CHHATTISGARH SWAMI VIVEKANAD TECHNICALUNIVERSITY, BHILAI
Scheme of Teaching & Examination
BE (Electronics &Telecommunication Engineering) III Semester

Sl. No.	Board of Study	Code No.	Subjects	Period Per Week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
							Theory/Practical				
				L	T	P	ESE	CT	TA		
1	Appl. Mathematics	328351(14)	Mathematics-III	4	1	-	80	20	20	**120**	5
2	Electronics &Telecom.	328352(28)	Probability and Random Variables	3	1	-	80	20	20	**120**	4
3	Electronics& Telecom.	328353(28)	Electronic Devices and Circuits	3	1	-	80	20	20	**120**	4
4	Electronics &Telecom.	328354(28)	Network Analysis& Synthesis	3	1	-	80	20	20	**120**	4
5	Electronics &Telecom.	328355(28)	Industrial Instrumentation	2	1	-	80	20	20	**120**	3
6	Electronics &Telecom.	328356(28)	Digital Logic Design	3	1	-	80	20	20	**120**	4
7	Electronics &Telecom.	328361(28)	Electronic Devices and Circuits Lab	-	-	3	40	-	20	**60**	2
8	Electronics &Telecom.	328362(28)	Industrial Instrumentation Lab	-	-	3	40	-	20	**60**	2
9	Electronics &Telecom.	328363(28)	Digital Logic Design Lab	-	-	4	40	-	20	**60**	2
10	Electronics &Telecom.	328364(28)	Electronics Workshop	-	-	3	40	-	20	**60**	1
11	Humanities	328365(46)	Value Education	-	-	2	-	-	40	**40**	1
12			Library	-	-	1	-	-	-	-	-
TOTAL				**18**	**6**	**16**	**640**	**120**	**240**	**1000**	**32**

L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment

Note: Duration of all theory papers will be of Three Hours.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Mathematics – III**	Code:	**328351(14)**
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 tools for studying electromagnetic waves, signal processing etc.
2. To use partial differential equations and study its considerable importance in engineering systems
3. To describe initial and boundary value problems involving wave motions, transmission of signals along a cable.
4. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differentials equations.
5. To provide a sound background of complex analysis to perform a thorough investigation of major theorems of complex analysis and to apply these ideas to a wide range of problems that include the evaluation of both complex line integrals and real integrals.
6. To provide tools to investigate the strength and direction of a relationship between two variables by collecting measurements and using suitable statistical analysis.

UNIT- I **Laplace Transform:** Definition, Linearity, shifting & scaling properties, Transform of elementary functions, Transform of derivatives and integrals, Multiplication by t & division by t. Inverse Laplace transform, Convolution theorem, Transform of periodic functions, Unit step function & Dirac delta function, Initial value & final value theorems, Application to solution of ordinary differential equations.

UNIT-II **Complex Variables:** Limit, Derivative, Analytic function, Cauchy-Riemann equations, Harmonic functions, Application to flow problems. Complex integration, Cauchy's integral theorem and integral formula, Taylor's & Laurent's series, Singular point, Poles & residues, Residue theorem & its application to contour integration.

UNIT- III **Correlation and Regression:** Linear correlation, Measures of correlation, Karl Pearson's coefficient of correlation, Spearman's rank correlation coefficient, Bivariate frequency distribution, Regression, lines of regression & coefficients of regression, Standard error estimate.

UNIT-IV **Series Solution of Differential Equations and Special Functions:** Series solution of differential equations, The method of Frobenius, Bessel's differential equation, Bessel's function of the First Kind - recurrence relations, generating function, orthogonality, Legendre's differential equation, Legendre's polynomial - Rodrigue's formula, generating function, recurrence relations, orthogonality.

UNIT-V **Partial Differential Equations:** Formation, Solution of Lagrange's linear differential equation, homogeneous linear differential equation with constant coefficients, non-homogeneous linear differential equations, Method of separation of variables. **Applications of PDE:** Initial & boundary value problems, Transmission of signals along a cable - Telephone equation, Telegraph & radio equations.

Text Books:

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

Reference Books:

1. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N. Wartikar & J.N. Wartikar.Vol- II– Pune Vidyarthi Griha Prakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

Course outcomes: Students will be able to

1. Define (mathematically) Unit step, Unit impulse, Laplace transforms, its properties, Inverse and applications to solve ordinary differential equations.
2. Solve difficult problems using theorems of complex analysis and apply Residue theorem to evaluate real integrals
3. Able to evaluate and interpret Karl Pearson's correlation coefficient and Spearman's correlation coefficient and also find equation of regression line and use them where appropriate.
4. Use special functions in communication system, non linear wave propagation, electromagnetic theory, signal processing etc.
5. Know the importance of PDEs in modern communication technology and many numerical simulations.
6. Solve wave equation, telephone equation, telegraph equation, radio equation and vibrations of membranes.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Probability and Random Variables**	Code:	**328352(28)**
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:

- To study basics of probability theory.
- To understand the basic concepts of random variables & processes.

UNIT- I **SPECTRAL ANALYSIS OF SIGNALS:** Fourier series, Exponential form of the fourier series, Examples of fourier series, The sampling function, Response of a linear system, Normalized power, Normalized power in a fourier expansion, Power spectral density, Effect of transfer function on power spectral density, The fourier transform, Examples of fourier transforms, Convolution, Parseval's theorem, Power and energy transfer through a network, Band limiting of waveforms, Correlation between waveforms, Power and cross correlation, Autocorrelation, Autocorrelation of a periodic waveform, Autocorrelation of a nonperiodic waveform of finite energy.

UNIT-II **PROBABILITY:** Probability introduced through Sets and Relative Frequency, Joint and conditional probability, Independent events, Combined experiments, Bernoulli Trials.

UNIT- III **RANDOM VARIABLES:** Random variable concepts, Cumulative distribution function, Probability density function, Relation between probability and probability density, Joint cumulative distribution and probability density, Gaussian random variable, Poisson random variable, Rayleigh density and distribution function, Uniform density and distribution function, Exponential density and distribution function, Average value of a random variable, Variance of a random variable, Tchebycheff's inequality, Error function, Mean and variance of the sum of random variables, Probability density of $Z = X + Y$, Correlation between random variables, Central-limit theorem.

UNIT-IV **RANDOM PROCESSES - TEMPORAL CHARACTERISTICS:** The random process concept, Stationarity and independence, Correlation functions, Measurement of correlation functions, Gaussian random processes, Poisson random process.

UNIT-V **SPECTRAL CHARACTERISTICS OF RANDOM PROCESSES:** Power density spectrum and its properties, Relationship between power spectrum and autocorrelation function, Cross-Power density spectrum and its properties, Relationship between Cross-power spectrum and Cross-correlation function.

Text Books:

1. Principles of Communication Systems by Taub and Schilling, Tata McGraw Hill. (Unit – I & III)
2. Probability, Random Variables and Random Signal Principles, P. Z. Peebles, Tata McGraw Hill. (Unit – II , III, IV & V)

Reference Books:

1. Random Processes (Filtering, Estimation and Detection), Lonnie C. Ludeman, Wiley-IEEE Press.
2. Theory & problems of probability, Random variables and Random processes, Schaum Series, Hwei P. Hsu.
3. Probability and Random Processes with Application to Signal Processing, Henry Stark, John. W.Woods, 3rd Edition, Pearson Education.
4. Introduction to Random Signals and Noise, Wim C. van Ettn,, Wiley India.
5. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, S Chand and Sons.

Course outcomes:

1. Students should be able to define probability and interpret probability by modeling sample spaces.
2. To identify and formulate fundamental probability distribution and density functions, as well as functions of random variables.
3. Students are able to understand and analyze temporal and spectral characteristics of random processes.
4. Get the overview how various types of noise can be represented mathematically.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Electronic Devices and Circuits**	Code:	**328353(28)**
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:

- To study semiconductor charge carriers transport phenomena.
- To understand practical applications of PN junction diode.
- To understand the basic working physics of BJT and study transistor biasing arrangements.
- To study basic principle of JFET, MOSFET their characteristics and amplifiers.

UNIT- I **CONDUCTION IN SEMICONDUCTOR:** Transport phenomena in semiconductors: Mobility and conductivity, Electrons and holes in an intrinsic semiconductor, Donor and acceptor impurities, Charge densities in a semiconductor, Law of mass action, Charge neutrality equation, Generation and recombination of charge carriers, Diffusion, Continuity equation, Injected minority carrier, Potential variation in a graded junction. Formation of p-n junction and its characteristics.

UNIT-II D**IODE AND ITS APPLICATION:** Semiconductor Diode: Construction, current components, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Diode Capacitance: Transition and Diffusion Capacitance. Load line analysis of diode circuit, DC analysis of diode circuits: Piecewise linear model of p-n junction diode. **Rectifiers:** Half wave, Full wave and Bridge rectifier: Voltage regulation, Ripple factor, Ratio of rectification, PIV, Transformer Utilization factor. Filter circuits for power supply: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or π filter. **Zener diode:** Break down mechanism, Characteristics, Specifications, Voltage regulator circuit using zener diode.

UNIT- III **BIPOLAR JUNCTION TRANSISTOR & ITS CONFIGURATIONS:** Introduction, Construction, Types: npn and pnp, Current components. Transistor as an amplifier, Transistor Characteristics (input, output and transfer), Transistor Circuit Configuration: CB, CC, CE Configuration, Early Effect. Ebers-Moll Model. Transistor as a Switch. **TRANSISTOR BIASING & THERMAL STABILIZATION:** Concept of operating point, Thermal runway, Bias stability, Stability factors, Fixed bias, Collector to base bias, Voltage divider bias. Bias compensation. (Thermistor , Sensistor and Diode)

UNIT-IV **JFET & ITS SMALL SIGNAL MODEL:** JFET Construction, Symbol, Basic Operation, V-I Characteristics, Cut-off and pinch-off voltages, Transconductance, CS, CG and CD Configuration, FET as switch, FET as VVR.
Biasing arrangements for JFET: Fixed bias, Self bias and Voltage divider bias, **Small-Signal Model Analysis** of Single stage JFET amplifiers: Mathematical definition of g_m. Effect of I_D on g_m. AC input impedance, Output impedance and Voltage gain calculation for Fixed bias, Self bias and Voltage divider bias configuration of JFET.

UNIT-V **METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET):** Introduction, Construction, Symbol, Basic Operation, V-I Characteristics. MOSFET Types: Depletion MOSFET, Enhancement MOSFET, their characteristics and parameters, Body effect, Sub threshold conduction, The MOS Switch, CMOS devices. **MOSFET Biasing:** Fixed bias, Self bias and Voltage divider bias, Feedback bias in E-MOSFET.

Text Books:

1. Principles of Electronics by V. K. Mehta, Khanna Publication.
2. Electronic Devices and Circuit Theory – Robert L. Boylestad & L. Nashelsky, K.. L. Kishore, 9th Edition, PHI. (Unit- IV, V)
3. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, Tata McGraw Hill. (Unit- I, II & III)
4. Electronic Devices & Circuits – Donald A Neaman, Tata McGraw Hill,

Reference Books:

1. Electronic Devices & Circuit – A.K. Maini & Varsha Agrawal, 1st Edition, Wiley Publication.
2. Electronic Devices & Circuits – Allen Mottershead, PHI.
3. Microelectronic Circuits - Sedra and Smith, 5th Edition, Oxford University Press.

Course outcomes:

1. The student is able to gain complete knowledge of transport phenomena in semiconductor.
2. Students are able to design practical circuit using diodes.
3. Students understand the concepts of DC analysis of BJT.
4. Students get complete knowledge on JFET and MOSFET.

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Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Network Analysis & Synthesis**	Code:	**328354(28)**
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:

- To understand the basic concepts and analysis of electric circuits.
- T o make the students learn how to synthesize an electrical network from a given impedance / admittance function**.**

UNIT- I **METHODS OF ANALYSING CIRCUITS:** Introduction, Tree and Co-Tree, Twigs and Links, Incidence Matrix (A), Properties of Incidence Matrix A, Incidence Matrix and KCL, Link Currents: Tie-Set Matrix, Cut-Set and Tree Branch Voltages, Mesh Analysis, Nodal Analysis.
TWO-PORT PARAMETERS: Relationship of Two-Port Variables, Short-Circuit Admittance Parameters, The Open Circuit Impedance Parameters, Transmission Parameters, The Hybrid Parameters, Relationships between Parameters Sets, Parallel Connection of Two-Port Networks.

UNIT-II **INITIAL CONDITIONS IN NETWORKS:** Initial Conditions in Elements, Geometrical Interpretation of Derivatives, A Procedure for Evaluating Initial Conditions, Initial State of a Network.
THE LAPLACE TRANSFORMATION: Introduction, The Laplace Transformation, Basic Theorems for the Laplace Transformation, Application of Laplace Transformation Technique in Electric Circuit Analysis.

UNIT- III **TRANSFORMS OF SIGNAL WAVEFORMS:** The Shifted Unit Step Function, The Ramp and Impulse Functions, Waveform Synthesis, The Initial and Final Value of f(t) from F(s), The Convolution Integral, Graphical Convolution.
SINUSOIDAL STEADY-STATE ANALYSIS: The Sinusoidal Steady State, The Sinusoid and $e^{\pm j\omega t}$; Solution Using $e^{\pm j\omega t}$; Solution Using $Re^{j\omega t}$ or $Ime^{j\omega t}$; Phasors and Phasor Diagrams.

UNIT-IV **IMPEDANCE FUNCTIONS AND NETWORK THEOREMS:** The Concept of Complex Frequency, Transform Impedance and Transform Circuits, Series and Parallel Combinations of Elements, Network Functions for the One Port and Two Port, Calculation of Network Functions for Ladder and General Networks. Network Theorems: Thevenin's Theorem, Norton's Theorem, Superposition Theorem.
INPUT POWER AND POWER TRANSFER: Energy and Power, Effective or Root- Mean Square Values, Average Power and Complex Power, Problems in Optimizing Power Transfer.

UNIT-V **ELEMENTS OF REALIZABILITY AND SYNTHESIS OF ONE-PORT NETWORKS:** Hurwitz Polynomial, Positive Real Functions, Frequency Response of Reactive One-ports, Synthesis of Reactive One-ports by Foster's Method, Synthesis of Reactive One-ports by the Cauer Method, Synthesis of R-L Network by Foster's Method, Synthesis of R-L Network by Cauer Method, Synthesis of R-C Network by Foster's Method, Synthesis of R-C Network by Cauer Method.

Text Books:

1. Network Analysis–M.E. Van Valkenburg, Pearson Education. (Unit- I, II, III & IV)
2. Circuits and Networks: Analysis and Synthesis–A. Sudhakar & Shyammohan S. Palli, Tata McGraw Hill.(Unit- I, & V)
3. Network Analysis and Synthesis – Franklin Kuo, Wiley International.

Reference Books:

1. Engineering circuit analysis- Hayt and Kimberley, TMH.
2. Electronic circuit analysis-Alexender and Sadique, TMH.
3. Network Synthesis–T. Lapatra,TMH.

Course outcomes:

1. Students are able to apply laplace transform in analyzing the circuits.
2. To evaluate properties & apply network theorems on various networks.
3. To evaluate two-port parameters of a given network.
4. Synthesize given network using foster and cauer forms.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Industrial Instrumentation**	Code:	**328355(28)**
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:

- To studyBasic Measurement System.
- To understand Basics of Transducers and Primary Sensing Elements.
- To understand different types of Transducers relating with Non Electrical Parameter.
- To study Temperature and Pressure measurement.
- To study different phenomena of Flow measurement and Photo Electricity.

UNIT- I **MEASUREMENT SYSTEMS:** Introduction to Measurement Systems**:** Elements of Generalized Measurement System, Cathode Ray Oscilloscope: Block Diagram of General purpose CRO, Measurement of Phase and Frequency using Lissajous Patterns, Dual Trace Oscilloscopes, Sampling Oscilloscopes, Digital Storage Oscilloscopes. Display Devices: LED, LCD.

UNIT-II **PRIMARY SENSING ELEMENTS AND TRANSDUCERS:** Basics of Transducers: Transducer Performance, Transducers Classification. Static and Dynamic Characteristics.
Potentiometer: Loading effect, Power rating of Potentiometers, Linearity and sensitivity, Constructiom of Potentiometer. Theroy of Strain Gauges and its types. Variable Inductance type Transducer: LVDT and RVDT. Capacitive Transducer:Change in area of plates, Change in distance between plates, Change in dielectric constant, Frequency response of Capacitive transducers.

UNIT- III **MEASUREMENT OF NONELECTRICAL QUANTITIES: (**Velocity,Liquid Level and Humidity)
Measurement of Linear Velocity: Moving Coil, Moving Magnet and Seismic type, Measurement of Angular Velocity: Stroboscope. Measurement of Liquid Level: Resistive, Inductive and Capacitive methods. Measurement of Humidity: Resistive and Capacitive Hygrometers.

UNIT-IV **TEMPERATURE & PRESSURE MEASUREMENT:** Temperature Measurement: Bimetallic Thermometer, Platinum Resistance Thermometer, Thermistor, Thermocouple: Laws, Construction and its Types. Optical Pyrometers.
Pressure Measurement: U-Tube Double Column and Single Column Manometer, U-Tube Differential Manometer, Mechanical gauges: Elastic Pressure Transducers: Bourdan Gauge, Dead Weight Piston Gauge.

UNIT-V **FLOW MEASUREMENT & PHOTOELECTRIC TRANSDUCERS:** Flow Measurement: Classification of fluid flow measurement techniques, Theory of Variable head meters: Theory for incompressible fluids, Constructional details of variable head meters: Flow Nozzle, Orifice flow meter, Venturimeter. Pitot Tube. Special flow meter: Electromagnetic Flow Meter.
Photoelectric Transducers: Photoelectric Phenomenon, Photoconductive, Photovoltaic and Photo-emissive cell.

Text Books:

1. Electrical and Electronic Measurements & Measuring Instrumentation, A.K. Sawhney, Khanna Publication. (Unit- I, II & III)
2. Mechanical Measurements & Control, D.S. Kumar, Metropolitan Book Company Pvt. Ltd. (Unit- II, IV & V)
3. Transducers and Instrumentation; D.V.S. Murty, PHI.

Reference Books:

1. Mechanical and Industrial Measurements*;* R.K. Jain, 10th Edition, Khanna Publication.
2. Sensors and Transducers; D. Patranabis, 2nd Edition.,PHI.

Course outcomes:

1. Students will be acquainted with basics of measurement system and functioning of CRO.
2. Students are able to acquire knowledge and overview of Transducers.
3. Students are familiar with industrial applications of Transducers.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Digital Logic Design**	Code:	**328356(28)**
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 Design, Analyze and Interpret Combinational Circuits
2. To Design, Analyze and Interpret Sequential Circuits

UNIT- I **NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA:** Representation of Signed Numbers and Binary Arithmetic in Computers. **Codes**: Weighted and Non-Weighted Codes, Sequential Codes, Self-Complementing Codes, Cyclic Codes; The 8421 BCD Code: BCD Addition; Excess-3 Code; The Gray Code: Binary to Gray and Gray to Binary Code Conversion; Error Detecting Codes: Parity, Check Sums, Block Parity, Five-bit Codes, The Biquinary Code, The Ring Counter Code; Error Correcting Code:7-bit Hamming code; Alphanumeric Codes: The ASCII Code, The EBCDIC Code. **Boolean Algebra:** Logic Operations; Axioms and Laws of Boolean Algebra: Complementation Laws, AND Laws, OR Laws, Commutative Laws, Associative Laws, Distributive Laws, Redundant Literal Rule, Idempotence Laws, Absorption Laws, Transposition Theorem, Demorgan's Theorem; Duality; Reducing Boolean Expressions; Functionally Complete Sets of Operations; Boolean Functions and Their Representation.

UNIT-II **MINIMIZATIONTECHNIQUES:** Expansion of a Boolean expression to SOP form; Expansion of a Boolean expression to POS form; Two, Three & Four variable K-Map: Mapping and minimization of SOP and POS expressions; Completely and Incompletely Specified Functions- Concept of Don't Care Terms; Quine – McClusky Method (Up to 5 variable); Synthesis using AND-OR, NAND-NOR and XOR forms; Design Examples; Programmable Logic Devices: PAL, PLA's & PROMS.

UNIT- III **COMBINATIONAL CIRCUITS:** Adder & Subtractor: Half adder, Full adder, Half subtractor, Full subtractor; Binary Parallel Adder; The Look Ahead Carry Adder; Serial Adder; BCD Adder; Code Converters; Parity Bit Generators/ Checkers; Comparators; Decoders: 3-Line to 8-Line Decoder, 8-4-2-1 BCD to Decimal Decoder, BCD to Seven Segment Decoder; Encoders: Octal to Binary and Decimal to BCD Encoder; Multiplexers: 2- Input Multiplexer,4-Input Multiplexer, 16-Input Multiplexer; Demultiplexers: 1-Line to 4-Line & 1-Line to 8- Line Demultiplexer; Applications of Multiplexers.

UNIT-IV **SEQUENTIAL CIRCUITS:** Flip-Flops: S-R Latch; Gated S-R Latch; D Latch; Edge Triggered Flip-Flops: S-R,D,J-K and T Flips-Flops; Master-Slave J-K Flip-Flop; Asynchronous Inputs; Shift Registers: SISO, SIPO, PISO,PIPO, Bi-Directional Shift Registers, Universal Shift register; Counters: Asynchronous Counters: Design of Asynchronous Counters; Effects of Propagation Delay in Ripple Counters; Synchronous Counters: Design of Synchronous Counters, 3-bit Synchronous Up counter, 3-bit Synchronous Down Counter,3-bit Synchronous Up-down Counter, Design of Modulo-9 Synchronous Counter, Design Of Synchronous BCD Counter, Design of Synchronous Mod-6 Counter; Shift Register Counters; Pulse Train Generators, Design of Sequence Generators; Design of Finite State Machine: Mealy and Moore Model.

UNIT-V **DIGITAL LOGIC FAMILIES:** Introduction; Simple Diode Gating and Transistor Inverter; Digital IC Specification Terminology; Logic Families: TTL: Open collector gates, TTL subfamilies; IIL; ECL; MOS Logic; CMOS Logic; Dynamic MOS Logic; Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL; Comparison Among Various Logic Families, Manufacturer's Specification.

Text Books:

1. Fundamentals of Digital Circuits: A. Anand Kumar, PHI. (Unit – I to V)
2. Digital Electronics-Principles and Integrated Circuits, A.K. Maini, 1st Edition, Wiley India.

Reference Books:

1. Digital Fundamentals: Floyd & Jain: Pearson Education.
2. Digital Electronics: A. P. Malvino: Tata McGraw Hill.
3. Digital Circuits & Logic Design–LEE, PHI.

Course outcomes:

1. Students will be able to gain knowledge about various codes, employ Boolean algebra and circuit minimization techniques.
2. Students gain knowledge to interpret the operation of logic circuit such as adders, subtractors, multiplexers, flip-flops, shift registers and counters.
3. Students will be able to design asynchronous, synchronous sequential circuits and finite state machines.
4. Gain knowledge about various logic families and select a suitable one for a specific application.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Electronic Devices and Circuits Laboratory**	Code:	**328361(28)**
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 draw the characteristics of a semiconductor p-n junction diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
2. To simulate characteristics of pn junction using SPICE model.
3. To draw the characteristics of a zener diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
4. To design a half wave rectifier and to determine its efficiency and ripple factor.
5. To design a centre tap full wave rectifier and determine the ripple factor and efficiency with and without filter.
6. To design a bridge full wave rectifier and determine the ripple factor and efficiency with and without filter.
7. To draw the characteristics of CE configuration of a transistor amplifier.
8. To draw the characteristics of CB configuration of a transistor amplifier.
9. To draw the characteristics of CC configuration of a transistor amplifier.
10. To simulate characteristics of BJT using SPICE model.
11. To design a Zener regulator circuit and to find the regulation characteristics.
12. To draw the load line and find Q-point of a transistor amplifier under CE configuration.
13. To design and verify the self bias circuit operation.
14. To design and verify the voltage divider biasing circuit.
15. To draw the characteristics of FET.
16. To simulate characteristics of FET using SPICE model.
17. To draw the characteristics of MOSFET.

Equipment/Machines/Instruments/Tools/Software Required:

Circuit components, Breadboard, Hook-up wire, Power supply, CRO, Function generator, Any simulation software – Package like SPICE or MATLAB.

Recommended Books:

1. Laboratory Manual for Electronic Devices and Circuits, 4th Ed., David A. Bell, PHI
2. Lab Manual of Electronic Devices by Paul B Zbar.
3. Microelectronics' An integrated approach' by Roger T. howe and Charles G. Sodini.
4. Electronic Devices Systems and Applications by Robert Diffenderfer, Cengage learning.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Industrial Instrumentation Laboratory**	Code:	**328362(28)**
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 study method of displacement measurement using Linear Potentiometer.
2. To study Strain gauge working as displacement sensor.
3. Measurement of linear displacement using Linear Variable Differential Transformer (LVDT).
4. To study LVDT as displacement transducer and observe displacement versus output voltage characteristics.
5. To calibrate variation in capacitance to measure displacement using Capacitive Displacement Transducer.
6. To study measurement of humidity using Humidity Transmitter set up.
7. To study the characteristics of IC temperature sensor (LM 335).
8. To study the characteristics of NTC bridge circuit.
9. To study the characteristics of NTC Thermistor.
10. To study the characteristics of Temperature Sensor Setup (Thermocouple, RTD, Thermistor Setup).
11. To study working of Pressure sensor (Piezo resistive/strain) and to observe characteristics of air pressure versus output voltage.
12. To study Dead Weight Pressure Gauge Tester.
13. To study calibration of flow meters setup with Electromagnetic Flow Meter.
14. To measure liquid flow using Orifice, Ventury, Rotameter and Turbine type flow sensor.
15. To study the characteristics of Filament Lamp.
16. To study the characteristics of Photovoltaic Cell.
17. To study the characteristics of Photoconductive Cell.
18. To study the characteristics of Photo-Transistor.
19. To study the characteristics of Optically Controlled Switching System.
20. Measurement of displacement using Light Dependent Resistor (LDR).
21. To study Rotary Encoder for speed and angular measurement.
22. Study of Transducer and Measurement system based upon a particular Application.

Equipment/Machines/Instruments/Tools/Software Required:

Transducers Trainer Kit, Sensors, Power supply, Digital Multimeter.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Digital Logic Design Laboratory**	Code:	**328363(28)**
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 design and implement an X- OR Gate Using Only NAND Or NOR Gates Only.
4. To design and implement a Half Adder Circuit using Logic Gates And Verify its Truth table.
5. To design and implement a Full Adder Circuit And Verify its truth table (Using Two X-OR And 3 NAND Gates).
6. To design and implement a Half Subtractor Circuit by Using Basic Gates And Verify its truth table.
7. To design and implement a Full Subtractor Circuit by Using Basic Gates And Verify its truth table.
8. To design and implement a Circuit of 4 -Bit Parity Generator and Checker & Verify its truth table.
9. To design and implement a 4x1 Multiplexer using Logic Gates And Verify its truth table.
10. To design and implement a 1x4 De-Multiplexer using Logic Gates And Verify its truth table.
11. To design and implement a Programmable Inverter Using X-OR Gates & Verify its truth table.
12. To design Octal to Binary Encoder using Logic Gates and Verify its truth table.
13. To design BCD to Excess-3 Decoder using Logic Gates And Verify its truth table.
14. To design Binary to Gray Code Converter and Verify its truth table.
15. To Design A Comparator Circuit & Verify its truth table.
16. To Construct A RS Flip Flop Using Basic & Universal Gates (NOT, NOR & NAND)
17. To Construct A J.K. Master Slave Flip Flop & Verify its truth table
18. To Verify The Operation of A Clocked S-R Flip Flop And J. K. Flip Flop
19. To Construct A T & D Flip Flop Using J. K. Flip Flop And Verify Its Operations & truth table.
20. To Construct and study the operation of a 4-bit Shift Register in following modes:
    a. Serial In Serial Out
    b. Serial In Parallel Out
    c. Parallel In Serial Out
    d. Parallel In Parallel Out
21. To Verify the Operation of 4-bit Binary Asynchronous Counter.
22. To Verify The Operation of a Synchronous Decade Counter.
23. To perform the operation of BCD Counter Using 7490.

Equipment/Machines/Instruments/Tools/Software Required:

Various ICs , Power Supply, Hook-Up Wires.

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Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Electronic Workshop**	Code:	**328364(28)**
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 understand the operational features of Analog and Digital Multimeter.
2. To understand the operational features of Cathode Ray Oscilloscope.(Calibration, Time/div, Volt/div, X-Y, single channel, Dual channel)
3. To understand the operational features of Function Generator (Measurement of volt and frequency, attenuation).
4. Measurement of capacitors (mica, ceramic, paper, electrolytic and variable) using CRO and LCR Meter and verify with color coding.
5. Measurement of resistors- Fixed (carbon, wire wound, metal film and variable) using CRO and Multimeter and verify with color coding and identification of special resistors like Thermistor, LDR and VDR (FET)
6. Measurement of inductors (fixed) using CRO and LCR meter.
7. Study of Diodes (Ge and Si), Zener diodes and LEDs.(terminals, resistance and capacitance in forward biased and reversed biased conditions).
8. Study of Transistors (npn, pnp) using multimeter and CRO. (terminals, forward biased and reversed biased junction conditions.)
9. To understand the types of PCB.
10. To understand PCB designing rules (Art Work and layout) using EDA tools.
11. To design and fabricate a DC power supply using bridge rectifier on PCB.
12. To learn the use of SMD rework station.
13. Mini project (compulsory)

Equipment/Machines/Instruments/Tools/Software Required:

- Film Making unit
- Deep coating machine
- UV exposure unit
- PCB curing machine
- PCB etching machine
- PCB drilling machine
- PCB tining machine
- Magnifying lamp
- Soldering &desoldering iron
- LCRQ meter
- Digital & analog multimeter
- PCB making software (ULTIBOARD, PROTEL, EXPRESS LAB, EDWin XP)
- Resistance color code chart
- Capacitor color code chart
- Transistor chart
- CRO.
- SMD work station

Recommended books:

1. A Monograph on Electronic design Principles – by N.C. Goyal& R.K. Khetan
2. Electronic Measurement and Instrumentation – by A.K. Shawney.

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Name of program:	**Bachelor of Engineering**		
Branch:	**Electronics &Telecommunication**	Semester:	**III**
Subject:	**Value Education**	Code:	**328365(46)**
Total Theory Periods:	**24**	Total Tutorial Periods:	**NIL**
Maximum Marks:	**80**	**Minimum Marks:**	**28**

Course Objectives:

1. This course is designed to provide the importance of education with why, what & how.
2. To impart students with an understanding of fundamental humanitarian viewpoint and its outcomes.
3. To provide the knowledge about whole existence and its impact on values.
4. To bring the awareness about life long exercise so that they can fulfill their responsibility towards themselves, the family, the society, the planet.

UNIT- I **Aim of Education and Necessity for Value Education:** Education in values/wisdom/etc and education in traits/technologies/etc as the two fundamental strands of education; Answer to the frequently asked questions such as "Why to do studies", "What studies to do in overall", "How to do studies in a proper way", "How to think systematically and talk systematically"

UNIT-II **Humanitarian Viewpoint and Basic Human Objective:** Meaning and concept of happiness, Need for a fundamental viewpoint to judge things in all cases of human concerns, Proposal of the natural path of humanitarian coexistentialism; Consciousness development and its expression; Fundamental want of sustainable happiness in human being; Understanding the distinct activities and needs of self (I) and body in human being; Fundamental goal of human being; Sustainable-solution in individual (At the place of delusion); Sustainable-prosperity in family (At the place of poverty); Sustainable-cooperation in society (At the place of competition); Sustainable-coexistence in planet (At the place of struggle)

UNIT- III **Elements of Holistic and Systematic Perspective:** Need for study of fundamental information categories to develop holistic perspective; Particular-time actions and general-time laws; Need for fundamental information sequence to develop systematic perspective, Some examples for systematic study sequence

UNIT-IV **Elements of Society-friendly and Environment-friendly Goals:** Elements of Knowledge of whole existence; Elements of Knowledge of human being; Elements of fundamental Values and Wisdom; Value spectrum with reference to general relationships and particular relationships of the objects in nature; Elements of History and Contemporarity used to set current goals; Elements of Sciences and Techniques to formulate methods to achieve goals; Elements of Motoricity and Mattericity to make actions to execute the methods

UNIT-V **Lifelong Exercise for All-round Sustainability:** Collecting information for sustainability issues; Motivating people towards sustainable life-style; Ability to identify and develop appropriate technologies and management patterns for society-friendly and environment-friendly systems for production/protection/utilization/experimentation; Ability to establish and execute the fundamental five-fold system in order to ensure sustainable peace-and-prosperity worldwide.

Text Books:

Value Education for Consciousness Development by Dr P B Deshmukh, Radha K Iyer, and Deepak K Kaushik (2nd Edition, 2012, ISBN: 978-81-924034-0-3)

Reference Books:

1. International Research Handbook on Values Education and Student Wellbeing by Terence Lovat, Ron Toomey, Neville Clement (Eds.), Springer 2010, ISBN: 978-90481-86747
2. Values Education and Lifelong Learning: Principles, Policies, Programmes by David N Aspin and Judith D Chapman (Eds.); Springer 2007, ISBN: 978-1-4020-6183-7
3. Fundamentals of Ethics for Scientists and Engineers by E G Seebaur and Robert L Berry, 2000, Oxford University Press