TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
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B.TECH – ELECTRONICS & COMMUNICATION ENGINEERING
Course Structure R-20

SEMESTER III

S.No.	Class	Course Code	Name of the Subject	L	T	P	C
1	BS	CBSM15	Complex Analysis and Vector Calculus	3	1	0	4
2	ES	CESDL1	Digital Logic Design	3	0	0	3
3	PC	C43PC1	Electronic Circuit Analysis	3	0	0	3
4	PC	C43PC2	Signals and Systems	3	0	0	3
5	PC	C43PC3	Network Analysis	3	0	0	3
6	ES	CESDL2	Digital Logic Design Lab	0	0	2	1
7	PC	C43PC4	Electronic Circuit Design Lab	0	0	3	1.5
8	PC	C43PC5	Electronic Circuit Simulation Lab	0	0	2	1
9	PC	C43PC6	Basic Simulation Lab	0	0	3	1.5
10	MC	MC003	Cultural Activity	0	0	0	Satisfactory
Total Credits				**15**	**1**	**10**	**21**

Mandatory Course: Cultural Activity

The student should participate in culture activity (Music/Dance/Singing/etc.) conducted by the College, student should produce the participation certificate for clearing this course.

SEMESTER IV

S.No.	Class	Course Code	Name of the Subject	L	T	P	C
1	PC	C44PC1	Probability Theory and Stochastic Processes	3	0	0	3
2	PC	C44PC2	Analog Communications	3	0	0	3
3	PC	C44PC3	Pulse and Digital Circuits	3	0	0	3
4	PC	C44PC4	Linear IC Applications	3	0	0	3
5	PC	C44PC5	Electromagnetic Theory and Transmission Lines	3	0	0	3
7	HS	CHSE3	Advanced English Communication Skills Lab	0	1	2	2
6	PC	C44PC6	Analog Communications Lab	0	0	3	1.5
8	PC	C44PC7	Pulse and Digital Circuits Lab	0	0	3	1.5
9	PC	C44PC8	Linear IC Applications Lab	0	0	2	1
10	MC	MC004	Video with Social Messages	0	0	0	Satisfactory
Total Credits				**15**	**1**	**11**	**21**

Mandatory Course: Video with Social Messages

Student should make video with social messages. This has to be uploaded in the youtube.com, by maintaining the terms and conditions of youtube.com. Student should produce youtube.com link with screen shot for clearing this mandatory course.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech III Semester **L/T/P/C**
3 /1/ 0/ 4

COMPLEX ANALYSIS & VECTOR CALCULUS (CBSM15)

Course Objectives:

To learn:

1. Differentiation and integration of complex valued functions.
2. Evaluation of integrals using Cauchy's integral formula and residue theorem
3. Evaluation of integrals using Residues
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to line - surface and volume integrals.

Course Outcomes:

After learning the contents of this paper the student must be able to
CO1: Analyse the complex functions with reference to their analyticity.
CO2: Evaluate integrals using Cauchy's integral theorem, formula and finding the Taylor and Laurent's series expansion of complex functions.
CO3: Solve problems on Residues using different methods.
CO4: Evaluate real integrals.
CO5: Compute derivatives of vector valued functions, gradient function.
CO6: Evaluate the line- surface and volume integrals and converting them from one to another.

UNIT I
Functions of a Complex Variable:

Introduction, Continuity, differentiability, analyticity, properties, Cauchy Riemann equations in Cartesian and polar co-ordinates, harmonic and conjugate harmonic functions, Milne Thompson method.

UNIT II
Complex Integration:

Line integral, Cauchy integral theorem, Cauchy integral formula, generalized Cauchy integral formula. Power series -Taylor's series, Laurent series. Singular points, isolated singular points, pole of order m, essential singularity.

COMPLEX ANALYSIS & VECTOR CALCULUS (CBSM15)

UNIT III

Residues, Evaluation of Integrals:

Residue, Cauchy residue theorem, Types of real integrals Improper real integrals

a) $\int_{-\infty}^{\infty} f(x)dx$ b) $\int_{c}^{c+2\Pi} f(cos\Theta, sin\Theta)dx$.

UNIT IV

Vector Differentiation:

Vector point functions and scalar point functions- Gradient - Divergence and Curl. Directional Derivatives - Tangent plane and normal line- Vector Identities -Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT V

Vector Integration:

Line- Surface and Volume Integrals- Theorems of Green- Gauss and Stokes (without proofs) and their applications.

Text Books:

1. Erwinkreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons- 2006.
2. RamanaB.v.- Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.
3. Complex variables and applications by James ward Brown and Ruel V. Churchill-Eighth Edition – Mc-Graw Hill Higher Education.

Reference Books:

1. N.P. Bali and Manish Goyal- A text book of engineering Mathematics-Laxmi Publications-Reprint-2008.
2. B.S. Grewal - Higher Engineering Mathematics- Khanna Publishers- 36th Edition-2010.
3. Advanced Engineering Mathematics by S.R.K. Iyengar R.K. Jain – Narosa Publications.
4. Fundamentals of complex Analysis by Saff, E.B. and A.D. Snider, Pearson.

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B.Tech III Semester **L/T/P/C**
3 /0/ 0/ 3

DIGITAL LOGIC DESIGN (CESDL1)

Course Objectives:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits.
4. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
5. To implement synchronous state machines using flip-flops.
6. To implement memory devices using RAM and ROM.

Course Outcomes:

Upon completion of the Course, the students will be able to
CO1: Convert numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
CO2: Realize simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
CO3: Design and analyze of small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
CO4: Design of sequential logic circuits and synthesizing of threshold functions.
CO5: Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

UNIT I
Number System and Switching Functions:

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.

UNIT II
Boolean Algebra:

Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.
Minimization of Boolean Functions: Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and Six Variable Maps, Prime and Essential Implications, Don't Care Map conditions, Tabular Method.

DIGITAL LOGIC DESIGN (CESDL1)

UNIT III
Combinational Circuits:

Introduction, Adders, Subtractors, Multiplexers, Demultiplexers, Encoders, Decoders, code converters, Comparators and Hazards.

UNIT IV
Sequential Circuits I:

Introduction, Basic Differences between Combinational and Sequential circuits, the Binary Cell, Latch, Flip-Flop-Types, and Race around condition, Excitation tables and characteristic equations. Conversion from one type of Flip-Flop to another, preset and Clear inputs, Timing and Triggering Consideration, Clock Skew.
Sequential Circuits II: Introduction, Register-Types, Counter –Types, Design of Ripple (mod-N) Counter, Ring Counter.

UNIT V
Sequential Machines:

State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Finite state machine- capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

Text Books:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

References Books:

1. Anand Kumar, “Switching Theory and Logic Design” PHI, 2008.
2. Charles H. Roth, “Fundamentals of Logic Design” Thomson Publications, 5th Edition, 2004.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech III Semester **L/T/P/C**
3 /0/ 0/ 3

ELECTRONIC CIRCUIT ANALYSIS (C43PC1)

Course Objectives:

1. To introduce circuit diodes, BJTs and transistors studied earlier.
2. To give understanding of various types of amplifier circuits such as small signal, cascaded.
3. To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.
4. To introduce concept of different types of oscillators.
5. To familiarize about frequency response of amplifier of tuned or untuned using BJT.

Course Outcomes:

Upon completion of the Course, the student's will be able to:

CO1: Design and analyze BJT small signal amplifier circuits and applying the biasing techniques learnt earlier.
CO2: Obtain the required over all specifications like Gain, Bandwidth, etc. analyze the transistor at very high frequencies
CO3: Design and analyze small signal amplifier circuits applying the FET biasing techniques.
CO4: Utilize the Concepts of negative feedback to improve the stability of amplifiers and Positive feedback to generate sustained oscillations.
CO5: Design and realize different classes of Power Amplifiers and tuned amplifiers use able for audio and Radio applications.

UNIT I
Analysis and Design of Small Signal Low Frequency BJT Amplifiers:

Classification of Amplifiers–Distortion in amplifiers, Miller's theorem, Analysis of CE, CC, and CB Amplifiers, CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier, Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair.

UNIT II
Transistor at High Frequency:

Logarithms, Decibels. The Hybrid-pi (π)–Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, Single stage CE transistor amplifier response, Gain-bandwidth product.

ELECTRONIC CIRCUIT ANALYSIS (C43PC1)

UNIT III
FET Amplifiers:

Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOS amplifiers, MOS Small signal model, Common source amplifier with resistive load, Diode connected and Current source loads, Source follower, Common Gate Stage amplifier.

UNIT IV
Positive & Negative Feedback in Amplifiers:

Concepts of feedback – Classification of feedback amplifiers– General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics - Voltage series - Voltage shunt, Current series and Current shunt Feedback configurations, Simple problems.
Oscillators: Condition for Oscillations, RC and LC type Oscillators–Frequency and amplitude stability of oscillators–Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators, RC-phase shift and Wien-bridge oscillators.

UNIT V
Large Signal Amplifiers:

Class A Power Amplifier, Maximum Value of Efficiency of Class–A power Amplifier, Transformer Coupled Class A Power Amplifier, Class B Power Amplifier, Class B Push-Pull and Complimentary Symmetry Power Amplifiers. Distortion in amplifiers- Crossover distortion and harmonic distortion. Transistor Power Dissipation, Heat Sinks.
Tuned Amplifiers: Introduction, Q-Factor, Small Signal Tuned amplifier: Single Tuned Amplifier (Capacitive coupling & Inductive Coupling), Double Tuned Amplifier, Stagger tuned Amplifier.

Text Books:

1. Electronic Devices and Circuits, David A. Bell – 5thEdition, Oxford.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Integrated Electronics, Jacob Millman, ChristosCHalkias, McGraw Hill Education.

Reference Books:

1. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, person
2. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, AVallvaraj, 5th Edition, Mc Graw Hill Education.
3. Electronics circuits and applications, Md H Rashid, Cengage 2014.

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ELECTRONICS & COMMUNICATION ENGINEERING

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3 /0/ 0/ 3

SIGNALS AND SYSTEMS (C43PC2)

Course Objectives:

1. This gives the basics of Signals and Systems required for all Electrical Engineering related courses.
2. This gives concepts of Signals and Systems and its analysis using different transform techniques.
3. This gives basic understanding of random process which is essential for random signals and systems encountered in Communications and Signal Processing areas.

Course Outcomes:

At the end of this course students will be able to
CO1: Acquire the knowledge about types of signals, classification of signals & systems, orthogonality.
CO2: Analyze Fourier Representation of Continuous Time periodic and a periodic signals.
CO3: Analyze waveform synthesis using Laplace transforms, Sampling and Reconstruction of signals.
CO4: Investigate the convolution and correlation of signals.
CO5: Realizes the system reliability, transfer function using state space.

UNIT I
Introduction to Signals & Systems:

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

UNIT II
Fourier Representation of Continuous Time Signals:

Periodic Signals-Fourier Series: Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirchilet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum.
Non Periodic Signals-Fourier Transform: Deriving Fourier transform from Fourier series, 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.

SIGNALS AND SYSTEMS (C43PC2)

UNIT III

Laplace Transform:

Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis., Inverse Laplace Transform, Partial fraction method and long division method, Laplace transforms methods in circuit analysis, the transfer function. Analysis and characterization of LTI system using Laplace transform.

Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Types of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT IV

Convolution and Correlation of Signals:

Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

UNIT V

Signal Transmission through Linear Systems:

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

State Space Representation of Systems: Introduction to state space analysis, State model, Derivation of Transfer Function from State model, State Transition Matrix and its Role.

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
3. Signals and Systems - Anand Kumar, PHI.

Reference Books:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2 Ed.
2. Signals and Signals – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.
5. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
6. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

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ELECTRONICS & COMMUNICATION ENGINEERING

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3 /0/ 0/ 3

NETWORK ANALYSIS (C43PC3)

Prerequisite: Mathematics, Basic Electrical Engineering

Course Objectives:

1. To understand Network Topology.
2. To analyse transients in Electrical systems.
3. To evaluate Network parameters of given Electrical network
4. To design basic filter configurations.

Course Outcomes:

After this course, the student will be able to

1. Illustrate about network topology.
2. Obtain the transient and steady-state response of electrical circuits.
3. Analyze circuit analysis using Laplace transform.
4. Discuss about two port networks.
5. Design network filters.

UNIT I
Network Topology:

Definitions– Graph – Tree, Basic cut set and Basic Tie set matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent &independent voltage and current sources - Duality &Dual networks. Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.

UNIT II
Solution of First and Second Order Networks:

Solution of first and second order differential equations for Series and parallel R-L, R-C, R- L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.

UNIT III
Electrical Circuit Analysis Using Laplace Transforms:

Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots), series and parallel resonances

NETWORK ANALYSIS (C43PC3)

UNIT IV
Two Port Network and Network Functions:

Network functions driving point and transfer impedance function networks, necessary conditions for driving point functions and for transfer function, Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.

UNIT V
Introduction to Filters:

Introduction to filters –single tuned and double tuned filters - low pass – high pass and band pass, Band rejection filter – RC, RL, filters- constant K and m derived filters and composite filter design.

Text Books:

1. D. Roy Choudhury, "Networks and Systems",New Age International Publications,1998.
2. W.H.Haytand J.E. Kemmerly, "Engineering Circuit Analysis",McGraw HillEducation, 2013.

Reference Books:

1. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw HillEducation, 2004.
2. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.
3. M. E. Van Valkenburg, "Network Analysis", Prentice Hall,2006.
4. Electric Circuits by Schaum' soutlines.
5. Problems&SolutionsinElectricalEngineeringbyV.C.Natesan,Parkersmith's.

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ELECTRONICS & COMMUNICATION ENGINEERING

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0 /0/ 2/ 1

DIGITAL LOGIC DESIGN LAB (CESDL2)

Course Objectives:

1. To study the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations.
2. Knowledge of the methods for analysis and synthesis of combinational and sequential circuits.
3. To study the theory and applications of 74XX combinational and sequential series IC's.

Course Outcomes:

On completion of this lab course the students will be able to:
CO1: Acquires the knowledge of 74XX IC's.
CO2: Design various combinational & sequential circuits using various Digital ICs.
CO3: Acquires the knowledge of differentiating between Linear and Digital IC's.
CO4: Acquires the knowledge of demonstrating by designing digital circuits
Note:

1. To perform any twelve experiments.
2. Verify the functionality of the IC in the given application.

LIST OF EXPERIMENTS
Design and Implementation of:

1. Study of logic gates.
2. Deign a 4-bit Gray to Binary and Binary to Gray Converter.
3. Design a 16 bit Adder/ Subtractor using 4-bit Adder /Subtractor IC's.
4. Design a 3*8 Decoder.
5. Design a16x4 priority encoder using two 8x3 priority encoder.
6. Design a 16*1 multiplexer using 8x1 multiplexer.
7. Design a 16 bit comparator using 4 bit comparators.
8. Study of flip flops.
9. Design an 8 bit parallel load and serial out shift register using two 4 bit shift register.
10. Design an 8 bit serial in and serial out shift register using two 4 bit shift register.
11. Design a Ring counter and twisted ring counter using a 4-bit shift register.
12. Design a modulo counter using two decade counters.
13. Design a 4 digit hex counter using synchronous one digit hex counters.
14. Design a 4 digit hex counter using Asynchronous one digit hex counters.
15. Design a 4 bit pseudo random sequence generator using 4-bit ring counter.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech III Semester **L/T/P/C**
0 /0/3/1.5

ELECTRONIC CIRCUIT DESIGN LAB (C43PC4)

Course Objectives:

1. To train the students the operational principle, analysis, design and application of the Bipolar Junction Transistor (BJT).
2. To train the students the operational principle, analysis, design and application of the Field Effect Transistor (FET).
3. To develop the students' ability on conducting engineering experiments, analyze experimental observations scientifically.
4. To initiate the students the understanding of the concepts, know-how Multisim or P-spice or Equivalent Simulation software is used for circuit design.

Course Outcomes:

Upon completion of the subject, students will be able to
CO1: Design of Single & Multi stage amplifiers.
CO2: Design of Power and Tuned amplifiers.
CO3: Design of Feedback and Oscillator circuits.
CO4: Analyze the different types of FET Amplifiers.
Note: Minimum 12 Experiments are to be done in hardware.

LIST OF EXPERIMENTS:

1. Common Emitter Amplifier.
2. Common Base Amplifier.
3. Common Source amplifier.
4. Two Stage RC Coupled Amplifiers.
5. Current Shunt Feedback Amplifier.
6. Voltage Series Feedback Amplifier
7. Cascode Amplifier.
8. Wien Bridge Oscillator using Transistors.
9. RC Phase Shift Oscillator using Transistors.
10. Class A Power Amplifier (Transformer less).
11. Class B Complementary Symmetry Amplifier.
12. Hartley Oscillator.
13. Colpitt's Oscillator.
14. Single Tuned Voltage Amplifier.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech III Semester **L/T/P/C**
0 /0/ 2/ 1

ELECTRONIC CIRCUIT SIMULATION LAB (C43PC5)

Course Objectives:

1. To train the students to analyze, the operational principle design and application of the Bipolar Junction Transistor (BJT).
2. To train the students to analyze the operational principle, design and application of the Field Effect Transistor (FET).
3. To develop the students' ability on conducting engineering experiments, analyze experimental observations scientifically.
4. To initiate the students the understanding of the concepts, know-how Multisim or P-spice or Equivalent Simulation software is used for circuit design.

Course Outcomes:

Upon completion of the subject, students will be able to
CO1: Analyze Single & Multi stage amplifiers.
CO2: Analyze Power and Tuned amplifiers.
CO3: Analyze Feedback and Oscillator circuits.
CO4: Analyze the different types of FET Amplifiers.
Note: Minimum 10 Experiments are to be simulated using Multisim or P-spice or Equivalent Simulation.

LIST OF EXPERIMENTS:

1. Common Emitter Amplifier.
2. Common Base Amplifier.
3. Common Source amplifier.
4. Two Stage RC Coupled Amplifiers.
5. Current Shunt Feedback Amplifier.
6. Voltage Series Feedback Amplifier
7. Cascode Amplifier
8. Wien Bridge Oscillator using Transistors
9. RC Phase Shift Oscillator using Transistors
10. Class A Power Amplifier (Transformer less)
11. Class B Complementary Symmetry Amplifier
12. Hartley Oscillator
13. Colpitt's Oscillator
14. Single Tuned Voltage Amplifier.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech III Semester **L/T/P/C**
0 /0/3/1.5

BASIC SIMULATION LAB (C43PC6)

Course Objectives:

1. To provide background and fundamentals of MATLAB or equivalent tool for the analysis and processing of signals and to generate various continuous and discrete time signals.
2. To determine the Fourier Transform of signals and to convert a continuous time signal to discrete and reconstruction using Sampling theorem.
3. To apply convolution and correlation for continuous time signal.
4. To use Laplace and Z transforms for analyzing continuous /discrete time signals and systems.

Course Outcomes:

CO1: Understanding of MATLAB tool.
CO2: To analyze various signals and sequences in MATLAB including operations.
CO3: To verify Wiener-Khintchine Relations and Sampling Theorem.
Note: All the experiments are to be simulated using MATLAB or equivalent software Minimum of 15 experiments are to be completed.

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khintchine Relations.
18. Checking a Random Process for Stationary in Wide sense.

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ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech IV Semester **L/T/P/C**
3 /0/ 0/ 3

PROBABILITY THEORY AND STOCHASTIC PROCESSES (C44PC1)

Course Objectives:

1. Understand the elementary aspects of probability theory.
2. This gives basic understanding of random signals.
3. Utilization of Random signals and systems in Communications and Signal Processing areas.
4. To know the Temporal and Spectral Characteristics of Random Process.

Course Outcomes:

Upon completing this course, the student will be able to
CO1: Understand the basics of probability theory.
CO2: Understand the concepts of Random Variables.
CO3: Understand the operations of Random Variables.
CO4: Determine the Temporal Characteristics of Random Signals.
CO5: Determine the Spectral Characteristics of Random Signals.

UNIT I
Probability Theory:

Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events – two events, multiple events, properties, Bernoulli Trials.

UNIT II
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 and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density and Properties.
Multiple Random Variables: Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions.

PROBABILITY THEORY AND STOCHASTIC PROCESSES (C44PC1)

UNIT III
Operation on One Random Variable:

Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT IV
Stochastic Processes – Temporal Characteristics:

The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationary and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance.

UNIT V
Stochastic Processes – Spectral Characteristics:

Power 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, Noise – White noise and Colored noise.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Principles of Communication systems by Taub and Schilling (TMH), 2008.

Reference Books:

1. Random Processes for Engineers-Bruce Hajck, Cambridge Unipress, 2015.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.
3. Probability, Statistics & Random Processes - K.Murugesan, P.Guruswamy, Anuradha Agencies, 3 rd Edition, 2003.
4. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.
5. Statistical Theory of Communication – S.P Eugene Xavier, New Age Publications, 2003.

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ELECTRONICS & COMMUNICATION ENGINEERING

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ANALOG COMMUNICATIONS (C44PC2)

Course Objectives:

1. To develop ability to analyze system requirements of analog communication systems. To understand the need for modulation.
2. To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with the set techniques.
3. To gain knowledge on angle modulation techniques.
4. To acquire knowledge to analyze the performance of analog modulation techniques.
5. To acquire theoretical knowledge of each block in AM and FM receivers.
6. To understand the pulse modulation techniques.

Course Outcomes:

After completion of this course the student will be able to:

CO1: Learn the concept of modulation.
CO2: Analyze and design various Modulation and Demodulation analog systems.
CO3: Understand the characteristics of angle modulation techniques.
CO4: Study of signal to Noise Ration (SNR) performance of various Analog Communication systems.
CO5: Analyze and design the various Pulse Modulation Systems.
CO6: Understand the concepts of Multiplexing.

UNIT I
Amplitude Modulation:

Introduction to communication system, Need for modulation, Time division multiplexing, Frequency division multiplexing Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves, Square law detector, Envelope detector.
DSB Modulation: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT II
SSB Modulation:

Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves, Demodulation of SSB Waves, Vestigial Sideband Modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

ANALOG COMMUNICATIONS (C44PC2)

UNIT III
Angle Modulation:

Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave
Angle Modulation Methods: Generations of Fm Waves, Direct FM, Detection of FM Waves, Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM &AM, Applications of FM waves.

UNIT IV
Noise in Analog Communication System:

Types of Noise: Resistive(thermal) noise source, Shot noise, Extraterrestrial noise, Arbitrary noise sources, White noise, Modeling of noise sources, Average noise Bandwidth, Effective noise temperature, Average noise figure of cascoded networks.
Noise in DSB and SSB System, Noise in AM System, Noise in Angle Modulation System, Noise triangle in Angle Modulation System, Pre-emphasis & de-emphasis.

UNIT V
Transmitters:

Classifications of Radio transmitters, AM and FM transmitter block diagram and explanation of each block, Carrier frequency requirements of radio transmitter.
Receivers: Radio Receiver, Receiver Types, Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.
Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) Generation and demodulation, PWM: Generation and demodulation of PWM, PPM: Generation and demodulation of PPM.

Text Books:

1. Communication Systems by Simon Haykins John Wiley & Sons, 4thEdition.
2. Electronics & Communication System – George Kennedy and Bernard Davis, Mc Graw Hill Education, 2004.

Reference Books:

1. Communication theory, Thomas and A. Chandrasekhar ,2nd edition, McGraw-Hill Education.
2. Communication Systems, 2E, R.P. Singh, S. D. Sapre, McGraw-Hill Education, 2008.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.
4. Electronics Communication Systems- Wayne Tomasi, 6th Edition, Person 2009.

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PULSE AND DIGITAL CIRCUITS (C44PC3)

Course Objectives:

1. To explain the complete response of R-C and R-L-C transient circuits.
2. To explain clippers, clampers, switching characteristics of transistors and sampling gates.
3. To construct various multivibrators using transistors, design of sweep circuits and sampling gates.
4. To discuss and realize logic gates using diodes and transistors.

Course Outcomes:

At the end of the course, the student will be able to:
CO1: Understand the applications of diode as integrator, differentiator, clippers, and Clampers.
CO2: Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates.
CO3: Design multivibrators for various applications, synchronization techniques and sweep circuits.
CO4: Realizing logic gates using diodes and transistors.
CO5: Understanding of time and frequency domain aspects.
CO6: Importance of clock pulse and its generating techniques.

UNIT I
Linear Wave Shaping:

High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input, Ringing Circuit.

UNIT II
Non-Linear Wave Shaping:

Diode clippers, Transistor clippers, Clipping at two independent levels, Emitter coupled clipper, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, effect of Diode Characteristics on Clamping Voltage.

UNIT III
Switching Characteristics of Devices:

Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor switching times, Silicon-controlled-switch circuits.
Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

PULSE AND DIGITAL CIRCUITS (C44PC3)

UNIT IV
Multivibrators:

Multivibrators (using BJT's):The Bistable Multivibrator: Fixed bias and Self bias transistor binary stable state voltages and currents, Design of Fixed bias and Self Bias Binary, Commutating Capacitors, Symmetrical and Unsymmetrical Triggering, Direct Coupled Binary Analysis and Design of Schmitt trigger circuit, Monostable Multivibrator (collector Coupled only), Analysis and Design of Astable Multivibrator (collector coupled only) and Applications of Multivibrators.

UNIT V
Sampling Gates:

Basic operating principles of Sampling Gates, Unidirectional and Bidirectional Sampling Gates, Four Diode Sampling Gate, An alternate form of four diode gate, Six diode sampling gate, Reduction of pedestal in Gate Circuits, Applications of sampling gates. Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL, CML (ECL) and CMOS Logic Families and its Comparison.

Text Books:

1. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2nd Ed., 2008, McGraw Hill.
2. Pulse, Switching and Digital Circuits - David A. Bell, 5th edition 2015, OXFORD University Press.

Reference Books:

1. Pulse and Digital Circuits -Venkata Rao K, Rama Sudha K, Manmadha rao G, Pearson, 2010
2. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.

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LINEAR IC APPLICATIONS (C44PC4)

Course Objectives:

1. To introduce the basic building blocks of linear integrated circuits.
2. To introduce the theory of operational amplifiers and PLL.
3. To introduce the theory of applications of PLL.
4. To introduce the concepts of waveform generation.
5. To teach the theory of ADC and DAC.

Course Outcomes:

Upon completing this course, the student will be able to
CO1: A thorough understanding of operational amplifiers with linear integrated circuits.
CO2: Attain the knowledge of functional diagrams and applications of IC 555 and IC565.
CO3: Acquire the knowledge about the Data converters.
CO4: Design different ADC's.
CO5: Design different DAC's.

UNIT I
Integrated Circuits:

Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC Characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II
Op-amp and Applications:

Basic information of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, log and anti logarithmic amplifiers, differentiators and integrators, comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, three terminal voltage regulators, features of IC 723.

UNIT III
Active Filters & Oscillators:

Introduction, 1st order LPF, HPF filters, Band pass, Band reject and all pass filters. Oscillator types and principle of operation - RC, Wein Bridge, waveform generators - triangular, sawtooth, square wave and VCO.

LINEAR IC APPLICATIONS (C44PC4)

UNIT IV
Timers & Phase Locked Loops:

Introduction to 555 timer, functional diagram, monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT V
D/A and A/D Converters:

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC dual slope integration type ADC, DAC and ADC specifications.

Text Books:

1. Linear Integrated Circuits, D. Roy Chowdhury, New Age International (p) Ltd.
2. Op-Amps & Linear ICs, Ramakanth A. Gayakwad, PHI

References Books:

1. Operational Amplifiers & Linear Integrated Circuits: R.F. Coughlin & Fredrick F. Driscoll, PHI.
2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications, Denton J.Daibey, TMH.
3. Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, Mc Graw Hill.
4. Digital Fundamentals - Floyd and Jain, Pearson Education.

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ELECTROMAGNETIC THEORY AND TRANSMISSION LINES (C44PC5)

Course Objectives:

This is a structured foundation course, dealing with concepts, formulations and applications of Electromagnetic Theory and Transmission Lines, and is the basic primer for all electronic communication engineering subjects.

The main objectives of the course are:

1. To explain the basics of electrostatic and magneto static concepts and show the time varying electromagnetic fields as applied to high frequency circuit design.
2. To interpret the electromagnetic wave characteristics at interface of different boundaries.
3. To illustrate the importance of transmission line theory and applications of it to circuit design with the help of Smith chart.
4. To understand the basic concepts of guided waves.

Course Outcomes:

Upon completion of the Course, the students will be able to:

CO1: Analyze the electric fields due to different charge distributions and analyze the electric fields in different mediums.

CO2: Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.

CO3: Analyze the EM wave propagation and attenuation in various media and analyze the importance of pointing theorem.

CO4: Determine the Transmission Line parameters for different lines characterize the distortions and estimate the characteristics for different lines.

CO5: Choose smith chart to design transmission lines, to find the reflection coefficient for given impedance and vice versa

UNIT I

Electrostatics:

Introduction to coordinate systems and Vector analysis. Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance - Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES (C44PC5)

UNIT II

Magneto Statics:

Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law. **Maxwell's Equations (Time Varying Fields):** Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface : Dielectric- Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems.

UNIT III

EM Wave Characteristics - I:

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics- Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Depth of penetration, Polarization of uniform Plane wave.

EM Wave Characteristics - II: Reflection and Refraction of Plane Waves - Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Pointing Vector and Pointing Theorem - Application.

UNIT IV

Transmission Lines - I:

Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Infinite Line Concepts, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Lossless, Distortion less and High Frequency Transmission Lines, Condition for Minimum Attenuation, Line Distortion, Loading - Types of Loading.

UNIT V

Transmission Lines – II:

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines - Impedance Transformations, Significance of Z_{min} and Z_{max} , Single and Double Stub Matching, Smith Chart - Configuration and Applications, Illustrative Problems.

Text Books:

1. Principles of Electromagnetics - Matthew N.O. Sadiku and S.V. Kulkarni, 4thEd. Oxford University Press, Asian Edition, 2015.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K.G. Balmain, 2ndEd. 2000, PHI.
3. Transmission Lines and Networks – Umesh Sinha, SatyaPrakashan, 2001, (Tech. India Publications), New Delhi.

Reference Books:

1. Engineering Electromagnetics - Nathan Ida, 2ndEd. 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Networks, Lines and Fields - John D. Ryder, 2ndEd. 1999, PHI.
3. Engineering Electromagnetics - William H. Hayt Jr. and John A. Buck, 7thEd. 2006, McGraw Hill Education.

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ADVANCED ENGLISH COMMUNICATION SKILLS LAB (CHSE3)

Course Objectives:

1. To improve students' fluency in spoken English.
2. To enable them to listen to English spoken at normal conversational speed.
3. To help students develop their vocabulary.
4. To read and comprehend texts in different contexts.
5. To communicate their ideas relevantly and coherently in writing.
6. To make students industry-ready.
7. To help students acquire behavioral skills for their personal and professional life.
8. To respond appropriately in different socio-cultural and professional contexts.
9. To sensitize the importance of Soft Skills and people skills.

Course Outcomes:

Students will be able to:

1. Acquire vocabulary and use it contextually.
2. Listen and speak effectively.
3. Develop proficiency in academic reading and writing.
4. Increase possibilities of job prospects.
5. Communicate confidently in formal and informal contexts.
6. Develop interpersonal communication skills.

UNIT I
Inter-Personal Communication and Building Vocabulary:

Starting a Conversation – Responding Appropriately and Relevantly – Using Appropriate Body Language – Role Play in Different Situations – Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.
What are soft skills? Active listening-self motivation-effective communication-assertive communication-controlling emotions-team player attitude-ability to work under pressure- openness to feedback.

UNIT II
Reading Skills and Appropriate English Usage:

General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, Skimming, Scanning, Inferring Meaning and practice with different texts.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB (CHSE3)

Grammatical Accuracy: Use of tense in scientific writing-active vs. Passive voice –number agreement (singular and plural)-agreement of subject with verb in person and number - using phrases and clauses to construct simple complex and compound sentences-verb patterns-Eliminating ambiguity.

UNIT III
Writing Skills:

Structure and Presentation of Different Types of Writing – Letter writing/ Resume Writing/ e-correspondence / statement of purpose/ Technical Report Writing/Styles-Types Report in Manuscript format. Writing and SOP and Portfolio Assessment.
How to write a project –what is a scientific project-how to prepare the title, abstract, introduction, how to review literature –body of the project –how to write the results and conclusion-correct form and grammar ethics to be followed –avoiding plagiarism.

UNIT IV
Group Discussion and Presentation Skills:

Group Discussions-Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation- Concept and Process. **Presentation Skills** – Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/ emails/Assignment.

UNIT V
Interview Skills:

Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

Text Books:

1. Rizvi, M Ashraf. Effective Technical Communication. Mc Graw – Hill.
2. Kumar, Sanjay and Pushp Lata. English for Effective Communication, OUP, 2015.
3. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt Ltd, 2011.
4. Shiv Khera, You can Win, Macmillan Books, New York, 2003.
5. Jeff Butterfield, Soft Skills for Everyone, Cengage Learning, 2015.
6. Barbara Gastel and Robert "A Day How to write and publish a scientific paper", Greenwood, 2016.

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ANALOG COMMUNICATIONS LAB (C44PC6)

Course Objectives:

1. To understand modulation, demodulation techniques used in communication system, and develop the Modulation techniques used in both time and frequency domains.
2. To gain the knowledge on pre-emphasis and de-emphasis circuits used in analog communication.
3. To apply sampling theorem for converting analog signals to digital signals.
4. To understand the concept of PLL and multiplexing techniques.

Course Outcomes:

Upon completion of the lab, students will be able to:
CO1: Design Analog Communication systems to meet desired needs.
CO2: Convert Analog Signals to digital while satisfying certain specifications.
CO3: Analyze the Signal Transmission and Receiving fundamental concepts.
CO4: Describe the operation of multiplexing techniques.

Note: Minimum 12 experiments should be conducted:
Experiments are to be simulated first either using MATLAB or any other simulation software tools or then testing to be done in hardware.

LIST OF EXPERIMENTS:

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and Measurement of frequency spectrum of AM and FM Signals
6. Pre-emphasis & de-emphasis.
7. Time Division Multiplexing & De multiplexing
8. Frequency Division Multiplexing & De multiplexing
9. Verification of Sampling Theorem
10. Pulse Amplitude Modulation & Demodulation
11. Pulse Width Modulation & Demodulation
12. Pulse Position Modulation & Demodulation
13. Frequency Synthesizer.
14. AGC Characteristics.
15. PLL as FM Demodulation
16. Radio Receiver for measuring Sensitivity & Selectivity.

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PULSE AND DIGITAL CIRCUITS LAB (C44PC7)

Course Objectives:

1. Ability to design an Integrator & Differentiator using R, L&C circuits.
2. Ability to design Clipping, Clamping, and Pulse circuits such as Multivibrators, Time Base Generators.
3. Ability to understand the switching characteristics of devices
4. Realization of Logic Gates using Diodes and Transistors.
5. To gain the knowledge on existing and future Analog circuits.

Course Outcomes:

Upon completion of the Lab, students will be able to:
CO1: Design RC circuits.
CO2: Design Multivibrators for various Applications.
CO3: Design Time Base Generators and Relaxation Oscillators.
CO4: Design different types of Digital Circuits by using Logic Gates and Flip-Flops.
Note: Minimum Twelve experiments to be conducted:

1. Linear wave Shaping
   a. RC Low Pass Circuit for different time constants.
   b. RC High Pass Circuit for different time constants.
2. Non-linear wave shaping
   a. Transfer characteristics and response of Clippers.
   i) Positive and Negative Clippers.
   ii) Clipping at two independent levels.
   b. The steady state output waveform of clampers for a square wave input.
   i) Positive and Negative Clampers.
   ii) Clamping at different reference voltage.
3. Different types of Comparators.
4. Switching characteristics of a transistor.
5. Design a Bistable Multivibrator and draw its waveforms.
6. Design an Astable Multivibrator and draw its waveforms.
7. Design a Monostable Multivibrator and draw its waveforms.
8. Response of Schmitt Trigger circuit for loop gain less than and greater than one.
9. UJT relaxation oscillator.
10. The output- voltage waveform of Boot strap sweep circuit.
11. The output- voltage waveform of Miller sweep circuit.
12. Pulse Synchronization of An Astable circuit.
13. Response of a transistor Current sweep circuit.
14. Sampling gates
    a. Response of Unidirectional gate.
    b. Response of Bidirectional gate using transistors.
15. Study of logic gates.

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ELECTRONICS & COMMUNICATION ENGINEERING

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LINEAR IC APPLICATIONS LAB (C44PC8)

Course Objectives:

1. The main aim of this lab is to teach the linear and non- linear applications of operational amplifiers (741).
2. Students are made familiar with theory and applications of 555timers.
3. Students are made familiar with theory and applications of 565PLL.
4. Students are made familiar with voltage regulators using 78xx, 79xx and IC723.
5. Students are made to Design various applications like waveform generations using IC741.

Course Outcomes:

Upon the completion of Lab, student will be able to:
CO1: Acquires the knowledge of operational amplifier (741).
CO2: Design circuits using operational amplifiers for various applications.
CO3: Design circuits using IC 555 and IC 565 for various applications.
CO4: Design circuits using voltage regulators for various applications.
CO5: Design circuits using active filters.
NOTE: To perform any twelve experiments.
Verify the functionality of the IC in the given application.

Design and Implementation of:

1. Inverting and Non-inverting Amplifiers using Op Amp.
2. Adder, Subtractor using Op Amp.
3. Comparators using Op Amp.
4. Integrator Circuit using IC741.
5. Differentiator circuit using IC 741.
6. Schmitt Trigger Circuit - using IC741.
7. Three Terminal Voltage Regulators -7805, 7809, 7912.
8. Active Filter Applications - LPF (first order) using IC741.
9. Active Filter Applications - HPF (first order) using IC741.
10. IC 741 Waveform Generators - Sine, Square wave and Triangular waves.
11. Mono-stable Multivibrator using IC555.
12. Astable Multivibrator using IC555.
13. IC 565 – PLL Applications.