Chhattisgarh Swami Vivekananda Technical University,Bhilai

SCHEME OF TEACHING AND EXAMINATION
BE (ELECTRICAL ENGINEERING) IV SEMESTER

S.No.	Board of Studies	Subject Code	Subject	Periods per week			Scheme of Exam Theory / Practical			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Electrical & ElectronicsEngg.	324451(25)	Analog Electronics	3	1		80	20	20	120	4
2	Electrical Engg.	324452(24)	Electro Magnetic Theory	3	1		80	20	20	120	4
3	Electrical & ElectronicsEngg.	324453(25)	Network Analysis & Synthesis	3	1		80	20	20	120	4
4	Electrical & ElectronicsEngg.	324454(25)	Digital Electronics & Logic Design	3	1		80	20	20	120	4
5	Electrical Engg.	324455(24)	Electrical Power Systems	3	1		80	20	20	120	4
6	Electrical Engg.	324456(24)	Electrical Measurements & Measuring Instruments	3	1		80	20	20	120	4
7	Electrical & ElectronicsEngg.	324461(24)	Analog Electronics Lab			3	40		20	60	2
8	Electrical & Electronics Engg.	324462(24)	Digital Electronics and Logic Design Lab			3	40		20	60	2
9	Electrical Engg.	324463(24)	Electrical Power Systems I Lab			3	40		20	60	2
10	Electrical Engg.	324464(24)	Electrical Measurements & Measuring Instruments Lab			3	40		20	60	2
11	Humanities etc.	324465(46)	Health, Hygiene & Yoga			2			40	40	1
12			Library			1					
	Total			**18**	**6**	**15**	**640**	**120**	**240**	**1000**	**33**

L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment
Note (1): Duration of all theory papers will be of Three Hours.
Note (2): Industrial Training of six weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Analog Electronics**	Code:	**324451(25)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To clearly understand and demonstrate the knowledge of transistors at low frequencies and in the process build a strong base of mathematics, science and engineering.
2. To clearly understand and demonstrate the knowledge of amplifiers at low frequencies.
3. To conceptualize the concepts of multistage amplifiers and their applications.
4. To understand the basics of feedback in amplifiers.
5. To gain a thorough understanding of oscillators, their applications and in the process gain substantial knowledge of system analysis & design as well as team work

UNIT- I **DC Analysis of Transistor and FET Amplifiers:**
Transistor Biasing and Thermal stabilization: The operating point, Bias stability, Stability factor, Emitter Bias, Collector to base bias, Voltage divider bias with emitter bias, Emitter bypass capacitor, Bias compensation.
FET Biasing: Field Effect Transistor (FET): biasing of FET and MOSFET

UNIT-II **AC Analysis of Transistor and FET Amplifiers:**
Small signal Analysis: h-parameter Models for CB, CE, CC configurations and their interrelationship; Analysis and Comparison of the three configurations; Linear analysis of Transistor Circuits: Miller's Theorem and its Dual, Cascading: Simplified Models and Calculation of CE, CB and CC Amplifiers; Effect of emitter Resistance in CE amplifiers, Darlington Pair.
Analysis of Single stage FET amplifier: CS and CD configuration, FET as VVR.

UNIT- III **High Frequency Transistor Amplifiers**: CE hybrid- pi model: Validity and parameter Variation: Current Gain with Resistive load: frequency response of a single stage CE Amplifier: Gain-Bandwidth product: CC stage High frequencies

UNIT-IV **Multistage Amplifiers**: Classification: Distortion in Amplifiers: Frequency Response: Bode plots: Step Response: pass band of Cascaded Stages: Response of a Two-stage RC Coupled Amplifier at Low and high frequencies, Sources of noise in Transistor Circuits; Noise Figure.

UNIT-V **Feedback Amplifiers**: Classification: Feedback concept; Ideal Feedback amplifier: Properties of Negative Feedback Amplifier Topologies: Method of Analysis of Feedback amplifiers: Voltage series Feedback: Voltage series Feedback pair: Current series, Current shunt and Voltage shunt feedback; Effect of feedback on amplifier Bandwidth and stability.

Text Books:

1. Integrated Electronics – Millman&Halkias, TMH Publications
2. Electronic Devices and Circuits, A.K. Maini& V. Agrawal, Wiley India

Reference Books:

1. Electronic Circuit Discrete And Integrated: D. L. Schilling and C. Belove, McGraw-Hill edition
2. Electronic Devices & Circuits – David A. Bell, PHI
3. Microelectronics – Millman and Grabel, TMH Publications
4. Electronic Devices and Circuit Theory – Boylestad&Nashelsky, 8th Ed. PHI.

Course outcomes:

1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. To develop a clear understanding of transistor as an amplifier.
4. To understand the working of amplifiers at low frequencies and study about the hybrid model.
5. To know about the different amplifier configurations and the Millers theorem.
6. To gain knowledge about transistors at high frequencies.
7. An ability to work professionally in electronic systems areas including the design and analysis of such systems.
8. To learn about the different configurations of power amplifiers and their applications.
9. To understand the inadequacy of single stage amplifiers and learn about multistage amplifiers.
10. To grasp the concept of feedback and learn about feedback in amplifiers, oscillators and their applications

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Electro Magnetic Theory**	Code:	**324452(24)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications which will be utilized in the development of the theory for power transmission lines and electrical machines.

UNIT- I **Basics of Electromagnetic Fields:** Scalars and vectors, vector algebra, Cartesian, Cylindrical and Spherical coordinate systems, transformations between coordinate systems, Coulomb's law, Electric field intensity, electric field due to point charge, line charge, continuous volume charge and surface charge.

UNIT-II **Electric Flux and Potential:** Electric flux and Electric flux density, Gauss's law and its application (symmetrical charge distribution only), divergence and divergence theorem, Maxwell's first equation, Definition of potential difference and potential, potential field of a point charge, potential field between two coaxial cylinders, potential between two conducting spherical shells, conservative property, potential gradient, Energy Density in the Electrostatic field.

UNIT- III **Electric current and Poisson & Laplace equations:** Current and current density, continuity of current, metallic conductors, conductor properties and boundary conditions, the method of images, nature of dielectric materials, boundary conditions for perfect dielectric materials, Poisson and Laplace equation, Uniqueness theorem, examples of the solution of Laplace equations (one dimension only).

UNIT-IV **Magneto staticsand Magnetic Force:** The steady state magnetic field, BiotSavart Law, Ampere's circuital Law, Curl, Stoke's theorem, Magnetic flux and Magnetic flux density, scalar and vector magnetic potentials, force on a moving charge, force on a differential current element, force between differential current elements, force and torque on a closed circuit, magnetic materials, magnetization andpermeability, Magnetic boundary conditions.

UNIT-V **Time Varying Field and Maxwell's Equations:** Faraday's law of electromagnetic induction, statically and dynamically induced EMFs, displacement current, modification of Maxwell's equations under time varying conditions (point form and integral form), Poynting Theorem and Poynting vector.

Text Books:

1. William H.Hayt and Jr. John A. Buck , "Engineering Electromagnetics", Tata McGraw-Hill,
2. John D. Kraus, "Electromagnetics with Application", McGraw-Hill International Edition
3. Mathew N. O. Sadiku, "Elements of Electromagnetics", 4th Edition, Oxford University Press

Reference Books:

1. Ramo, Whinnery and Van Duzer, "Fields and Waves in Communications Electronics", Third Edition, John Wiley & Sons.
2. David J. Grithiths, "Introduction to Electrodynamics", Third Edition, PHI.
3. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems.", Prentice Hall of India 2nd edition.

Course outcomes:

1. Compute electric field intensity for various charge distribution
2. Compute Electric flux for various charge distribution
3. Compute potential for different charge distributions.
4. Compute solution of Laplace and Poisson's equations
5. Compute magnetic field intensity and magnetic flux density using Ampere's circuital LawandStoke's theorem.
6. Compute force and torque for various current carrying elements.
7. Enlist Maxwell's equations for time varying fields and solve them for specific regular geometries

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Network Analysis and Synthesis**	Code:	**324453(25)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction.
2. To analyze circuits using the node-voltage method and the mesh-current method.
3. To analyze RL, RC and RLC circuits - step and natural response.
4. To apply the Laplace transform in circuit analysis and transform circuits using Thevenin and Norton equivalents.
5. To determine the response to any excitation and to identify and use transfer functions in circuit analysis.

UNIT- I Formulation of network equations, solution of first order differential equations, initial conditions in networks and network solution with Laplace transformation, step, ramp and impulse functions, initial and final value theorem.

UNIT-II Transform impedance and transform circuits, Thevenin's and Norton's theorem, discrete and continuous spectrum, relation and Laplace transforms, poles and zeros with restrictions for driving point functions and transform functions

UNIT- III Two port parameters(z,y,h,g,Transmission parameters), Interrelation between z, y, g, h, ABCD parameters, Reciprocity & Symmetry, cascade, series, parallel and series-parallel connections of Two port Networks, Barletts bisection Theorem.

UNIT-IV Identification of network synthesis and positive real function (PRF), properties of PRF, testing of driving point functions, even and odd function, one terminal pair network driving point synthesis with LC, RL and RC elements, Foster-I & II and Cauer-I & II form.

UNIT-V Low pass filters, high pass filters, band pass filters, band reject filters, Gain equalizer and delay equalizers, m-derived filters, constant k-filters, design of filters.

Text Books:

1. "Network Analysis and Synthesis", M. E. Van Valkenburg, PHI Publications.
2. **"**Circuit theory", Kuriakose-PHI Learning Pbs.

Reference Books:

1. "Engineering Network Analysis and synthesis and filter design", G.G Bhise, P.R. Chadha and D. C. Kulshreshtha, Umesh Publications.
2. "Network Analysis and Synthesis", C. L. Wadhwa, New Age Publications.
3. "Network Analysis and Synthesis", M. E. Van Valkenburg, PHI Publications.
4. "Network Analysis and Synthesis", 2nd Ed, Franklin F. Kuo, Wiley India

Course outcomes:

1. Students will be able to analyze circuits using Kirchhoff's laws and design and conduct experiments using various elements, as well as to analyze and interpret data.
2. To develop the ability of understanding the application of network theorems in reducing complicated networks to simpler ones.
3. Students should have the ability to demonstrate the application of Fourier transform and Laplace transform in networks.
4. Explain and analyze the different types of network functions.
5. To understand the different parameters of one port and two port networks.
6. Derive interrelationship between various parameters.
7. Analyze the stability of network function and interpret time domain behavior of networks from pole zero plots of network function.
8. To develop the ability to identify and synthesize the impedance functions using various techniques of synthesis.
9. An ability to design the low pass and high pass filters.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical & Electronics**	Semester:	**IV**
Subject:	**Digital Electronics and Logic Design**	Code:	**324454(25)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To know the different codes used in digital electronics and their application.
2. To minimization of Boolean algebra using k-map & tabulation methods.
3. To realize the combinational & sequential logic circuits.
4. To introduce with digital logic families.

UNIT- I **Binary Number Systems & Codes:** Number System: Decimal, binary, octal, Hexadecimal number systems, conversion of number systems, r's & (r-1)'s complement. *Boolean algebra*: Reduction of Boolean expression using Identities, Laws & Theorems, Basic & universal logic gates, NAND-NOR implementation, Converting AND/ OR/ Invert logic to NAND/ NOR logic. *Binary Codes*: Weighted & Non weighted codes, Sequential code, Self- complementing code, Cyclic code, Excess-3 code, Gray code, error detecting & correcting code, Hamming code, ASCII & EBCDIC Codes.

UNIT-II **Minimization Techniques:**Minimization of Boolean function in SOP & POS, Canonical & Standard form, Min-term, Max-term, mapping & minimization of SOP & POS expression using two, three & four variables K-map, concept of Don't care terms, Quine-McCluskey or Tabulation method of minimization.

UNIT- III **Combination logic circuits:** Half adder, Full adder, Half Subtractor, Full subtractor, Binary parallel adder, Binary parallel subtractor, BCD adder, Look ahead carry generator, Serial adder, Code converters, Parity bit generator/ checker, magnitude comparators, Decoders: 3 line to 8 line decoder, BCD to Decimal decoder, BCD to Seven segment decoder. Encoder: Octal to binary encoder, Decimal to BCD encoder, Multiplexer: 2-input Mux, 4-input Mux & 16-input Mux, Demultiplexer: 1 line to 4 line & 1 line to 8 line De-mux, Logic Array: PAL, PLA, PROM, ROM.

UNIT-IV **Sequential logic circuits:** Latches: Active low & high S-R Latch, Gated S-R latch. Flip flops: Edge triggered S-R, D, J-K and T flip-flops, Master-Slave flip-flops & its timing diagram, Truth table & Excitation Table. Asynchronous inputs of flip-flop, Conversion of one flip-flop to other flip-flop. Counters: Asynchronous Ripple or Serial Counter, up/down counter, Decade counter, Synchronous counter, State diagram, up/down synchronous counters, Module-N synchronous counters, RING counters, Johnson counter, Shift Registers: SISO, SIPO, PISO, PIPO, Bi-directional shift registers, Universal shift registers.

UNIT-V **Logic families:** Introduction of Digital terminologies, Transistor Inverter, RTL and DTL, TTL: Totem-pole arrangement, ECL & its specifications. MOS Logic: NMOS NAND & NOR gate, CMOS Inverter, NAND & NOR Gate, comparison among various logic families, manufacturer's Specification.

Text Books:

1. "Digital Logic and Concept design", Morris Mano, PHI Publications
2. "Fundamentals of Digital Circuits": A. Anand Kumar, PHI Learning

Reference Books:

1. "Digital Integrated Electronics": H. Taub and D. Schilling: TMH Publications
2. "An Introduction To Digital Computer Design", V, Rajaraman and Radhakrishnan, 3rd Edition, PHI
3. "Digital Principles And Application" Malvino& Leach, 4th Edition, McGraw Hill.
4. "Digital circuit and design", Salivahan and Aricozhagan, VikasPublications
5. "Study, Theory and Logic design" Jain, TMH Publications

Course outcomes:

1. Be able to design, build, test, troubleshoot, and evaluate digital circuits.
2. Be able to utilize computer software such as Electronic Work Bench (Multisim).
3. Be able to evaluate and revise designs as actual performance is reviewed.
4. Be able to prepare a written report that effectively communicates the objective, the design procedure, the experimental results, and the conclusion for any project design.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Electrical Power System**	Code:	**324455(24)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To learn the fundamentals of transmission system and parameter for the design of transmission system.
2. To comprehend the working and performance of transmission line with the help of its circuit model.
3. To understand the concept of reactive power and voltage control in generation, transmission and distribution.
4. To understand and analyze the performance of cables.
5. To model the transmission lines in terms of mechanical parameter and stresses.
6. To study the effect of surges in transmission and associated equipment

UNIT- I **Overhead Lines:** General structure of electrical power system, power generation, power transmission & voltage levels, power distribution through overhead lines, Type of overhead conductors, solid conductors, stranded conductors, bundled conductors, skin effect, proximity effects, corona, calculation of corona loss and factors affecting corona, inductance and capacitance of single-phase, three-phase single circuit and double circuit lines, concept of GMD, transposition of lines, effect of earth on capacitance of transmission lines.

UNIT-II **Transmission Lines:** Transmission lines as four terminal networks, A, B, C, D constants, nominal-T, nominal-π, equivalent-T, and equivalent- π representation of transmission lines, Characteristics and performance of transmission lines, distributed parameters of long lines, hyperbolic solutions, Ferranti effect, surge impedance loadings, power flow equations, sag and tension calculations.

UNIT- III **Cables and Power Factor Correction:** Types of cables, insulation resistance of cables, capacitance of cables, dielectric stress, capacitance grading of cables, use of inter-sheaths, power factor of cables.
Causes of low power factor, Methods of Improving power factor, Phase advancing and generation of reactive KVAR using static Capacitors, Most economical power factor for constant KW load and constant KVA type loads, Numerical Problems.

UNIT-IV **Distribution Systems and Voltage Control:** Classification of Distribution Systems, Comparison of DC vs. AC and Under-Ground vs. Over - Head Distribution Systems, Radial D.C Distributor, Ring Main Distributor. Generator voltage control, line drop compensation by static capacitors and reactors, control of voltage profile, control of active and reactive power, calculation of synchronous phase modifier capacity, on-load tap changing transformer.

UNIT-V **Travelling Waves:** Transients in power systems, wave equation, characteristic impedance, energy and power surge, velocity, traveling wave phenomenon in open circuited and short circuited lines, lines with series reactive termination, junction of two dissimilar lines, repeated reflections, Bewley's Lattice diagram.

Text Books:

1. Electrical power systems, AshfaqHussain, CBS Publications.
2. Elements of Power System Analysis, William D Stevenson, Tata Mc Graw Hill Publishing Company Limited
3. Electrical Power System , D. Das , New Age publication

Reference Books:

1. A Course in Electrical Power, by Soni, Gupta and Bhatnagar, Dhanpat Rai Publications.
2. Electrical Power Systems, C. L. Wadhwa, New Age Publications.
3. Power System Engineering, I.J.Nagrath and D.P.Kothari, TMH Publications.
4. Power System, V.K. Mehta and Rohit Mehta, S. Chand Publications

Course outcomes:

1. Student will be to calculate the resistance, inductance and capacitance of transmission line.
2. Student will be able to learn how to model the element in power system and able to carry out studies of load flow, transient stability,harmonics and other relevant studies.
3. Student will be able to calculate the voltage regulation of line and analyze the voltage profile of the transmission line.
4. Student will gain an understanding of VAR control using component to improve p.f,location of capacitor, operation of load tap changing can be examine.
5. Student will be able to calculate the sag, tension and mechanical stress of a transmission line.
6. Student will be able to learn different types of conductor and cable with its performance.
7. Student will able to understand the effect of surges in line

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Electrical Measurements &Measuring Instruments**	Code:	**324456(24)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To provide students with a fundamental knowledge of low , medium & high resistance and there measuring technique with the help of D.C. bridges
2. To provide students with a fundamental knowledge of Inductor and capacitor and there measuring technique with the help of various A.C. bridges.
3. To provide students with a fundamental knowledge of galvanometer construction and working.
4. To provide students with a fundamental knowledge of wattmeter & Energy meter and there testing.

UNIT- I **Measurement of Resistance:** Classification of resistances (low, medium and high), measurement of resistance by volt drop method, loss of charge method, Wheatstone's bridge, Kelvin's double bridge, Megger and ohmmeter, AC Potentiometers and their use for calibration of meters (ammeter, voltmeter and wattmeter), Error analysis and sensitivity.

UNIT-II **AC Bridges:** Measurement of inductance (self and mutual) and capacitance by AC bridges: Hay's, Maxwell's, Anderson, Desauty'sbrigde, Schering bridge, Oven's bridge and Heaviside bridge and its modification, Wein's bridge for measurement of frequency, Wagner earthing device.

UNIT- III **Detectors And Magnetic Measurement:** Construction, theory and operation of D'Arsonval vibration galvanometer, (b) Oscilloscope – Basic Principal, CRT feature, Block diagram of Oscilloscope, Triggered sources, Measurement of frequency and phase by Lissajous Figures.

UNIT-IV **Measuring Instruments:** Classification, operation and working principle of PMMC, MI and dynamometer type instruments, controlling, damping and balancing devices, single-phase and three-phase electrodynamometer power factor meter, frequency meters: electrical resonance type, electrodynamometer, ratio-meter type. Phase sequence meter, maximum demand indicator, tri-vector detector meter.

UNIT-V **Power And Energy Measurement:** Construction and principle of operation of dynamometer and induction type wattmeter, measurement of power in a three-phase circuit by using single-phase wattmeter, wattmeter errors, low power factor wattmeter, testing of wattmeter, single and poly-phase energy meters, testing of energy meters.

Text Books:

1. "A Course In Electrical And Electronics Measurement And Instrumentation", Sawhney, DhanpatRaiPbs.
2. Electrical Measurement and Measuring Instruments", Golding, CBS Publication
3. Electronic Instrumentation, H. S. Kalsi, TMH Publications

Reference books:

1. "A Course In Electrical And Electronics Measurement And Instrumentation", J. B. Gupta, KatariaPbs.
2. "Electric Measurements", Harris, Wiley Publication
3. "Electrical Measurements and Instrumentation, Cooper, TMH Publications

Course outcomes:

1. The students should be able to Measure low, medium & high Resistances using suitable bridges.
2. The students should be able to determine the value of inductor and capacitor with the help of A.C. Bridge & they can draw phasor diagram of bridges.
3. The students should be able to test and calibrate ammeter, voltmeter, and Wattmeter and energy meter.
4. The students should be able to select proper instrument for measurement various Electrical elements.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Analog Electronics Laboratory**	Code:	**324461(24)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At leastTen experiments are to be performed by each student)*

1. Static input characteristics curves of CE transistor.
2. Static output characteristic curve CE transistor.
3. Static input characteristic curve of CB transistor.
4. Static output characteristic curve of CB transistor.
5. To design and study the frequency response of single stage CE transistor amplifier.
6. To study the frequency response of RC coupled double stage CE transistor amplifier.
7. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback.
8. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback.
9. To plot the voltage gain vs. load characteristics of common collector (emitter follower) n-p-n transistor.
10. Experiment with emitter follower a voltage series feed back amplifier.
11. Study of various topologies of feedback amplifier.
12. Experiment with Darlington pair amplifier.

Equipment/Machines/Instruments/Tools/Software Required:

Circuit components, Power supply, CRO, Function generator, Multimeter, Breadboard.

Recommended Books:

1. Integrated Electronics – Millman&Halkias, TMH Publications

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Digital Electronics & Logic Design Laboratory**	Code:	**324462(24)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At leastTen experiments are to be performed by each student)*

1. To Verify the Properties of NOR & NAND Gates As Universal Building Block.
2. Realization of Boolean Expression Using NAND Or NOR Gates.
3. To Construct X- OR Gate Using Only NAND Or NOR Gates Only.
4. To Construct a Half Adder Circuit. And Logic Gates And Verify its Truth table.
5. To Construct a Full Adder Circuit and Verify its truth table (Using Two X-OR And 3 nandgates).
6. To Construct a Half Subtractor Circuit. by Using Basic Gates and Verify its truth table.
7. To Construct a Full Subtractor Circuit by using Basic Gates And Verify its truth table.
8. To Construct a Circuit of 4 -Bit Parity Checker & Verify its truth table.
9. To Construct a Programmable Inverter Using X-OR Gates & Verify its truth table.
10. To Design a Comparator Circuit & Verify its truth table.
11. To Construct A RS Flip Flop Using Basic & Universal Gates (NOT, NOR & NAND)
12. To Construct a J.K. Master Slave Flip Flop & Verify its truth table
13. To Verify the Operation of a Clocked S-R Flip Flop and J. K. Flip Flop
14. To Construct a T & D Flip Flop Using J. K. Flip Flop and Verify Its Operations & truth table.
15. To Verify the Operation of Asynchronous Decade Counter
16. To verify the operation of various decoding and driving devices
17. To perform the operation of BCD Counter Using 7490

Equipment/Machines/Instruments/Tools/Software Required:

Circuit components, Power supply, CRO, Function generator

Recommended Books:

1. "Digital logic and concept design", Morris Mano, PHI Publications
2. "Study, theory and logic design" Jain, TMHPublications

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Electrical Power System – I Laboratory**	Code:	**324463(24)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At leastTen experiments are to be performed by each student)*

1. Study of types of cables.
2. Study of types of Insulator used in power system
3. Study of Bus –bar arrangement of a power supply sub – station.
4. Study of Synchronous phase modifier and calculation of its rating.
5. To measure the A, B, C, D constants of transmission lines.
6. To measure the A, B, C, D constants of series transmission lines (HV-HV).
7. To measure the A, B, C, D constants of series transmission lines (LV-LV).
8. To measure the A, B, C, D constants of parallel transmission lines.
9. To locate faults in a cable by Murray loop test.
10. Measurement of capacitance between conductor –conductor and conductor –earth.
11. Comparison of conductor Characteristics (Self GMD) between two different groups of conductors.
12. To find out the rating of capacitor required for improving the power factor of an inductive load.
13. Study of Ferranti effect.
14. Study of transmission structure used for different types of power supply system.
15. Study the lay out diagram of college power supply system.

Equipment/Machines/Instruments/Tools/Software Required:

Transformer, Voltmeter, Ammeter, Multimeter, Wattmeter, Insulators, Synchronous motor, Capacitor, resistors, inductor, Power supply.

Recommended Books:

1. Power system analysis by C.L Wadhava, New Age
2. Power system analysis by V.K Mehta, S. Chand.

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Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Electrical Measurements & Measuring Instrument Laboratory**	Code:	**324464(24)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At leastTen experiments are to be performed by each student)*

1. To determine unknown resistance or value resistance by Kelvin Bridge Method.
2. To determine unknown resistance R by Wheatstone Bridge Method.
3. To determine unknown inductance of a given coil by Maxwell Bridge Method.
4. To determine the inductance of the given coil by Anderson Bridge Method.
5. To determine unknown capacitance of a given capacitor by Desauty Bridge Method.
6. To determine capacitance of a given capacitor by Schering Bridge Method.
7. To determine the inductance by Owen's Bridge Method.
8. To determine unknown inductance by Hay Bridge Method.
9. To calibrate a given single phase induction type Energy Meter.
10. To find the phase sequence of the supply by the rotating type phase sequence meter.
11. To find the phase sequence of the supply by the Static type phase sequence meter.
12. To determine the unknown resistance R by Voltmeter-Ammeter Method.
13. To observe the B-H curve and hysteresis loop of agiven transformer core on CRO.
14. Measurement of high resistance by using Meggar.

Equipment/Machines/Instruments/Tools/Software Required:

Bridges, Head Phone, Transformer, Variac, Voltmeter, Ammeter, Multimeters, Resistors, DC Supply, Meggar

Recommended Books:

1. Electrical measurement & measuring instrument by A.K.Sawhney.
2. Electrical measurement & measuring instrument by J.B.Gupta

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electrical Engineering**	Semester:	**IV**
Subject:	**Health, Hygiene & Yoga**	Code:	**324465(46)**
No. Of Periods:	**2 Periods/Week**	Total Tutorial Periods:	**NIL**
Maximum Marks:	**40**	**Minimum Marks:**	**24**

Course Objectives:

1. To provide understanding the importance of health.
2. To provide insight into the hygiene aspect & quality of life.
3. To study the concepts of various medical therapy.
4. To practice the various yogasans.
5. To provide knowledge about common diseases and its cure through yagasans and pranayam.
6. To develop concentration through various methods.

UNIT- I **HEALTH & HYGIENE:** Concept of health, Physical health and mentall health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT-II **INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE:** History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III **YOGASANS:** Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

UNIT-IV **YOGASANS FOR COMMON DISEASES:** From Yogic MateriaMedica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:**Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:**Shirshpadasan, Shashankasan.
- **Asans for eye sight:**Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT-V **CONCENTRATION:** Concentration of mind and how to achieve it. Tratak (त्राटक), Concentration on breath, Japa (जप), Ajapajap (अजपाजप), internal silence (अन्तर्मौन), visualization in mental sky (चिदाकाश धारणा), Concentration on point of light (ज्योति ध्यान), Concentration on feeling (भाव ध्यान), Concentration on figure (मूर्त्त ध्यान).

Text Books:

Health, Hygiene & Yoga,Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

Reference Books:

(1) Yogic MateriaMedica
(2) Asan, Pranayam and Bandh.