Course Name	ELECTRONIC CIRCUIT ANALYSIS				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3

ELECTRONIC CIRCUIT ANALYSIS

Objectives:

The main objectives of this course are:

- Small signal high frequency BJT transistor amplifier Hybrid-π equivalent circuit and the expressions for conductances and capacitances are derived.
- Cascading of single stage amplifiers is discussed. Expressions for overall voltage gain arederived.
- The concept of feedback is introduced. Effect of negative feedback on amplifier characteristics is explained and necessary equations are derived.
- Basic principle of oscillator circuits is explained and different oscillator circuits are given with their analysis.
- Power amplifiers Class A, Class B, Class C, Class AB and other types of amplifiers areanalyzed.
- Different types of tuned amplifier circuits areanalyzed.

Syllabus:

UNIT I: Small Signal High Frequency Transistor Amplifier Models :BJT at High Frequencies, Hybrid- Common Emitter Transistor Model, Hybrid- Conductances, Hybrid capacitances, validity of hybrid pi model, determination of high frequency parameters in terms of low frequency parameters, Current Gain with Resistive Load, CE Short Circuit Current Gain, cutoff frequencies, frequency response and gain bandwidth product.

FET: Analysis of common source and common drain amplifier circuits at high frequencies.

UNIT II:
Multi Stage Amplifiers: Classification of amplifiers**,** methods of coupling, cascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis- Darlington pair amplifier, Cascode amplifier, boot-strap emitter follower, analysis of multi stage amplifiers using FET,

UNIT III:
Feedback Amplifiers : Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, characteristics of negative feedback amplifiers, generalized analysis of feedback amplifiers, performance comparison of feedback amplifiers.

UNIT IV:
Oscillators: oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and wein bridge oscillators with BJT and FET and their analysis, generalized analysis of LC oscillators, Hartley and colpitts oscillators with BJT and FET and their analysis, crystal oscillators.

UNIT V:
Power Amplifiers: classification of amplifiers, class A, class B and power amplifiers and their analysis , harmonic distortions, push-pull amplifiers and their analysis , complementary symmetry push pull amplifier, class AB power amplifier, thermal stability and heat sinks. Introduction to tuned amplifiers, Q-factor, small signal tuned amplifier, capacitance coupled single tuned amplifier, double tuned amplifiers

Text Books:

1. Integrated Electronics- J. Millman and C.C. Halkias, Tata Mc Graw-Hill, 1972.
2. Electronic Devices and Circuits- Salivahanan, N.Suressh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition

References:

1. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc GrawHill.
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, TenthEdition.
3. Electronic Circuit Analysis-B.V.Rao,K.R.Rajeswari, P.C.R.Pantulu,K.B.R.Murthy, PearsonPublications.
4. Microelectronic Circuits-Sedra A.S. and K.C. Smith, Oxford University Press, SixthEdition.

Outcomes:

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

- Design and analysis of small signal high frequency transistor amplifier using BJT andFET.
- Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier usingBJT
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stabilityconcept.
- Know the classification of the power and tuned amplifiers and their analysis with performancecomparison.

VISHNU
UNIVERSAL LEARNING

VISHNU INSTITUTE OF TECHNOLOGY :: BHIMAVARAM (AUTONOMOUS)

Department of Basic Science

Year/Semester	II B.Tech. I Sem	**L**	**T**	**P**	**C**
Regulation Year	2020-21	2	0	0	0
Name of the Subject	**Constitution of India**				
Branch	ECE				

COURSE OBJECTIVES:

- To train students in understanding the basic structure of Indian Constitution
- To prepare students to live better and happily with other fellow beings through the application of Fundamental Rights in their lives.

UNIT-I: Introduction to Indian Constitution

Meaning of the term Indian Constitution –Preamble- Constituent Assembly- Salient Features of Indian Constitution

UNIT-II: Fundamental Rights

Fundamental Rights -Fundamental Duties -The Directive Principles of State Policy

UNIT-III: Union Government

Union Government -Union Legislature (Parliament) -Lok Sabha and Rajya Sabha (with Powers and Functions) -Union Excecutive -President of India (with Powers and Functions) -Prime Minister of India (with Powers and Functions) -Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court

UNIT-IV State Government

State Government -State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) -Powers and Functions of the State Legislature -State Executive-Governor of the State (with Powers and Functions) -The Chief Minister of the State (with Powers and Functions) -State Judiciary (High Courts)

UNIT-V: Local Self Governance

Powers and functions of Municipalities, Panchyats, ZP's and Co – Operative Societies

BOOKS:

1. Introduction to constitution of India, Durga Das Basu, Lexis Nexis Publications
2. Constitution of India by PRFESSIONAL BOOK PUBLISHERS
3. The Constitution of India by Arun K Tiru vengadam, Blooms bury publishers.
4. The constitution of India by PM Bakshi, Universal law publishing co
5. The Constitution of India by S.R. Bhansali, Universal law publishing co

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

CO1: Examine salient features of Indian Constitution and live accordingly in society.

CO2: Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.

CO3: Discover various aspects of Union Government legislation and live up to the expectations of the rules.

CO4: Critically examine State Government legislation and improve your living standards by following the rules strictly

CO5: Examine powers and functions of local bodies such as Muncipalities and Panchayats and, take advantage of available resources for better living

Mathematics III (Complex Variables& PDE)

L	T	P	C
3	0	0	3

II B.Tech I Semester R 20 Regulations

Course Objectives:

To enable the students to

1. make use the significance of differentiability and analyticity for complex variable functions and be familiar with the Cauchy-Riemann equations.
2. find integrals along a path in the complex plane using the Cauchy's theorem and Residue theorem.
3. solve the singularities of complex variable function by expanding them into Taylor's and Laurent's series and finding residues
4. make the students learn modeling various physical phenomena as first and higher order PDE and applications

UNIT - I: Functions of Complex Variables

Continuity and differentiability, Analyticity, properties, Cauchy Riemann equations in Cartesian and polar coordinates, harmonic and conjugate harmonic functions, Milne – Thompson method.

Unit -II: Complex Integration

Integration of complex functions – Line Integrals, Cauchy's Integral theorem, Cauchy's Integral Formula - Generalized Cauchy's Integral formula (without proofs)

Unit -III:Complex power series and Residues

Complex power series-Taylor's Series and Laurent's Series, Singularities, Poles and Residues-Cauchy Residues theorem (without proof),evaluation of integrals of type $\int_{-\infty}^{\infty} f(x)dx$ and $\int_0^{2\pi} f(cos\theta, sin\theta)d\theta$ using Residue theorem.

UNIT-IV: First Order Partial Differential Equations

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions– solutions of first order linear (Lagrange) equations and nonlinear equations-standard types

UNIT- V: Higher Order Partial Differential Equations and Applications

Solutions of Linear Partial differential equations with constant coefficients. RHS terms of the type $e^{ax + by}$, Sin(ax+by), Cos (ax+by), $x^m y^n$. Classification of second order partial differential equations-parabolic, elliptical and hyperbolic.
Method of Separation of Variables, Applications to wave equation, heat conduction equation in one dimensions and Laplace equation in two dimensions

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Ed., Wiley, 2012.

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganatham and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
3. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
4. S.KaleshaValli, G.VenkataRao and A.V.Papa Rao, Engineering Mathematics-I, Cengage Publications, 2018.

Course Outcomes:

After undergoing this course, students will be able to

1. understand the differentiability and analyticity for complex variable functions and learn sufficient conditions for analyticity
2. evaluate the integration of complex valued functions
3. expand the functions in power series, classify the singularities of complex function
4. model first order linear and non-linear partial differential equations and solve analytically
5. model higher order partial differential equations and solve analytically and physical problems of engineering like steady and unsteady heat conduction, vibration of string, etc.,

NETWORKS ANALYSIS & ELECTRICAL TECHNOLOGY LAB

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	**Network Analysis and Electrical Technology Lab**				

Learning Objectives:

- To understand the concept network theorems in network reduction of electrical networks.
- To determine resonance frequency, Q-factor of RLC networks.
- To estimate parameters of two port networks
- To determine efficiency of dc shunt machine with actual loading.
- To analyze performance of transformer and three phase induction motor

Any five experiments are to be conducted from each part.

PART – A

1. Verification of KCL and KVL.
2. Verification of Thevenin's and Norton's theorems
3. Verification of Superposition theorem& Reciprocity theorem.
4. Verification of Maximum power transfer theorem(DC)
5. Series and Parallel Resonance Circuits
6. Z and Y parameters of two port Network

PART – B

1. Determination of critical field resistance of D.C. Shunt generator by using Magnetization characteristics
2. Speed control of D.C. Shunt motor by Armature & flux control methods
3. Determination of performance characteristics by conducting Brake test on DC shunt motor.
4. OC & SC tests on Single-phase transformer.
5. Brake test on 3-phase Induction motor (performancecharacteristics).
6. Load test on Single Phase Transformer.

Learning Outcomes:

- Able to analyze RLC resonance circuits and understand resonant frequency andQ-factor.
- Able to estimate the parameters of two port networks
- Able to apply network theorems to analyze the electricalnetwork.
- Able to describe the performance of dc shuntmachine.
- Able to investigate the performance of Single-phasetransformer.
- Able to perform tests on 3-phase induction motor.

RANDOM VARIABLES & STOCHASTIC PROCESSES

Course Name	**RANDOM VARIABLES & STOCHASTIC PROCESSES**				
Year/Semester	II B.Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3

OBJECTIVES:

- To give students an introduction to elementary probability theory, in preparation for courses on statistical analysis, random variables and stochastic processes.
- To mathematically model the random phenomena with the help of probability theory concepts.
- To introduce the important concepts of random variables and stochastic processes.
- To analyze the LTI systems with stationary random process as input.
- To introduce the types of noise and modelling noise sources.

Syllabus

UNIT I

THE RANDOM VARIABLE: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Conditional Density, Properties.

UNIT II

OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS: Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance, Characteristic Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable.

UNIT III

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density, Statistical Independence, Sum of Two Random Variables.

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variables case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT IV

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second-order and Wide-Sense Stationarity, N^{th}-order and Strict-Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT V

RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The Power Density Spectrum: Properties, Relationship between Power Density Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Density Spectrum and Cross-Correlation Function.

LINEAR SYSTEMS WITH RANDOM INPUTS: Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, Autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectra of Input and Output.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, TMH, 4^{th} Edition, 2001.
2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrisha, PHI, 4^{th} Edition, 2002.

REFERENCE BOOKS:

1.Probability Theory and Stochastic Processes – B. Prabhakara Rao, BS Publications
2. Probability and Random Processes with Applications to Signal Processing, Henry Stark and John W. Woods, Pearson Education, 3^{rd} Edition.
Schaum's Outline of Probability, Random Variables, and Random Processes.
3. An Introduction to Random Signals and Communication Theory, B.P. Lathi, International Textbook, 1968.

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OUTCOMES:

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

- ✓ Mathematically model the random phenomena and solve simple probabilistic problems.
- ✓ Identify different types of random variables and compute statistical averages of these random variables.
- ✓ Characterize the random processes in the time and frequency domains.
- ✓ Analyze the LTI systems with random inputs.
- ✓ Apply these techniques to analyze the systems in the presence of different types

VISHNU INSTITUTE OF TECHNOLOGY: VISHNUPUR, BHIMAVARAM.
(AUTONOMUS)
Department of Electronics & Communication Engineering

II Year - I Semester	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

SIGNALS & SYSTEMS

OBJECTIVES:

The main objectives of this course are given below:

- To introduce the terminology of signals and systems.
- To introduce Fourier series and Fourier Transform through signal analysis.
- To analyze the linear systems in time and frequency domains.
- To introduce Laplace transform as mathematical tool to analyze continuous-time signals and systems.
- To introduce Sampling theorem and to study z-transform to analyze discrete-time signals and systems.

UNIT-I: INTRODUCTION: Definition of signal and system, classification of signals, operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling, Complex exponential and sinusoidal signals, singularity functions: unit impulse and unit doublet functions, properties, step function, signum function and ramp function. Classification of Systems, Problems on classification of signals and systems.

SIGNAL ANALYSIS: Analogy between vectors and signals, orthogonal signal space, signal approximation using orthogonal functions, mean square error, closed or complete set of orthogonal functions, orthogonality in complex functions, Gibb's Phenomenon.

UNIT–II: FOURIER SERIES AND FOURIER TRANSFORM: Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, trigonometric Fourier series and exponential Fourier series, complex Fourier spectrum. Fourier transform of arbitrary signal.
Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT-III: ANALYSIS OF LINEAR SYSTEMS: Linear time invariant (LTI) system, impulse response, concept of convolution in time domain and frequency domain, graphical representation of convolution, transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, signal bandwidth, system bandwidth, Ideal LPF, HPF, BPF and BSF characteristics.

UNIT–IV: LAPLACE TRANSFORM: Review of Laplace transforms, partial fraction expansion, inverse Laplace transform, concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, properties of Laplace transform, relation between Laplace and Fourier transforms. Laplace transform of certain signals using waveform synthesis.

UNIT–V: SAMPLING AND Z–TRANSFORM: Graphical and analytical proof for band limited signals, impulse sampling, natural and flat top sampling. Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to band pass sampling. Related Problems. Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z-transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, properties of Z-transforms, inverse Z-transform.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Principles of Linear Systems and Signals – BP Lathi, Oxford University Press, 2015
3. Signals and Systems – K Raja Rajeswari, B VisweswaraRao, PHI, 2009
4. Fundamentals of Signals and Systems- Michel J. Robert, MGH International Edition, 2008.
5. Signals and Systems – T K Rawat , Oxford University press, 2011
6. Signals and Systems- I. Ravi Kumar, PHI,2009

OUTCOMES:

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

- Understand and differentiate among various classes of signals and Systems
- Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
- Understand the relationships among the various representations of LTI systems
- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Apply z-transform to analyze discrete-time signals and systems.

Course Name	**SWITCHING THOERY AND LOGIC DESIGN**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3

SWITCHING THOERY AND LOGIC DESIGN

COURSE OBJECTIVES:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates.
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine-Mc Cluskey methods.
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

UNIT I

Review of Number Systems & Codes: Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction.
4-bit codes: BCD, EXCESS 3, 2421, Gray code.

UNIT II

Boolean Theorems and Minimization Functions: Boolean theorems, principle of complementation & duality, De-Morgan theorems. Basic logic gates and Universal gates, NAND-NAND and NOR-NOR realizations, Standard SOP and POS, Minimization techniques: minimization of logic functions using Boolean theorems, minimization of switching functions using K-Map up to 5 variables, tabular minimization.

UNIT III

Combinational Logic Circuits: Design of Half adder, Full adder, Half subtractor, Full subtractor, applications of Full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, Excess3 adder circuit, look-a-head adder circuit. Design of Encoder, Multiplexer, Decoder, Demultiplexer, Realization of Boolean Functions Using Decoders and Multiplexers, Priority Encoder, 4 bit digital comparator.

UNIT IV

PLDs: Introduction, Types of PLDs, Basics structures of PROM, PAL, PLA, Realization of Boolean function using PROM, PAL, PLA, Comparison of PLDs

UNIT V

Sequential Logic Circuits: Classification of sequential circuits, Latches and Flip flops, Triggering, excitation tables, Asynchronous inputs, Conversion from one flip-flop to another flip flop. Registers-Types, modes of operations, bi-directional shift registers, universal shift register, Counters-synchronous & Asynchronous counters, design of mod counters, Counters using shift registers, Serial binary adder.

TEXT BOOKS:

1. Switching Theory and Logic Design by Hill and Peterson Mc-Graw Hill TMH edition.

2. Switching Theory and Logic Design by A. Anand Kumar

3. Digital Design by Morris Mano PHI.

4. Switching and finite automata theory Zvi. KOHAVI, Niraj. K.Jha 3rdEdition,Cambridge University Press, 2009

REFERENCE BOOKS:

1. Modern Digital Electronics by RP Jain, TMH

2. Fundamentals of Logic Design by Charles H. Roth Jr, Jaico Publishers, 2006

3. Micro electronics by Milliman MH edition.

COURSE OUTCOMES:

- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters
- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- Produce innovative designs by modifying the traditional design techniques.

II YEAR II SEMESTER

ELECTRONIC CIRCUITANALYSIS LAB

Course Name	**ELECTRONIC CIRCUIT ANALYSIS LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5

Note: The students are required to design the circuit and perform the simulation using Multisim /Equivalent Industrial Standard simulation software tool**.** Further they are required to verify the result using necessary hardware equipment.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Determination of f_T of a given transistor.
2. Voltage-Series Feedback Amplifier
3. Current-Shunt Feedback Amplifier
4. RC Phase Shift/Wien Bridge Oscillator
5. Hartley Oscillator
6. Colpitt's Oscillator
7. TwoStageRCCoupledAmplifier
8. DarlingtonPairAmplifier
9. BootstrappedEmitterFollower
10. ClassASeries-fedPowerAmplifier
11. Transformer-coupledClassAPowerAmplifier
12. ClassBPush-PullPowerAmplifier
13. ComplementarySymmetryClassBPush-PullPowerAmplifier
14. SingleTunedVoltageAmplifier

Equipmentrequired:

Software:

i. Multisim/EquivalentIndustrialStandardsimulationsoftwaretool.

ii. ComputerSystemswithrequiredspecifications

Hardware:

10. RegulatedPowersupplies
11. Analog/DigitalStorageOscilloscopes
12. Analog/DigitalFunctionGenerators
13. DigitalMultimeters
14. DecadeResistanceBoxes/Rheostats
15. DecadeCapacitanceBoxes
16. Ammeters(AnalogorDigital)
17. Voltmeters(AnalogorDigital)
18. Active&PassiveElectronicComponents

Course Name	**SWITCHING THOERY AND LOGIC DESIGN LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5

SWITCHING THOERY AND LOGIC DESIGN LAB

LABORATORY OBJECTIVES:

- To design and realize basic digital combinational and sequential circuits.
- To verify the functionality of basic digital combinational and sequential circuits.

Experiments (minimum of ten)

1. Verify
   (a) Basic Logic gates (AND, OR, NOT, NAND, NOR, EX-OR)
   (b) De-Morgan's Theorem for 2 variables.
2. Verification of functional table of 3 to 8 line Decoder
3. Variable logic function verification using 8 to 1 multiplexer IC 74151
4. Design and implementation De-multiplexer using logic gates and study of IC74155
5. Design and implementation of Adders and Subtractor (Half and Full) using logic gates.
6. Verification of functional tables of
   (a) RS Flip Flop using level triggering,
   (b) JK Flip Flop using level triggering
7. Verify the operation of 4-bit Universal Shift Register for different Modes of operation
8. Design and implementation of decade counter
9. Design and Implementation of 4-bit Digital Comparator using IC 7485.
10. Verification of functional tables of dual D type level triggered flip-flops with preset and clear inputs.
11. Verification of functional table of Master Slave JK Flip Flop.
12. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
13. (a) Draw the circuit diagram of a single bit comparator and test the output.
    (b) Construct 7 Segment Display Circuit Using Decoder and 7 Segment LED and test it.
14. Design a four bit ring counter using D Flip – Flops / JK Flip Flop and verify output.
15. Design a four bit Johnson’s counter using D Flip-Flops / JK Flip Flops and verify output.

16. Design and implementation of Encoder and Decoder using logic gates and study of IC7445 and IC74147

LABORATORY OUTCOMES:

- Solve the Boolean algorithms using practical logic gates.
- Demonstrate the truth table of various expressions and combinational circuits using logic gates.
- Design and verify basic combinational logic circuits using Practical ICs.
- Design and verify basic sequential logic circuits using Practical ICs.

R-20 REGULATION SYLLABUS

Course Name		**EMPLOYABILITY SKILLS- ASSISTIVE TECHNOLOGY**			
Year/Semester		**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**1**	**0**	**2**	**2**

EMPLOYABILITY SKILLS- ASSISTIVE TECHNOLOGY

OBJECTIVES:

1. To gain an understanding of the engineering, medical, and social aspects associated with the design, development, and use of assistive technology.
2. To understand various tools used in assistive technology.
3. To provide an opportunity for students to interact with users of assistive technology in the local community along with health care professionals, coaches, and project partners.
4. To enhance the problem solving, critical thinking and communication skills.
5. To engage students in a project experience that enhances the team work skills and enable them to apply engineering design process to address the needs of individuals with disabilities and older adults.

SYLLABUS

ABOUT ASSISTIVE TECHNOLOGY

Assistive technology – definition, principles of operation, perspectives of assistive technology, general awareness including the use of various embedded technologies in the development of assistive devices. Engineering, Medical, and Social issues to be considered in the design of assistive technology. Ethical issues in assistive technology.

IDE TOOLS

Writing Sketches, Tabs, Multiple Files, and Compilation, Uploading, Libraries, Serial Monitor, Preferences of Arduino IDE.

List of Experiments

1. Light Emitting Diodes (LEDs), Push Button Switch, and Magnetic Switch.

2. 7-Segment Display with Keypad.

3. Input voltage measurement using ADC

4. LCD Interfacing

5. Object range measurement using Ultrasonic Sensor and LCD

6. Temperature and humidity measurement using DHT 11 and LCD

7. Servo motor interfacing

8. Stepper motor interfacing

9. Automatic street light control using LDR.

10. Gas detection using MQ 3 sensor.

TEXT BOOKS:

1. Assistive technologies principles and practice - Jan Miller Polgar and Pedro Encarnação, St. Louis Mosby, 2020.
2. Arduino Programming: The Ultimate Guide for making the best of your Arduino Programming Projects by Damon Parker

REFERENCES:

1. The Handbook of Assistive Technology by Gregory Church and Sharon Glennen, 1992.
2. Essentials of Assistive Technologies by Albert Cook Janice Polgar, Mosby, 2011

Outcomes:

At the end of this course, students should be able to:

1. Understand the Assistive Technology and its application.
2. Apply the engineering skills to assistive technology.
3. Design projects to support people with disabilities.

R-20 REGULATION SYLLABUS

Course Name		**EMPLOYABILITY SKILLS- (PCB design)**			
Year/Semester	**II B.Tech/ I Semester**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**1**	**0**	**2**	**2**

EMPLOYABILITY SKILLS- PCB DESIGN

OBJECTIVES:

6. To understand the PCB designing used for various electronic devices.
7. To learn a variety of PCB designing issues like clearance between tracks and DRC errors etc.
8. Students get good skills on PCB designing
9. To provide an opportunity for students in various electronic industries

List of Experiments

PART -A

1) Preparation of layout and artwork layout planning.
2) Preparation of Negative from the film.
3) Prepare a simple PCB
4) Etching of PCB.
5) Drilling of PCB.
6) Preparation and mounting components.
7) PCB Layout Design Procedure using DipTrace Software
8) Design the schematic and PCB layout of 7805 regulator circuit and prepare the PCB design using dip trace eda tool.

PART -B

9) Design the schematic and PCB layout of Astable Multivibrator using 55 timer and prepare the PCB design using dip trace eda tool
10) Design the schematic and PCB layout of Full adders using half adders and prepare the PCB design using dip trace eda tool

11) Design the schematic and PCB layout of a bike antitheft alarmand prepare the PCB design using dip trace eda tool
12) Design the schematic and PCB layout of an automatic street light controller circuit and prepare the PCB design using dip trace eda tool
13) Design the schematic and PCB layout of a traffic controller circuit using PIC microcontrollerand prepare the PCB design using dip trace eda tool
14) Design the schematic and PCB layout of a quiz competition buzzer circuit and prepare the PCB design using dip trace eda tool
15) Design the schematic and PCB layout of a gas leakage detector circuit using MQ6and prepare the PCB design using dip trace eda tool
16) Make a line soldering PCB for LCD display interfacing with PIC microcontroller.

R-20 REGULATION SYLLABUS

Course Name		**EMPLOYABILITY SKILLS- (Scientific Writing using LATEX)**			
Year/Semester	**II B.Tech/ I Semester**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**1**	**0**	**2**	**2**

LATEX is a macro package which enables authors to typeset and print their work at the highest typographical quality, using a predefined, professional layout. LATEX is often considered as the de-facto standard for typesetting scientific documents. It is an accepted format for submission to a number of scientific journals, as well as many professional publishers.

COURSE OBJECTIVES:

- To establish the importance of scientific writing and the role of using LATEX in effectively articulating a scientific document.
- To provide a thorough hands-on training to the students with respect to using LATEX right from installing the software through successfully producing a full document using LATEX.
- To present the importance of referencing in scientific writing and thereby explain the techniques available in LATEX for dynamic referencing
- To explain the importance of data visualization in research and train the student on various tools that can be used for plotting the scientific data
- To make the student understand the importance of ethics in scientific writing and plagiarism.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- Successfully install the LATEX package with required packages and write the scientific documents using LATEX
- Using open-source software such as Dia, Inkspace, and draw.io for sketching clear diagrams that demonstrate the ideas
- Using MATLAB and ORIGIN for data visualization
- Using LATEX for creating own templates for various use cases
- Making presentations using beamer (LATEX)

The entire course involves hands-on practice and the course covers the following:

S. No	**Experiment**
PART -A	
1.	Downloading and Installing LATEX and writing a single paragraph document using LATEX
2.	Organizing the Article/Write-up: Sections and Subsections
3.	Typesetting considerations: Indentation, Single Quotes, and Double Quotes, Emphasizing the text, new pages, setting font style and size, using appropriate class files

4.	Writing Mathematical Equations, Definitions, Lemmas, and Theorems. Aligning larger equations
5.	Writing Algorithms and Pseudocodes using LATEX
6.	Graphics Environment and Figures alignment in Latex. Drawing Clear Images for idea demonstration using Dia, Inkspace, and draw.io
PART -B	
7.	Creating and aligning Tables in Latex.
8.	Importance of referencing in scientific documents and reference styles
9.	Dynamic Referencing using Bibtex and its advantages. Dynamic reference to Tables, Figures, and various other parts of the document.
10.	Data Visualization using MATLAB and ORIGIN
11.	Introduction to Plagiarism (TURNITIN, Urkund) and Ethics in Scientific writing
12.	Building beautiful Statement of Purpose and Resumes using Latex
13.	Making Presentation using Beamer (LATEX)