators - physical realization - design of lag, lead compensators using Bode plots.

UNIT - 5

State Space Analysis of LTI Systems (BTL-2)

Concepts of state - state variables and state model - state space representation of transfer function: Controllable Canonical Form - Observable Canonical Form, solving the time invariant state equations State Transition Matrix and its properties- concepts of controllability and observability.

Text Books:

1. Modern Control Engineering by Kotsuhiko Ogata, Prentice Hall of India, 2010.
2. Automatic control systems by Benjamin C.Kuo, Prentice Hall of India, 2nd Edition.
3. Control systems by Nagoor kani 3rd edition RBA Publications.

Reference Books:

1. Control Systems principles and design by M.Gopal, Tata Mc Graw Hill education Pvt Ltd., 4th Edition.
2. Control Systems Engineering by Norman S. Nise, Wiley Publications, 7th edition
3. Control Systems by Manik Dhanesh N, Cengage publications.
4. Control Systems Engineering by I.J.Nagarath and M.Gopal, NewagePublications, 5th Edition.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/107/106/107106081/
2. https://archive.nptel.ac.in/courses/108/106/108106098/
3. https://nptelvideos.com/video.php?id=1423&c=14

Course Outcomes:

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

CO1: Derive the transfer function of physical systems and determine overall transfer function using block diagram algebra and signal flow graphs.

CO2: Obtain the time response of first and specifications of second order systems and determine error constants. Analyze the absolute and relative stability of LTI systems using Routh's stability criterion and root locus method.

CO3: Analyze the stability of LTI systems using frequency response methods.

CO4: Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode Diagrams.

CO5: Apply state space analysis concepts to represent physical systems as state models, derive transfer function and determine the response. Understand the concepts of controllability and observability

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Assistant Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II B.Tech – II Semester

L	T	P	C
0	0	3	1.5

INDUCTION AND SYNCHRONOUS MACHINES LAB
(23EE4L05)

Course Objectives:

The objectives of this course is

- To apply the concepts of speed control methods in 3-phase Induction Motor.
- To experimentally develop circle diagram and obtain equivalent circuit to analyse the performance of 3-phase induction motor
- To apply the concepts of power factor improvement on single phase Induction Motor
- To perform various testing methods on alternators for experimentally predetermine the regulation

List of Experiments

Any 10 experiments of the following are required to be conducted

1. Brake test on three-phase Induction Motor.
2. Circle diagram of three phase induction motor.
3. Speed control of three phase induction motor by V/f method.
4. Equivalent circuit of single-phase induction motor.
5. Power factor improvement of single-phase induction motor by using capacitors.
6. Load test on single phase induction motor.
7. Regulation of a three -phase alternator by synchronous impedance methods.
8. Regulation of three-phase alternator by MMF method.
9. V and Inverted V curves of a three-phase synchronous motor.
10. Determination of X_d, X_q& Regulation of a salient pole synchronous generator.
11. Determination of efficiency of three phase alternator by loading with three phase induction motor.
12. Parallel operation of three-phase alternator with infinite bus bar under no-load condition.
13. Determination of efficiency of a single-phase AC series Motor by conducting Brake test.

Online Learning Resources: https://em-coep.vlabs.ac.in/List%20of%20experiments.html

Course Outcomes:

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

CO1: Analyze the speed control methods on 3-phase Induction Motor.

CO2: Evaluate the performance of 3-phase Induction Motor by obtaining the locus diagramand equivalent circuit of 3-phase Induction Motor

CO3: Adapt the power factor improvement methods for single phase Induction MotorCO4: Pre-determine the regulation of 3-phase alternator

CO5: Determine the synchronous machine reactance of 3-phase alternator

Note: Students supposed to do an Experiment beyond the syllabus/Lab oriented mini Project/Case Study and submit it for internal valuation.

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro, Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II B.Tech – II Semester

CONTROL SYSTEMS LAB
(23EE4L06)

L	T	P	C
0	0	3	1.5

Course Objectives:

- To impart hands on experience to understand the performance of basic control system components such as magnetic amplifiers, D.C. servo motors, A.C. Servo motors and Synchros.
- To understand time and frequency responses of control system with and without Controllers and compensators.
- To know the different logic gates and Boolean expressions using PLC.

List of Experiments:

Any 10 of the following experiments are to be conducted:

1. Analysis of Second order system in time domain
2. Characteristics of Synchros
3. Effect of P, PD, PI, PID Controller on a second order systems
4. Design of Lag and lead compensation – Magnitude and phase plot
5. Transfer function of DC motor
6. Root locus, Bode Plot and Nyquist Plot for the transfer function of systems up to 5^{th}order using MATLAB.
7. Kalman's test of Controllability and Observability using MAT LAB.
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. Characteristics of DC servo motor
12. Study and verify the truth table of logic gates and simple Boolean expressions using PLC

Course Outcomes:

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

CO1: Analyze the performance of Magnetic amplifier, D.C and A.C. servo motors and synchros.

CO2: Design of PID controllers and compensators.

CO3: Evaluate temperature control of an oven using PID controller

CO4: Determine the transfer function of DC Motor and examine the truth table of logicgates using PLC.

CO5: Judge the stability in time and frequency domain and Kalman's test for controllabilityand observability.

Note: Students supposed to do an Experiment beyond the syllabus/Lab oriented mini Project/Case Study and submit it for internal valuation

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533 003

II Year - II Semester	CODE: 23CS4S04	L	T	P	C
		0	1	2	2

PYTHON PROGRAMMING LAB
(EEE)

Course Objectives:

- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these

Course Outcomes: Students are able to

COs	Statement	Blooms Level
CO1	Apply basic types to implement python programs	BL3
CO2	Apply functions in problem solving	BL3
CO3	Apply dictionaries in problem solving	BL3
CO4	Implement programs using files	BL3
CO5	Implement python programs using data science libraries	BL3

UNIT – I

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.

Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.

Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
   i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v)Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

Dr.N Ramakrishnaiah, Professor of CSE And Controller of Examinations UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE. IIT Patna	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	rayana Rao Routhu, echnology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

UNIT - II

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

Sample Experiments:

1. Write a program to define a function with multiple return values.
2. Write a program to define a function using default arguments.
3. Write a program to find the length of the string without using any library functions.
4. Write a program to check if the substring is present in a given string or not.
5. Write a program to perform the given operations on a list:
   i. addition ii. insertion iii. slicing
6. Write a program to perform any 5 built-in functions by taking any list.

UNIT - III

Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists,
Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

Sample Experiments:

1. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
2. Write a program to count the number of vowels in a string (No control flow allowed).
3. Write a program to check if a given key exists in a dictionary or not.
4. Write a program to add a new key-value pair to an existing dictionary.
5. Write a program to sum all the items in a given dictionary.

UNIT - IV

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism

N. Ramakrishnaiah, Professor of CSE And Controller of Examinations UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE. IIT Patna	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	Online Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	ch. s. Rao. Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Head of the
Computer Science & Engineering Dept.
BVC Engineering College, Odalarevu

Sample Experiments:

1. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
2. Python program to print each line of a file in reverse order.
3. Python program to compute the number of characters, words and lines in a file.
4. Write a program to create, display, append, insert and reverse the order of the items in the array.
5. Write a program to add, transpose and multiply two matrices.
6. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT – V

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

Sample Experiments:

1. Python program to check whether a JSON string contains complex object or not.
2. Python Program to demonstrate NumPy arrays creation using array () function.
3. Python program to demonstrate use of ndim, shape, size, dtype.
4. Python program to demonstrate basic slicing, integer and Boolean indexing.
5. Python program to find min, max, sum, cumulative sum of array
6. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
   a) Apply head () function to the pandas data frame
   b) Perform various data selection operations on Data Frame
7. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib

Reference Books:

1. Gowri shankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

Online Learning Resources:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

Dr.N Ramakrishnaiah, Professor of CSE And Controller of Examinations UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE. IIT Patna	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	Narayana Rao Routhu, Technology Manager, Hidden Brains, Ahmadabad.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. B S N Murthy Professor of CSE, BVCEC.

Head of the
Computer Science & Engineering Dept.
BVC Engineering College, Odalarevu
East Godavari Dist. A.P. 533 210

II B.Tech – II Semester

L	T	P	C
1	0	2	2

DESIGN THINKING & INNOVATION
(23ES4L06)

Course Objectives: The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

UNIT – I: Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT - II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring theimpact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation,Debate on value-based innovation.

UNIT – IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Productplanning, product specifications. Innovation towards product design Case studies.

Activity: Importance of modeling, how to set specifications, Explaining their own productdesign.

UNIT – V Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design thinking principles that redefine business –Business challenges- Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity: How to market our own product, about maintenance, Reliability, and plan for start-up.

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada

Textbooks:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. Chesbrough.H, The era of open innovation, 2003.

Online Learning Resources:

- https://nptel.ac.in/courses/110/106/110106124/
- https://nptel.ac.in/courses/109/104/109104109/
- https://swayam.gov.in/nd1_noc19_mg60/preview
- https://onlinecourses.nptel.ac.in/noc22_de16/preview

Course Outcomes:

COs	Statements	Blooms Level
CO1	Define the concepts related to design thinking.	L1
CO2	Explain the fundamentals of Design Thinking and innovation.	L2
CO3	Apply the design thinking techniques for solving problems in various sectors.	L3
CO4	Analyse to work in a multidisciplinary environment.	L4
CO5	Evaluate the value of creativity.	L5

S.No.	Members	Name & Institution	Signature of member
1	Chairman	Dr. S.Srikanth , Professor & HOD	
2	University Nominee	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	
3	Subject expert from outside the college	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad	
4	Subject expert from outside the college	Dr. G.Siva Kumar , Asst. professor , Dept. of EE, NIT Warangal	
5	Representative from Industry	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,Pune	
6	Alumni Member	D.Lakshman Kumar, Asst. professor, Dept. of EEE,Sri Vishnu Engineering College for Women(A), WG Dist.	

Associate Professor
Dept of Elec. & Electronics Engg.
University College of Engineering
J.N.T University Kakinada
KAKINADA-533 003

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date of Meet: 10-10-2025 VENUE: Conference Hall

Time: 02:00PM

AGENDA for 3rd BOS Meeting

1. Welcome address by BOS chairman.
2. Discussion on the ratification of the course structure and syllabus of M.Tech in Power Electronics (BR25).
3. Discussion & Finalization of Academic Regulations for Elective Courses offered through NPTEL/ Swayam/ Swayam Plus
4. Any other item.

Chairman BOS

Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date of Meet: 21-06-2025 VENUE: Conference Hall
Time: 01:00PM

Minutes of meeting

Chairman of Board of studies (BOS) welcome all the members of the BOS. Following are the Minutes of meeting of the BOS in the E.E.E Department held on 21-06-2025 through virtual mode (online) from 01.00 p.m-03.00p.m.

1. Chairman, BOS briefed the agenda for the 3rd BOS meeting for BR23 Regulation of the B.Tech. Programme in. Electrical and Electronics Engineering
2. **BR23 III Year Course Structure & Syllabus**
   Presented the Course Structure and Syllabus of III B.Tech. I and II Semesters prepared in-line with JNTUK-R23 Regulation.
3. **Course Structure & Syllabus for Honors in Electrical and Electronics Engineering**
   Presented proposed Course Structure & Syllabus as per JNTUK R23 for Honors Program
4. **Course Structure & Syllabus for Minor in Electrical and Electronics Engineering.**
   Presented proposed Course Structure & Syllabus as per JNTUK R23 for Minor Degree in Electrical and Electronics Engineering,
5. **Academic Regulations for MOOCs through NPTEL/SWAYAM**
   Discussed on the minimum & maximum number of credits to be earned through MOOCs (*Applicable for Professional Elective & Open Elective Courses only*). The student needs to complete minimum one course of 12 weeks duration for 3 credits compulsorily and has the provision to pursue and earn 20% of the total Credits (160), i.e. 32 credits.

RESOLUTIONS TAKEN:

1. The proposed course structure & Syllabi of B.Tech. III year I and II Semesters is ratified. The proposed interchange of one Elective Course under the pool of Professional Elective-I to Professional Elective-II in the5th& 6th Semester is approved by the members of BOS.

S.No.	Course Title as per R23(JNTUK)	Course Title as per BR23 (BVCEC)
1	Communication systems	Renewable and Distributed Energy Technologies
2	Renewable and Distributed Energy Technologies	Communication systems

2. The proposed Course Structure & Syllabi for Honors & Minor Degree Programs are ratified, which are *in toto* with JNTUK
3. Hon'ble JNTUK University Nominee Dr,N.Sumathi has suggested to get the recent academic regulations on MOOCs courses from the affiliating University: JNTUK. It is resolved to follow the same academic regulations on MOOCs, Honors and Monor Degree Programs in toto with JNTUK.

Finally, Chairman of BOS thanked all the members for their active participation and valuable suggestions for possible implementation. The meeting was completed with the items stated as per the agenda.

Chairman BOS
EEE Department

Members Present:

S.No	Name	Position in BOS	Signature
1	Dr. S.Srikanth HOD, Dept. of EEE	Chairman	
2	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK, JNTUK Kakinada	University Nominee	
3	Dr. K.Siva Kumar , Professor, Dept. of EE, IIT Hyderabad.	Subject expert from IIT Hyderabad	
4	Dr. G.Siva Kumar , Assistant Professor, Dept. of EE, NIT Warangal	Subject expert Dept. of EE, NIT Warangal	
5	Dr.S.Jayadeep Product Development Engineer, Digital Energy Solutions Larsen&Toubro,	Representative from Industry	
6	D.Lakshman Kumar, Department of EEE, Sri Vishnu Engineering College for Women,	Alumni Member	
7	Dr. M.Srinivasa Rao Professor, Dept. of EEE	Member	
8	Dr. K.Satya Rajasekhar Asst. Professor, Dept. of EEE	Member	
9	A.Rama krishana Assoc. Professor, Dept. of EEE	Member	
10	N.Siva Nagendra Asst. Professor, Dept. of EEE	Member	
11	G.Lova Raju Assoc. Professor, Dept. of EEE	Member	
12	A.S.S.Rao Asst. Professor, Dept. of EEE	Member	
13	E. Raju Asst. Professor, Dept. of EEE	Member	
14	A.V. Narayana Asst. Professor, Dept. of EEE	Member	
15	T Mani Ratnam, Asst. Professor, Dept. of EEE	Member	
16	K Vijaya Prasad Asst. Professor, Dept. of EEE	Member	
17	Ch Maniteja Asst. Professor, Dept. of EEE	Member	

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

III B.Tech - I Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23EE5T08	PC	Power Electronics	3	0	0	3
2	23EE5T09	PC	Digital Circuits	3	0	0	3
3	23EE5T10	PC	Power Systems-II	3	0	0	3
4	23EE5D01 23EE5D02 23EE5D03	PE	Professional Elective -1 1. Signals and Systems 2.Computer Architecture and Organization 3. Renewable and Distributed Energy Technologies 4.12 week MOOC Swayam/NPTEL course recommended by the BOS	3	0	0	3
5		OE	Open Elective-I	3	0	0	3
6	23EE5L07	PC	Power Electronics Lab	0	0	3	1.5
7	23EE5L08	PC	Analog and Digital Circuits Lab	0	0	3	1.5
8	23HM5S01	SEC	Soft Skills	0	1	2	2
9	23ES5L07	ES	Tinkering Lab	0	0	2	1
10	23BS5P01	BS	Evaluation of Community Service Project	-	-	-	2
Total				**15**	**1**	**10**	**23**

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

III B.Tech. - II Semester

S.No.	Course Code	Category of course	Subjects	L	T	P	C
1	23EE6T11	PC	Electrical Measurements and Instrumentation	3	0	0	3
2	23EE6T12	PC	Microprocessors and Microcontrollers	3	0	0	3
3	23EE6T13	PC	Power System Analysis	3	0	0	3
4	23EE6D04	PE	Professional Elective -II	3	0	0	3
			1.Switchgear and Protection				
	23EE6D05		2.Advanced Control Systems				
	23EE6D06		3. Communication systems				
			4.12 week MOOC Swayam /NPTEL course recommended by the BOS				
5	23EE6D07	PE	Professional Elective -III	3	0	0	3
			1.Electric Drives				
	23EE6D08		2.Digital Signal Processing				
	23EE6D09		3.High Voltage Engineering				
			4.12 week MOOC Swayam/NPTEL course recommended by the BOS				
6		OE	Open Elective-II	3	0	0	3
7	23EE6L09	PC	Electrical Measurements and Instrumentation Lab	0	0	3	1.5
8	23EE6L10	PC	Microprocessors and Microcontrollers Lab	0	0	3	1.5
9	23EE6S01	SEC	IoT Applications of Electrical Engineering	0	1	2	2
10	23AC6T04	AC	Research Methodology	2	0	0	-
			Total	20	1	08	23
23EE6P02- **Mandatory Industry Internship of 08 weeks duration during summer vacation**							

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Department Of Electrical And Electronics Engineering

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

OPEN ELECTIVES (Not for EEE)

S.No.	Course Code	Category	Subjects	L	T	P	C
1		OE	Open Elective-I	3	0	0	3
	23EE5E01		1.Renewable Energy Sources				
	23EE5E02		2.Concepts of Energy Auditing &Management				
2		OE	Open Elective-II	3	0	0	3
	23EE6E03		1.Fundamentals of Electric Vehicles				
	23EE6E04		2..Electrical Wiring Estimation and Costing				

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

Minor Engineering Courses offered by EEE Department for Other Branches (Except EEE Branch)

S.No.	Course Code	Subjects	L	T	P	C
1	23EEMT01	Concepts of Control Systems	3	0	0	3
2	23EEMT02	Fundamentals of Electrical Measurements and Instrumentation	3	0	0	3
3	23EEMT03	Concepts of Power System Engineering	3	0	0	3
4	23EEMT04	Fundamentals of Power Electronics	3	0	0	3
5	23EEMT05	Basics of Electric Drives and applications	3	0	0	3
6	23EEMT06	Fundamentals of utilization of Electrical Energy	3	0	0	3
		Total	18	**0**	0	18

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

Department Of Electrical And Electronics Engineering

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

Honors Engineering Courses offered EEE Branch students

Need to Acquire 18 credits

Power Systems

S.No.	Course Code	Subjects	L	T	P	C
1	23EEHT01	Electric Power Quality	3	0	0	3
2	23EEHT02	Smart Grid Technologies	3	0	0	3
3	23EEHT03	Power System Deregulation	3	0	0	3
4	23EEHT04	Real Time Control of Power Systems	3	0	0	3
5	23EEHT05	Advanced Power Systems Protection	3	0	0	3
6	23EEHT06	Flexible AC Transmission Systems	3	0	0	3
7	23EEHT07	AI applications in Power Systems	3	0	0	3
8	23EEHL01	Power Systems Lab	0	0	3	1.5
9	23EEHL02	Advanced Power Systems Simulation Lab	0	0	3	1.5

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONOICS ENGINEERING

Course structure for the A.Y 2025-2026 (BR23Regulations)

Honors Engineering Courses offered EEE Branch students

Need to Acquire 18 credits

Power Electronics

S.No.	Course Code	Subjects	L	T	P	C
1	23EEHT08	Special Electrical Machines	3	0	0	3
2	23EEHT09	Machine Modeling and Analysis	3	0	0	3
3	23EEHT10	Power Electronic Converters	3	0	0	3
4	23EEHT11	Power Quality and Custom Power Devices	3	0	0	3
5	23EEHT12	Power Electronics for Renewable Energy systems	3	0	0	3
6	23EEHT13	Industrial Applications of Power Electronic Converters	3	0	0	3
7	23EEHT14	Advanced Electrical Drives	3	0	0	3
8	23EEHT15	FACTS Controllers	3	0	0	3
9	23EEHL03	Power Converters Laboratory	0	0	3	1.5
10	23EEHL04	Electric Drives Laboratory	0	0	3	1.5
11	23EEHL05	Renewable Technologies Laboratory	0	0	3	1.5
12	23EEHL06	Electric Vehicles Laboratory	0	0	3	1.5

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
JNTU University Kakinada
KAKINADA-533003.

Department Of Electrical And Electronics Engineering

III B.Tech. - I Semester	23EE5T08	L	T	P	C
		3	0	0	3

Power Electronics

Pre-requisite:

Electrical Circuit Analysis, Semiconductor Physics, Control Systems

Course Objectives:

- To know the characteristics of various power semiconductor devices.
- To learn the operation of single phase controlled converters and perform harmonic
- analysis of input current.
- To learn the operation of three phase controlled converters and AC/AC converters.
- To learn the operation of different types of DC-DC converters and control techniques.
- To learn the operation of PWM inverters for voltage control and harmonic mitigation.

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT.
CO2: Analyse the operation of phase-controlled rectifiers.
CO3: Analyse the operation of three-phase full–wave converters, AC Voltage Controllers and Cycloconverters.
CO4: Examine the operation and design of different types of DC-DC converters.
CO5: Analyse the operation of Square wave inverters and PWM inverters for voltage control.

UNIT – I

Power Semi-Conductor Devices

Silicon controlled rectifier (SCR) – Two transistor analogy - Static and Dynamic characteristics – Turn on and Turn off Methods - Triggering Methods (R, RC and UJT) – Snubber circuit design. Static and Dynamic Characteristics of Power MOSFET and Power IGBT-Numerical problems.

UNIT – II

Single-phase AC-DC Converters

Single-phase half-wave controlled rectifiers - R and RL loads with and without freewheeling diode - Single-phase fully controlled bridge converter with R load and RL load - Continuous conduction - Effect of source inductance in Single-phase fully controlled bridge rectifier – Expression for output voltages – Single-phase Semi-Converter with R load-RL load– Continuous conduction - Dual converter and its mode of operation - Numerical Problems.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT – III

Three-phase AC-DC Converters & AC – AC Converters

Three-phase half-wave Rectifier with R and RL load - Three-phase fully controlled rectifier with R and RL load - Expression for Output Voltage - Numerical Problems.

Single-phase AC-AC power control by phase control with R and RL loads - Expression for rms output voltage – Single-phase step down and step up Cycloconverter - Numerical Problems.

UNIT – IV

DC–DC Converters

Operation of Basic Chopper – Analysis of Buck, Boost and Buck-Boost converters in Continuous Conduction Mode (CCM) - Output voltage equations using volt-sec balance in CCM– Expressions for output voltage ripple and inductor current ripple – control techniques – Introduction to PWM control -Numerical Problems.

UNIT – V

DC–AC Converters

Introduction - Single-phase half-bridge and full-bridge inverters with R and RL loads – Phase Displacement Control – PWM with bipolar voltage switching, PWM with unipolar voltage switching - Three-phase square wave inverters - 120^0 conduction and 180^0 conduction modes of operation - Sinusoidal Pulse Width Modulation - Current Source Inverter (CSI) - Numerical Problems.

Text Books:

1. Power Electronics: Converters, Applications and Design by Ned Mohan, Tore M Undeland, William P Robbins, John Wiley & Sons, 2002.
2. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 2017.
3. Power Electronics: Essentials & Applications by L.Umanand, Wiley, Pvt. Limited, India, 2009.

Reference Books:

1. Elements of Power Electronics–Philip T.Krein. Oxford University Press; Second edition, 2014.
2. Power Electronics – by P.S.Bhimbra, Khanna Publishers.
3. Thyristorised Power Controllers – by G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K.Sinha, New Age International (P) Limited Publishers, 1996.
4. Power Electronics: by Daniel W.Hart, Mc Graw Hill, 2011.

Online Learning Resources:

1. https://ocw.mit.edu/courses/6-334-power-electronics-spring-2007
2. https://archive.nptel.ac.in/courses/108/101/108101126

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5T09	L	T	P	C
		3	0	0	3

Digital Circuits

Pre-requisite:
Knowledge of electronic components and semiconductor devices, number systems, binary arithmetic, Boolean or switching algebra and logic gates.

Course Objectives:

- To know the simplification methods of Boolean functions
- To understand the realization of arithmetic, data routing and memory logic circuits.
- To know the operation and design of various counters and registers.
- To understand the analysis and design of synchronous sequential circuits.
- To understand the basic concepts of digital integrated circuits.

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

CO1: Use the concepts of Boolean algebra, K-map, tabulation method in minimization of switching functions and able to design the arithmetic combinational circuits.
CO2: Realize different types of data routing combinational circuits and PLDs.
CO3: Apply knowledge of flip-flops in designing of registers and counters.
CO4: Analyze synchronous sequential circuits and apply different methods for the design of synchronous sequential circuits.
CO5: Understand the logic families in the form of digital integrated circuits.

UNIT – I:

Combinational logic circuits – I

Definition of combinational logic, canonical forms, Generation of switching equations from truth tables, simplification of logic functions using Boolean theorems, NAND and NOR implementations, Karnaugh maps – 3,4 variables, Incompletely specified functions (Don't care terms), Simplifying Max term equations, General approach to combinational logic design, Look ahead carry adder, Cascading full adders, 4-bit adder-subtractor circuit, BCD adder circuit, Binary comparators.

UNIT – II:

Combinational logic circuits – II

Decoders, BCD decoders, 7 segment decoder, higher order decoder, multiplexer, higher order multiplexing, de-multiplexers, realization of Boolean functions using decoders, multiplexers, encoders, priority encoder, Read only and Read/Write Memories, Programmable ROM, PAL, PLA-Basics structures, Realization of Boolean functions using PROM.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
J.N.T.University Kakinada
KAKINADA-533003.

UNIT – III

Sequential logic circuits

Timing considerations of flip-flops, master-slave flip-flop, edge triggered flip-flops, characteristic equations, flip-flops with reset and clear terminals, excitation tables design of asynchronous and synchronous counters, design of modulus-N counters, Johnson counter, ring counter, design of registers - register, control register, shift register, bi-directional shift register, universal shift register.

UNIT – IV

Sequential Circuit Design

Mealy and Moore models, State machine notation, Synchronous Sequential circuit analysis, Construction of state diagrams, Analysis of clocked sequential circuits, realization of sequence detector circuit, state reduction and assignments.

UNIT – V

Digital integrated circuits:

Logic levels, propagation delay time, power dissipation, fan-out and fan-in, noise margin, logic families – RTL and DTL Circuits,TTL, Emitter-Coupled Logic, Metal-Oxide Semiconductor, Complementary MOS, CMOS Transmission Gate Circuits.

Textbooks:

1. Switching and finite automata theory Zvi. Kohavi, 3rd edition, Cambridge University Press, 2010.
2. M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education,2006.

Reference Books:

1. Fundamentals of Logic Design by Charles H. Roth Jr, Jaico Publishers, 5th Edition, 1992.
2. Switching Theory and Logic Design by A. AnandKumar,Prentice Hall India Pvt., Limited, Third Edition, 2016.

Online Learning Resources:

1.https://nptel.ac.in/courses/117106086.

2.https://nptel.ac.in/courses/108105113

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5T10	L	T	P	C
		3	0	0	3

Power Systems-II

Pre-requisite:

Power systems-I, Electrical circuit Analysis.

Course Objectives:

- To understand the concepts of GMD&GMR to compute inductance & capacitance of transmission lines.
- To distinguish the models of short, medium and long length transmission lines and analyze their performance.
- To learn the effect of travelling waves on transmission lines with different terminal conditions.
- To learn the concepts of corona, the factors effecting corona and effects of transmission lines.
- To design the sag and tension of transmission lines as well as to learn the performance of line insulators.

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Calculate parameters of transmission lines for different circuit configurations.
CO2: Analyze the performance of short, medium and long transmission lines.
CO3: Analyze the effect of travelling waves on transmission lines.
CO4: Estimate the effects of corona in transmission lines.
CO5: Calculate sag and tension of transmission lines and design the line insulators.

UNIT–I

Transmission Line Parameters Calculations

Types of conductors – Calculation of inductance and capacitance for Single-phase and Three-phase single and double circuit lines– Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition–Bundled conductors, Skin and Proximity effects

UNIT–II

Performance Analysis of Transmission Lines

Classification of Transmission Lines – Short, medium, long lines and their model representation – Nominal-T, Nominal-π and A, B, C, D Constants for symmetrical Networks.

Rigorous Solution for long line equations –Surge Impedance and Surge Impedance Loading of Long Lines - Regulation and efficiency for all types of lines – Ferranti effect.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT – III

Power System Transients

Types of System Transients – Propagation of Surges – Attenuation–Distortion– Reflection and Refraction Coefficients.

Termination of lines with different types of conditions: Open Circuited Line–Short Circuited Line, Line terminated through a resistance and line connected to a cable. Reflection and Refraction at a T-Junction.

UNIT–IV

Corona & Effects of transmission lines

Description of the phenomenon – Types of Corona - critical voltages and power loss – Advantages and Disadvantages of Corona - Factors affecting corona - Radio Interference.

UNIT–V

Sag and Tension Calculations and Overhead Line Insulators:

Sag and Tension calculations with equal and unequal heights of towers–Effect of Wind and Ice weight on conductor – Stringing chart and sag template.

Types of Insulators – Voltage distribution in suspension insulators–Calculation of string efficiency and Methods for String efficiency improvement.

Text Books:

1. Electrical Power Systems – by C.L.Wadhwa, New Age International (P) Limited, 1998.
2. Power System Engineering by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 3rd Edition, 2019.

Reference Books:

1. Power system Analysis–by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai Co Pvt. Ltd.2016.
4. Electrical Power Systems by P.S.R. Murthy, B.S. Publications, 2017.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/108/105/108105104
2. https://archive.nptel.ac.in/courses/108/102/108102047

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5D01	L	T	P	C
		3	0	0	3

Signals and Systems

Course Outcomes:

- Differentiate the various classifications of signals and systems
- Analyze the frequency domain representation of signals using Fourier concepts
- Classify the systems based on their properties and determine the response of LTI Systems.
- Know the sampling process and various types of sampling techniques.
- Apply Laplace and z-transforms to analyze signals and Systems(continuous & discrete).

UNIT- I: INTRODUCTION: Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems, Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum and ramp function.

UNIT–II: FOURIER SERIES AND FOURIER TRANSFORM:
Fourier series representation of continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of standard signals, properties of Fourier transforms, FT involving impulseand Signum function.

UNIT-III:
CORRELATION: Auto-correlation and cross-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation.
SAMPLING THEOREM: Graphical and analytical proof or Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Aliasing, Related problems.

UNIT–IV:
LAPLACE TRANSFORMS: Introduction, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Inverse Laplace transform, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT–V:
Z–TRANSFORMS: Concept of Z-Transform of a discrete sequence. Region of convergence in Z- Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms, Distinction between Laplace, Fourier and Z transforms.

TEXT BOOKS:

1. Signals, Systems & Communications-B.P.Lathi,BSPublications,2003.
2. Signals and Systems-A.V. Oppenheim, A.S. Willsky and S.H. Nawab,PHI,2ndEdn,1997
3. Signals & Systems-SimonHaykinandVanVeen,Wiley,2ndEdition,2007

REFERENCE BOOKS:

1. PrinciplesofLinearSystemsandSignals–BPLathi,OxfordUniversityPress,2015
2. Signals and Systems–TK Rawat, Oxford University press,2011.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5D02	L	T	P	C
		3	0	0	3

Computer Architecture and Organization

Pre-requisite:

Basic knowledge in digital electronics, fundamentals of computers.

Course Objectives:

- To explain the basic working of a digital computer.
- To understand the register transfer language and micro operators.
- To learn various addressing modes supported by the processors.
- To be familiar with peripheral interfacing with processors.
- To understand memory hierarchy in computers.

Course Outcomes:

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

CO1: Demonstrate the instruction cycle of a computer.
CO2: Understand various micro operations and register transfer language.
CO3: Describe parallel processing and pipelining.
CO4: Interface different peripherals with processors.
CO5: Know the advantages of cache and virtual memory.

UNIT-I

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output and Interrupt, Complete Computer Description, Design of Basic Computer.

UNIT-II

Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit. Micro programmed Control: Control Memory, Address Sequencing, Micro program Example.

UNIT-III

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC) Pipeline and Vector Processing.

UNIT-IV

Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), Serial Communication.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT-V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Memory Management Hardware.

Text Books:

1. Computer System Architecture, M. Morris Mano, Prentice Hall of India Pvt. Ltd., 3rd Edition, Sept. 2008.

References Books:

1. Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003.
2. Computer Organization and Architecture, Linda Null, Julia Lobur, Narosa Publications ISBN 81- 7319-609-5

Computer System Organization by John. P. Hayes.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5D03	L	T	P	C
		3	0	0	3

Renewable and Distributed Energy Technologies

Pre-requisite: Power system I

Course Objectives:

- To understand the basic concepts on solar energy systems.
- To understand the various concepts like PV characteristics, sizing and MPPT techniques..
- To understand the basic concepts wind energy systems
- To design the Hydel system components and to get an idea on different other sources like tidal and gas based units.
- To understand the concepts of hybrid renewable energy systems.

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Illustrate basic concepts of renewable and distributed sources of solar energy.
CO2: Demonstrate the components of solar energy conversion systems.
CO3: Model Wind energy systems and analyze MPPT Techniques.
CO4: Illustrate the concept of Energy Production from Hydro - Tidal and Gas.
CO5:Explain the aspects of hybrid renewable energy systems.

UNIT–I

Solar energy

Solar radiation: Outside earth's atmosphere – Earth surface – Analysis of solar radiation data – Geometry – Radiation on tilted surfaces.

UNIT–II

Solar Photovoltaic Systems

Solar photovoltaic cell, module, array– Efficiency of solar cells –Cell I-V characteristics – Equivalent circuit of solar cell – Balance of system components - System design: storage sizing – PV system sizing – Maximum power point techniques: Perturb and observe (P&O) technique – Hill climbing technique.

UNIT–III

Wind Energy systems

Sources of wind energy - Types of turbines –Horizontal axis and vertical axis machines - Kinetic energy of wind – Betz coefficient – Tip–speed ratio – Efficiency – Power output of wind turbine – Selection of generator(synchronous, induction) – Maximum power point tracking.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

UNIT – IV

Small Hydro and other sources

Hydel: Small-Mini-Medium -Plant layouts Water power estimates -use of hydrographs -hydraulic turbine - characteristics and part load performance. Other sources: Tidal - Gas-based generations.

UNIT – V

Hybrid Renewable systems

Requirements of hybrid/combined use of different renewable and distributed sources -Need of energy storage- Control of frequency and voltage of distributed generation in Stand-alone and Grid-connected mode - use of energy storage and power electronics interfaces for the connection to grid and loads - Design and optimization of size of renewable sources and their storages.

Text Books :

1. Math J. Bollen - Fainan Hassan 'Integration of Distributed Generation in the Power System' - IEEE Press - 2011.
2. G.D.Rai 'Non-Conventional Energy Sources' KHANNA PUBLISHERS.

Reference Books

1. Studies' Craig Anderson and Rudolf I. Howard 'Wind and Hydropower Integration: Concepts - Considerations and Case - Nova Publisher - 2012.
2. Amanda E. Niemi and Cory M. Fincher 'Hydropower from Small and Low-Head Hydro Technologies' - Nova Publisher - 2011.
3. D. YogiGoswami - Frank Kreith and Jan F. Kreider 'Principles of Solar Engineering' - Taylor & Francis 2000.
4. Math J. Bollen - Fainan Hassan 'Integration of Distributed Generation in the Power System' - IEEE Press - 2011.
5. S. Heier and R. Waddington 'Grid Integration of Wind Energy Conversion Systems' – Wiley - 2006.
6. Loi Lei Lai and Tze Fun Chan 'Distributed Generation: Induction and Permanent Magnet Generators' - Wiley-IEEE Press - 2007.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/103/103/103103206
2. https://archive.nptel.ac.in/courses/103/107/103107157

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23EE5L07	L	T	P	C
		0	0	3	1.5

Power Electronics Lab

Course objectives:

- To learn the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- To analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
- To understand the operation of AC voltage regulator with resistive and inductive loads.
- To understand the working of Buck converter and Boost converter.
- To understand the working of single-phase & three-phase inverters.

Course outcomes:

After the completion of the course the student should be able to:

CO1: Analyse characteristics of various power electronic devices and design firing circuits for SCR.
CO2: Analyse the performance of single–phase dual, three–phase full–wave bridge converters and dual converter with both resistive and inductive loads.
CO3: Examine the operation of Single-phase AC voltage regulator and Cyclo converter with resistive and inductive loads.
CO4: Differentiate the working and control of Buck converter and boost converter.
CO5: Differentiate the working & control of square wave inverter and PWM inverter.

List of Experiments:

Any 10 of the Following Experiments are to be conducted

1. Characteristics of SCR - Power MOSFET & Power IGBT.
2. R, RC & UJT firing circuits for SCR.
3. Single -Phase semi-converter with R & RL loads.
4. Single -Phase full-converter with R & RL loads.
5. Three- Phase full-converter with R & RL loads.
6. Single-phase dual converter in circulating current & non circulating current mode of operation.
7. Single-Phase AC Voltage Regulator with R & RL Loads.
8. Single-phase step down Cyclo-converter with R & RL Loads.
9. Boost converter in Continuous Conduction Mode operation.
10. Buck converter in Continuous Conduction Mode operation.
11. Single -Phase square wave bridge inverter with R & RL Loads.
12. Single - Phase PWM inverter.
13. Three-phase bridge inverter with 120^0 and 180^0 conduction mode.
14. SCR commutation techniques.
15. Single - Phase Series inverter.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

III B.Tech. - I Semester	23EE5L07	L	T	P	C
		0	0	3	1.5

Analog and Digital Circuits Lab

Course Objectives:

To impart knowledge on

- Analysis of transistor amplifiers
- Analysis of feedback amplifiers and oscillators
- Realization of digital circuits such data routing, registers and counters.

Course Outcomes:

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

CO1: Analyse diode clipper/clamper circuits and transistor biasing.
CO2: Illustrate the operation of feedback amplifiers and oscillator circuits.
CO3: Analyze the applications of linear IC's
CO4: Demonstrate the operation of digital circuits such as arithmetic, data routing, registers and counters.

Any 5 of the Following Experiments are to be conducted from each PART.

PART-A

1. Analysis of clipper and clamper circuits.
2. Analysis of self-bias to a transistor.
3. Analysis of voltage series and current series feedback amplifiers.
4. Analysis of Wien Bridge oscillator and RC-phase shift oscillator.
5. Analysis of Integrator and Differentiator Circuits using IC 741.
6. Analysis of Monostable and Astablemultivibrator operation using IC 555 Timer.
7. Analysis of Schmitt Trigger Circuits using IC 741 and IC 555.
8. Verify the PLL characteristics using IC 565.
9. Analysis of 8 bit A to D and D to A circuits

PART-B

1. Design of Full adder and Full Subtractor using logic gates.
2. Realization of parallel adder/subtractor using IC 7483.
3. Implementation of 3 to 8 line decoder using logic gates and IC 7445.
4. Implementation of 8 to 1 multiplexer using logic gates and IC 74151.
5. Verify the operation of master-slave JK flip-flop using IC7476.
6. Realization of the following shift registers using IC7495.
   a) SISO b) SIPO c) PISO d) PIPO
7. Implementation ofMod-10 ripples counter using flip-flops and IC 7490.
8. Implementation of Mod-8 synchronous up/down counters using flip-flops.
9. Implementation of 4 bit Ring Counter and Johnson Counter using D flip-flops/J-K flip-flops.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23HM5S01	L	T	P	C
		0	1	2	2

Soft Skills

Course Objectives:

The learning objectives of this course are to:

- To prepare to face global competition for employment and excellence in profession.
- To help the students understand and build interpersonal and intrapersonal skills that will enable them to lead meaningful professional life.

Course Outcomes:

CO1: Assimilate and understood the meaning and importance of soft skills and learn how to develop them.
CO2: Understand the significance of soft skills in the working environment for professional excellence.
CO3: Prepare to undergo the placement process with confidence and clarity.
CO4: Ready to face any situation in life and equip themselves to handle them effectively.
CO5:Understand and learn the importance of etiquette in both professional and personal life

UNIT – 1: INTRODUCTION

Introduction- Emergence of life skills, Definition & Meaning, Importance& need, reasons for skill gap, Analysis--Soft Skills vs Hard skills, Linkage between industry and soft skills, Challenges, Personality Developments. Soft Skills, Soft Skills vs English - Improving Techniques

UNIT – II: Intra-Personal:

Definition-Meaning – Importance-SWOT analysis, Johari windows - Goal Setting- quotient skills - Emotional Intelligence- Attitudinal skills - Right thinking- Problem Solving-Time management, stress management.

UNIT – III: Inter-Personal:

Definition – Meaning – Importance-Communications skills- Team Work, managerial skills -Negotiation skills- Leadership skills, corporate etiquettes

UNIT – IV: Verbal Skills:

Definition and Meaning-Listening skills, need- types, advantages, Importance-Improving Tips for Listening, Speaking, need- types, advantages, Importance- Improving Tips, Reading- Writing Skills, Report, Resume, statement of purpose, need- types, advantages, Importance-Improving Tips

UNIT – V: Non Verbal Skills& Interview skills

Definition and Meaning – Importance- Facial Expressions- Eye Contact – Proxemics- Haptics -Posture, cross cultural body language, body language in interview room, appearance and dress code – Kinetics- Para Language - tone, pitch, pause, neutralization of accent, use of appropriate language, Interview skills, interview methods and questions Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, Result Set Interface.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Department Of Electrical And Electronics Engineering

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

Text Books:

1) Sheffield, M. Robert at al, Cornerstone Developing Soft Skills, 4/e, Pearson Publication, New Delhi, 2014.

2) Alka Wadkar, Life Skills for Success, 1/e, Sage Publications India Private Limited, 2016

Reference Books:

1. Sambaiah.M. Technical English, Wiley publishers India. New Delhi. 2014.

2. Gangadhar Joshi, From Campus to Corporate, SAGE TEXT.

3. Alex.K, Soft Skills, 3rd ed. S. Chand Publication, New Delhi, 2014.

4. Meenakshi Raman and Sangita Sharma, Technical Communication: Principle andPractice, Oxford University Press, 2009

Online Learning Resources:

1)https://onlinecourses.nptel.ac.in/noc20_hs60/preview

2) http://www.youtube.com/@softskillsdevelopment6210

3)https://youtube.com/playlist?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q&si=Fs05Xh8ZrOPsR8F4

4) https://www.coursera.org/learn/people-soft-skills-assessment?language=English

https://www.edx.org/learn/soft-skills

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - I Semester	23ES5L07	L	T	P	C
		0	0	2	1

Tinkering Lab
(EEE)

The aim of tinkering lab for engineering students is to provide a hands-on learning environment where students can explore, experiment, and innovate by building and testing prototypes. These labs are designed to demonstrate practical skills that complement theoretical knowledge.

Course Objectives: To

1. Encourage Innovation and Creativity
2. Provide Hands-on Learning
3. Impart Skill Development
4. Foster Collaboration and Teamwork
5. Enable Interdisciplinary Learning
6. Impart Problem-Solving mind-set
7. Prepare for Industry and Entrepreneurship

Course Outcomes: The students will be able to experiment, innovate, and solve real-world challenges. These labs bridge the gap between academia and industry, providing students with the practical experience. Some students may also develop entrepreneurial skills, potentially leading to start-ups or innovation-driven careers. Tinkering labs aim to cultivate the next generation of engineers by giving them the tools, space, and mind-set to experiment, innovate, and solve real-world challenges.

List of experiments:

1) Make your own parallel and series circuits using breadboard for any application of your choice.
2) Demonstrate a traffic light circuit using breadboard.
3) Build and demonstrate automatic Street Light using LDR.
4) Simulate the Arduino LED blinking activity in Tinkercad.
5) Build and demonstrate an Arduino LED blinking activity using Arduino IDE.
6) Interfacing IR Sensor and Servo Motor with Arduino.
7) Blink LED using ESP32.
8) LDR Interfacing with ESP32.
9) Control an LED using Mobile App.
10) Design and 3D print a Walking Robot
11) Speed control of DC motor using LDR
12) Build a live soil moisture monitoring project, and monitor soil moisture levels of a remote plan in your computer dashboard.
13) Demonstrate all the steps in design thinking to redesign a motor bike.

Students need to refer to the following links:

1) https://aim.gov.in/pdf/equipment-manual-pdf.pdf, https://aim.gov.in/pdf/Level-3.pdf
2) https://atl.aim.gov.in/ATL-Equipment-Manual/
3) https://aim.gov.in/pdf/Level-1.pdf, https://aim.gov.in/pdf/Level-2.pdf,

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003

III B.Tech. - II Semester	23EE6T11	L	T	P	C
		3	0	0	3

Electrical Measurements and Instrumentation

Pre-requisite:

Basics of Electrical and Electronics Engineering.

Course Objectives:

- To understand and analyze the factors that effect the various measuring units.
- To choose the appropriate meters for measuring of voltage, current, power, power factor and energy qualities and understand the concept of standardization.
- Describe the operating principle of AC & DC bridges for measurement of resistance, inductance and capacitance.
- To understand the concept of the transducer and their effectiveness in converting from one form to the other form for the ease of calculating and measuring purposes.
- To understand the operating principles of basic building blocks of digital systems, record and display units.

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Know the construction and working of various types of analog instruments.
CO2: Describe the construction and working of wattmeter and power factor meters
CO3: Know the construction and working various bridges for the measurement resistance inductance and capacitance
CO4: Know the operational concepts of various transducers
CO5: Know the construction and operation digital meters

UNIT - I

Analog Ammeter and Voltmeters

Classification – deflecting, control and damping torques – PMMC, moving iron type Construction – Torque equation – Range extension – Errors and compensations – advantages and disadvantages. Instrument transformers: Current Transformer and Potential Transformer – theory –Ratio and phase angle errors–Numerical Problems.

UNIT - II

Analog Wattmeters and Power Factor Meters

Electrodynamometer type wattmeter (LPF and UPF) Construction – torque equation – advantages and disadvantages. Potentiometers: Principle and operation of D.C Crompton's potentiometer – Standardization –Applications Numerical Problems.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT - III

Measurements of Electrical parameters

DC Bridges: Method of measuring low, medium and high resistance –Wheat stone's bridge for measuring medium resistance– Kelvin's double bridge for measuring low resistance – Loss of charge method for measurement of high resistance– Numerical Problems.

AC Bridges: Measurement of inductance and quality factor – Maxwell's bridge –Anderson's bridge. Measurement of capacitance and loss angle – Schering Bridge – Wien's bridge –Numerical Problems.

UNIT - IV

Transducers

Definition – Classification – Resistive, Inductive and Capacitive Transducer – LVDT – Strain Gauge – Thermistors – Thermocouples – Piezo electric and Transducers– Numerical Problems.

UNIT - V

Digital meters

Digital Voltmeters – Successive approximation DVM – Ramp type DVM and Integrating type DVM – Digital frequency meter– Digital Energy Meter – Q meter.– Numerical Problems.

Text Books:

1. Electrical Measurements and measuring Instruments by E.W. Golding and F.C.Widdis - 5th Edition - Wheeler Publishing.
2. Modern Electronic Instrumentation and Measurement Techniques by A.D. Helfrick and W.D. Cooper - PHI - 5th Edition - 2002.

Reference Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications - 19th revised edition - 2011.

2.Electrical and Electronic Measurements and instrumentation by R.K.Rajput

Online Learning Resources:

1.https://archive.nptel.ac.in/courses/108/105/108105153

Dr. S.Srikanth , Professor & HOD	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003

III B.Tech. - II Semester	23EE6T12	L	T	P	C
		3	0	0	3

Microprocessors and Microcontrollers

Pre-requisite:

Basic knowledge in digital electronics, fundamentals of computers.

Course objectives:

- To understand the organization and architecture of Microprocessor
- To understand addressing modes to access memory
- To understand 8051 micro controller architecture
- To understand the programming principles for 8086 and 8051
- To understand the interfacing of Microprocessor with I/O as well as other devices
- To understand how to develop cyber physical systems

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors.

CO2: Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors

CO3: Analyse the Microcontroller and interfacing capability

CO4: Describe the architecture and interfacing of 8051 controller

CO5: Know the concepts of PIC micro controller and its programming.

UNIT - I

Introduction to Microprocessor Architecture

Introduction and evolution of Microprocessors – Architecture of 8086 – Memory Organization of 8086 – Register Organization of 8086– Introduction to 80286 - 80386 - 80486 and Pentium (brief description about architectural advancements only).

UNIT - II

Minimum and Maximum Mode Operations

Instruction sets of 8086 - Addressing modes – Assembler directives –Simple Programs-General bus operation of 8086 – Minimum and Maximum mode operations of 8086 – 8086 Control signal interfacing – Read and write cycle timing diagrams.

Dr. S.Srikanth Professor & HOD	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of EEE, A.U.C.E.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT - III

Microprocessors I/O interfacing

8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255–Interfacing A to D converters– Interfacing D to A converters– Stepper motor interfacing– Static memory interfacing with 8086 – Architecture and interfacing of DMA controller (8257).

UNIT - IV

8051 Microcontroller

Overview of 8051 Microcontroller – Architecture– Memory Organization – Register set – Instruction set – Simple Programs - I/O ports and Interrupts – Timers and Counters – Serial Communication – Interfacing of peripherals.

UNIT - V

PIC Architecture

Block diagram of basic PIC 18 micro controller – registers I/O ports – Programming in C for PIC: Data types - I/O programming - logical operations - data conversion.

Text Books:

1. Ray and Burchandi - "Advanced Microprocessors and Interfacing"- Tata McGraw–Hill - 3rd edition - 2006.
2. Kenneth J Ayala - "The 8051 Microcontroller Architecture- Programming and Applications" - Thomson Publishers - 2nd Edition.
3. PIC Microcontroller and Embedded Systems using Assembly and C for PIC 18 - -Muhammad Ali Mazidi - RolindD.Mckinay - Danny causey -Pearson Publisher 21st Impression.

Reference Books:

1. Microprocessors and Interfacing - Douglas V Hall - Mc–Graw Hill - 2nd Edition.
2. R.S. Kaler- "A Text book of Microprocessors and Micro Controllers"- I.K. International Publishing House Pvt. Ltd.
3. Ajay V. Deshmukh-"Microcontrollers– Theory and Applications"- Tata McGraw–Hill Companies – 2005.
4. Ajit Pal - "Microcontrollers – Principles and Applications" - PHI Learning Pvt Ltd - 2011.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/108/105/108105102
2. https://archive.nptel.ac.in/courses/108/103/108103157
3. https://nptel.ac.in/courses/106108100.

Dr. S.Srikanth , Professor & HOD	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK.	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Basic & Electronics Engineering
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - II Semester	223EE6T13	L	T	P	C
		3	0	0	3

Power System Analysis

Pre-requisite:

Concepts of electrical circuits and power systems-II.

Course Objectives:

- To develop the impedance diagram (p.u) and formation of Y_{bus}
- To learn the different load flow methods.
- To learn the Z_{bus} building algorithm.
- To learn short circuit calculation for symmetrical faults
- To learn the effect of unsymmetrical faults and their effects.
- To learn the stability of power systems and method to improve stability.

Course Outcomes:

After the completion of the course the student should be able to:

CO1: Draw impedance diagram for a power system network and calculate per unit quantities.

CO2: Apply the load flow solution to a power system using different methods.

CO3: Form Z_{bus} for a power system networks and analyse the effect of symmetrical faults.

CO4: Find the sequence components for power system Components and analyse its effects ofunsymmetrical faults.

CO5: Analyse the stability concepts of a power system.

UNIT - I

Y Bus formation & Per Unit Representation

Formation of Y_{bus} matrix by singular transformation using element node incidence and bus incidence matrices and direct inspection methods. Per Unit Quantities–Single line diagram – Impedance diagram of a power system – Simple Numerical Problems.

UNIT - II

Power Flow Studies

Necessity of power flow studies – Derivation of static power flow equations – Power flow solutions using Gauss-Seidel Method– Newton-Raphson Method (Rectangular coordinates form)- Algorithmic approach.

UNIT - III

Z-Bus Algorithm

Formation of Z_{bus}: Algorithm for the Modification of Z_{bus} Matrix (without mutual impedance)

Symmetrical Fault Analysis

Reactance's of Synchronous Machine – Three Phase Short Circuit Currents - Short circuit MVA calculations for Power Systems – Numerical Problems.

Dr. S.Srikanth , Professor & HOD	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

UNIT - IV

Symmetrical Components

Definition of symmetrical components – symmetrical components of unbalanced three phase systems – Power in symmetrical components – Sequence impedances and Sequence networks of Synchronous generator ,Transformers and Transmission line.

Unsymmetrical Fault analysis

Various types of faults: LG– LL– LLG and LLL on unloaded alternator -Numerical problems (without fault impedance).

UNIT - V

Power System Stability Analysis

Elementary concepts of Steady state – Dynamic and Transient Stabilities – Swing equation – Steady state stability – Equal area criterion of stability – Applications of Equal area criterion – Factors affecting transient stability – Methods to improve steady state and transient stability.

Text Books:

1.Power System Analysis by Grainger and Stevenson - Tata McGraw Hill.2003

2. Modern Power system Analysis – by I.J.Nagrath& D .P.Kothari: Tata McGraw–Hill Publishing Company - 3rd edition - 2007.

Reference Books:

1. Power System Analysis – by A.R.Bergen - Prentice Hall - 2nd edition - 2009.
2. Power System Analysis by HadiSaadat – Tata McGraw–Hill 3rd edition - 2010.
3. Power System Analysis by B.R.Gupta - A H Wheeler Publishing Company Limited - 1998.
4. Power System Analysis and Design by J.Duncan Glover - M.S.Sarma - T.J.Overbye – Cengage Learning publications - 5th edition - 2011.

Online Learning Resources:

1.https://archive.nptel.ac.in/courses/117/105/117105140

2.https://archive.nptel.ac.in/courses/108/105/108105104

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - II Semester	23EE6D04	L	T	P	C
		3	0	0	3

Switchgear and Protection

Pre-requisite:

Basic concepts of Electrical Machines and Power Systems.

Course Objectives:

- To explain the working principles and applications of circuit breakers in power systems, including MCBs, oil, SF6, and vacuum breakers.
- To provide an understanding of electromagnetic protection mechanisms, particularly relays used in fault detection and system protection (overcurrent, under-voltage, directional, differential).
- To analyze protection techniques for generators and transformers, including fault protection schemes like percentage differential protection and Buchholz relays.
- To explore feeder and busbar protection methods using advanced relay systems such as distance and static relays.
- To study over-voltage protection systems including lightning arresters and neutral grounding methods to safeguard the power system.

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

CO1: Understand and describe the operation of circuit breakers, including their ratings, principles of arc interruption, and types.

CO2: Analyze relay-based protection systems, identifying and explaining their roles in over current, under voltage, and fault detection.

CO3: Design protection schemes for generators and transformers, addressing faults like restricte dearth faults and inter-turn faults.

CO4: Implement feeder and bus bar protection using advanced relays such as distance, impedance, and static relays.

CO5: Evaluate over-voltage protection strategies, including the use of lightning arresters, and understand various neutral grounding techniques.

UNIT – I

Circuit Breakers

Miniature Circuit Breaker(MCB)– Elementary principles of arc interruption– Restriking Voltage and Recovery voltages– Restriking phenomenon - RRRV– Average and Max. RRRV– Current chopping and Resistance switching– Concept of oil circuit breakers– Description and operation of Air Blast– Vacuum and SF_6 circuit breakers

UNIT – II

Electromagnetic Protection

Relay connection – Balanced beam type attracted armature relay - induction disc and induction cup relays– Torque equation - Relays classification–Instantaneous– DMT and IDMT types– Applications of relays: Over current and under voltage relays– Directional relays– Differential relays– Universal torque equation

Dr. S.Srikanth , Professor & HOD	Dr.N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

UNIT – III

Generator Protection

Protection of generators against stator faults– Rotor faults and abnormal conditions–inter turn fault protection.

Transformer Protection

Percentage differential protection– Design of CT's ratio– Buchholz relay protection

UNIT – IV

Feeder and Bus bar Protection & Static Relays:

Over current Protection schemes – PSM - TMS – Carrier current and three zone distance relay using impedance relays. Protection of bus bars by using Differential protection. Static relays: Introduction – Classification of Static Relays – Basic Components of Static Relays.

UNIT – V

Protection against over voltage and grounding

Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc oxide lighting arresters. Grounded and ungrounded neutral systems – Effects of ungrounded neutral on system performance – Methods of neutral grounding: Solid–resistance–Reactance grounding .

Text Books:

1. Power System Protection and Switchgear by Badri Ram and D.N Viswakarma - Tata McGraw Hill Publications - 2nd edition - 2011.
2. Power system protection- Static Relays with microprocessor applications by T.S.Madhava Rao - Tata McGraw Hill - 2nd edition.

Reference Books:

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide. - PHI - 2003.
2. Art & Science of Protective Relaying – by C R Mason - Wiley Eastern Ltd.

Online Learning Resources:

1.https://archive.nptel.ac.in/courses/108/107/108107167

2.https://archive.nptel.ac.in/courses/108/105/108105167

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
Vignana College of Engineering
J.N.T.University Kakinada
KAKINADA-533003.

III B.Tech. - II Semester	23EE6D05	L	T	P	C
		3	0	0	3

Advanced Control Systems

Pre-requisite:

Basic concepts of Control Systems.

Course Objectives:

- To understand the concept of controllability, observability, and their tests for continuous-time systems, as well as the principle of duality in state-space analysis.
- To understand the state-space methods to assess controllability, observability, and design state feedback controllers via pole placement.
- To know the stability of nonlinear systems using phase-plane analysis, describing functions, and Lyapunov's stability theorems.
- To Learn optimal control strategies using the calculus of variations, including constrained minimization and the minimum principle.
- To learn Optimal control and state regulator problems.

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

CO1: Explain controllability, observability, and the principle of duality in state-space systems.
CO2: Apply state-space methods to analyze controllability, observability, and design state feedback controllers.
CO3: Analyze the stability of nonlinear systems using phase-plane analysis and Lyapunov's stability theorems.
CO4: Examine the minimization of functional and control variable inequality constraints.
CO5: Formulate and solve the optimal regulator problems.

UNIT – I

Controllability - Observability and Design of Pole Placement

General concepts of controllability and observability -Tests for controllability and observability for continuous time systems - Principle of duality - Effect of state feedback on controllability and observability - Design of state feedback control through pole placement, full order and reduced order observers.

UNIT – II

Nonlinear Systems

Introduction to nonlinear systems - Types of nonlinearities. Introduction to phase plane analysis, construction of phase trajectories-Analytical and Isocline method, Describing function - Describing functions of on-off nonlinearity, on-off nonlinearity with hysteresis, and relay with dead zone.

Dr. S.Srikanth , Professor & HOD	Dr,N.Sumathi Associate Professor, Dept. of EEE,UCEK,	Dr. K.Siva Kumar Professor, Dept. of EE, IIT	Dr. G.Siva Kumar Asst. professor , Dept. of EE, NIT	Dr.S.Jayadeep Product Development Engineer L&T	D.Lakshman Kumar, Asst. professor, Dept. of EEE,SVCEW(A),

Associate Professor
Dept. of Elec. & Electronics Engg.
University College of Engineering
J.N.T.University Kakinada