TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

COURSE STRUCTURE & SYLLABUS

B.Tech III Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1	**BBSMS4**	Numerical Methods and Transforms	**3**	**1**	**0**	**3**
2	**B43ES2**	Digital Logic Design	**3**	**0**	**0**	**3**
3	**B43EC3**	Analog Electronic Circuit Analysis	**3**	**0**	**0**	**3**
4	**B43EC4**	Signals and Systems	**3**	**1**	**0**	**3**
5	**B43EC5**	Pulse and Digital Circuits	**3**	**0**	**0**	**3**
6	**B43ES6**	Network Analysis	**2**	**0**	**0**	**2**
7	**B43EC7**	Analog Electronic Circuit Analysis Lab	**0**	**0**	**3**	**1.5**
8	**B43EC8**	Basic Simulation Lab	**0**	**0**	**2**	**1**
9	**B43MC9**	Constitution of India	**0**	**2**	**0**	**0**
TOTAL CREDITS						**19.5**

B.Tech IV SEMESTER

Sl. No.	Course Code	Course Title	L	T	P	Credits
1	**BBSM7**	Special functions and complex variables	**3**	**1**	**0**	**3**
2	**B44PC2**	Control Systems	**3**	**0**	**0**	**3**
3	**B44PC3**	Analog Communications	**3**	**0**	**0**	**3**
4	**B44PC4**	Linear and Digital IC Applications	**3**	**0**	**0**	**3**
5	**B44PC5**	Probability Theory and Stochastic Process	**3**	**1**	**0**	**3**
6	**B44PC6**	Analog Communications Lab	**0**	**0**	**3**	**1.5**
7	**B44PC7**	Linear and Digital IC Applications Lab	**0**	**0**	**3**	**1.5**
8	**B44PC8**	Pulse and Digital Circuits Lab	**0**	**0**	**3**	**1.5**
9	**B44HS5**	Disaster Management	**0**	**2**	**0**	**0**
TOTAL CREDITS						**19.5**

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

Numerical Methods and Transforms - BBSMS4

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

COURSE OBJECTIVES:

1. The topics those deals with methods to find roots of an equation.
2. The topic of integration that deals using numerical techniques
3. The objective of this course is to familiarize the prospective engineers with techniques in Z and Fourier Transforms.
4. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.
5. Concepts and properties of Z and Fourier Transforms

COURSE OUTCOMES:

1. Find the root of a given equation using numerical methods.
2. Finding integral values using numerical techniques
3. Use Z - Fourier transform techniques for solving ODE and PDE
4. Finding a non-periodic function in terms of sine and cosine transforms.
   Finding a non-periodic function as integral representation.

UNIT I:

Algebraic and Transcendental equations: Solution of algebraic and transcendental equations – Bisection method- Newton-Raphson method and Regula-falsi method.

UNIT-II:

Interpolation and Integration : Finite differences- interpolation using Newton's forward and back ward difference formulae-Interpolation with unequal intervals- Newton's divided difference and Lagrange's formulae- Numerical integration- Trapezoidal rule and Simpson's 1/3 and 3/8 rules.

UNIT III:

Numerical solutions to Ordinary Differential Equations: Ordinary differential equations: Euler and modified Euler's methods- Taylor's series- Runge-Kutta method of fourth order – Predictor corrector method- Newton's bash fourth method-Milnes method.

UNIT IV:

Fourier series and Fourier Transforms: Fourier series for functions of periodicity 2l-Fourier Transforms: Introduction-Fourier Integral theorem- flourier sine and cosine integrals- fourier sine and cosine transforms- properties- inverse transforms- finite fourier transforms

UNIT V:

Z-Transforms: Z – Transforms and inverse Z- Transforms- damping rule- shifting properties- initial and final value theorems- convolution theorem (without proof)-Solving of difference equations using Z-transforms.

TEXT BOOKS

1. S.S.Sastry- introductory methods of numerical analysis- PHI-4th edition- 2005.
2. Erwinkreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons- 2006.
3. VeerarajanT.- Engineering Mathematics for first year- tataMcGraw-Hill- New delhi-2008.
4. RamanaB.v.- Higher Engineering Mathematics- TataMcGrawHillNewDelhi- 11th Reprint- 2010.
5. P.Kandasamy- K.Thilagavathy- K. Gunavathi- Numerial Methods- S.chand& company 2nd edition Reprint 2012

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

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

DIGITAL LOGIC DESIGN - B43ES2

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

COURSE OBJECTIVES:

This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

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

1. Convert numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
2. Realize simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Design of combinational logic using various PLD's and synthesizing of threshold functions.
5. 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 Boolean Algebra 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.

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.

UNIT –II:

Minimization and Design of Combinational Circuits: 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,

Combinational circuits: Introduction, Adders, Subtractors, Multiplexers, Demultiplexers, Encoders, Decoders, Comparator, Code Converters, Hazards.

UNIT –III:

Sequential Circuits I: Introduction, Basic Differences between Combinational and Sequential circuits, The Binary Cell, Latch, Flip-Flop-Types, 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.

UNIT –IV:

Sequential Circuits II: Introduction, Register-Types, Counters –Types, Design of Ripple (mod-N) Counters, Ring Counter.

Memory types- RAM, ROM, Realisation of switching functions using PLD's

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.

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

ANALOG ELECTRONIC CIRCUIT ANALYSIS - B43EC3

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

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

Upon completion of the Course, the students will be able

1. To Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
2. To Cascode different amplifier configurations to obtain the required over all specifications Like Gain, Bandwidth, Input and Output interfacing Impedances.
3. To Design and realize different classes of Power Amplifiers and tuned amplifiers use able for audio and Radio applications.
4. To Design and realize the concept of tuning for required frequency with stability of amplifier for real time application.
5. To Utilize the Concepts of negative feedback to improve the stability of amplifiers and Positive feedback to generate sustained oscillations.

UNIT – I:

Analysis and Design of Small Signal Low Frequency BJT Amplifiers:

Classification of Amplifiers–Distortion in amplifiers, Miller's theorem, Hybrid Model, Determination of h- parameters from transistors characteristics, Analysis of CE,CC, and CB Amplifiers , CE Amplifier with emitter resistance, r_e model of transistor ,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.

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, Cascode and Folded Cascode Amplifier– frequency response.

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. 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 A Push Pull 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 – 5th Edition, Oxford.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Integrated Electronics, Jacob Millman, Christos C Halkias, 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, A Vallvaraj, 5th Edition, MC GRAW HILL EDUCATION.
3. Electronics circuits and applications , Md H Rashid, Cengage 2014

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

SIGNALS AND SYSTEMS - B43EC4

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

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 demonstrate the ability to

1. Analyze different types of signals
2. Represent continuous and discrete systems in time systems
3. Analyze frequency domain using various transformations.
4. Investigate whether the system is stable
5. Sampling and reconstruction of a signal

UNIT - I:
Signal Analysis and Fourier series

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, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

UNIT - II:
Fourier Transforms and Sampling

Fourier Transforms: Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Typers 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 - III:

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. State-Space Analysis, Multi-input, multi-output representation. State Transition Matrix and its Role. Periodic inputs to an LTI system, the notion of a frequency response and its relation to the impulse response.

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:

Laplace Transforms and Z-Transforms

Laplace Transforms: Review of Laplace Transforms (L.T), 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 L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, 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, Inverse Z-transform, Properties of Z-transforms.

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.

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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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

PULSE AND DIGITAL CIRCUITS - B43EC5

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

3 /0/ 0/ 3

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 multi vibrators 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:

1. Design the applications of Diode.
2. Understand various Switching Devices such as Diode, Transistor, SCR.Difference between Logic Gates and Sampling Gates
3. Design Multi vibrators for various applications, Synchronization techniques and sweep circuits.
4. Realize Logic Gates using Diodes and Transistors.
5. Understand of time and frequency domain aspects. 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, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, and 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.

UNIT – IV:

Multi vibrators (using BJT's): Bistable Multi vibrator: 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.

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 Bi-directional Sampling Gates, Reduction of pedestal in Gate Circuits, Four Diode Sampling Gate, An alternate form of four diode Gate, Six Diode Sampling Gate**,** 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 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, 2 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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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

NETWORK ANALYSIS - B43ES6

B.Tech. III Semester **L/T/P/C**
3/0/ 0/ 2

Pre-requisite: Basic Electrical & Electronics Engineering

COURSE OBJECTIVES:

Objectives of this course are

1. To understand the basic concepts on RLC circuits.
2. To know the behavior of the steady states and transients states in RLC circuits.
3. To know the basic Laplace transforms techniques in period's waveforms.
4. To understand the two port network parameters and their interrelations.
5. To understand the properties of LC networks and filters.

COURSE OUTCOMES:

After completion of this course student

1. Gains the knowledge on Basic network elements.
2. Learns and analyze the RLC circuits' behaviour in detail.
3. Analyze the performance of periodic waveforms.
4. Learns and gain the knowledge in characteristics of two port network parameters Z, Y, ABCD, h & g and applications to Transmission lines.
5. To analyze the filter design concepts in real world applications.

UNIT – I:

Review of R, L,C, RC, RL, RLC circuits, Network Topology, Terminology, Basic cutest and tie set matrices for planar networks, Illustrative Problems, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co - efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal transformer.

UNIT – II:

Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2^{nd} order series and parallel RLC Circuits, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series & parallel resonance, Resonance curves.

UNIT – III:

Network Analysis using Laplace transform techniques, step, impulse and exponential excitation, response due to periodic excitation, RMS and average value of periodic waveforms.

UNIT – IV:

Two port network parameters, Z, Y, ABCD, h and g parameters, conditions for symmetry and reciprocity, inter relation between network parameters, series, parallel and cascaded configurations, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros**.**

UNIT – V:

Standard T, π, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network, T and π Conversion, LC Networks and Filters: Properties of LC Networks, Foster's Reactance theorem, design of constant K, LP, HP and BP Filters, Composite filter design.

TEXT BOOKS

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

REFERENCE BOOKS

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 5th Edition, 1993.
2. Electric Circuits – J. Edminister and M.Nahvi – Schaum's Outlines, MCGRAW HILL EDUCATION, 1999.
3. Network Theory – Sudarshan and Shyam Mohan, Mc Graw Hill Education.

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

ANALOG ELECTRONIC CIRCUIT ANALYSIS LAB - B43EC7

B.Tech. III Semester **L/T/P/C**
0/0/2/1.5

COURSE OBJECTIVES:

This subject aims to

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

1. Design of Single & Multi stage amplifiers
2. Design of Power and Tuned amplifiers.
3. Design of Feedback and Oscillator circuits.
4. Analyze the different types of FET Amplifiers.

Note: Minimum 12 Experiments are to be simulated using Multisim or P-spice or Equivalent Simulation and then testing 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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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

BASIC SIMULATION LAB - B43EC8

B.Tech. III Semester **L/T/P/C**
0 /0/ 2/1.5

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:

1. Understanding of MATLAB tool.
2. To analyze various signals and sequences in MATLAB including operations.
3. 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 realiazability 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 forthe 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-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

CONSTITUTION OF INDIA – B43MC9

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

UNIT-1:

Constitution of India – Basic features and fundamental principles: Meaning of the constitution law and constitutionalism, The Directive Principles of State Policy – Its importance and implementation. Federal structure and distribution of legislative and financial powers between the Union and the States Parliamentary Form of Government in India – The constitution powers and status of the President of India, Amendment of the Constitutional Powers and Procedure

The historical perspectives of the constitutional amendments in India, Emergency Provisions : National Emergency, President Rule, Financial Emergency, Local Self Government – Constitutional Scheme in India Scheme of the Fundamental Right to Equality Scheme of the Fundamental Right to certain Freedom under Article 19 Scope of the Right to Life and Personal Liberty under Article 21.

UNIT-II:

Universal Human Values; Sensitization of student towards self, family (relationship), society and Understanding and larger systems, on the basis of human relationships and resolved individuals. Strengthening of self-reflection.

Development of commitment and courage to act: Awareness of their surroundings, society, social problems and their sustainable solutions

UNIT-III: Environment Science
UNIT-IV: Essence of Indian Knowledge Tradition
UNIT-V: Learning an Art Form

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

SPECIAL FUNCTIONS AND COMPLEX VARIABLES – BBSM7

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

COURSE OBJECTIVES:

1. The objective of this course is to familiarize the prospective engineers with techniques in special functions and complex variables.
2. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.
3. Evaluation of integrals using Beta and Gamma functions.
4. Differentiation and Integration of complex valued functions.
5. Evaluation of Integrals using Cauchy's integral formula and Residue theorem- Expansion of Laurent's Series.

COURSE OUTCOMES:

1. Solving the problems using Beta and Gamma functions

2. Analyze the complex functions with reference to their analyticity- Integration using Cauchy's integral theorem.

3. Find the Taylor and Laurent's Series Expansion of Complex functions.

4. Solve problems of Bilinear Transformations.

5. Solve problems on Residues using different methods.

UNIT- I:

Beta Gamma Functions: Improper Integrals -Beta and Gamma functions – properties

UNIT- II:

Analytic Functions: Complex Numbers-Limits and continuity of complex functions – derivatives- analytic functions- Cauchy-Riemann equations- harmonic functions- finding harmonic conjugate.

UNIT –III:

Complex Integration: Cauchy integral formula-Cauchy Integral Theorem-Complex line integrals-Taylor's Theorem-Laurent's theorem-applications of Laurent's Theorem.

UNIT- IV:

Residue Calculus: Singularities- Residues- Cauchy Residue theorem-contour integrals.

UNIT –V:

Conformal Mappings: Bilinear Transformations--Mobius transformation- Conformal mappings - properties.

TEXT BOOKS

1. G.B. Thomas and R.L. Finney- Calculus and Analytic geometry- 9th Edition- Pearson- Reprint- 2002.
2. Erwinkreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons- 2006.
3. VeerarajanT.- Engineering Mathematics for first year- tataMcGraw-Hill- New delhi-2008.
4. RamanaB.v.- Higher Engineering Mathematics- TataMcGrawHillNewDelhi- 11th Reprint- 2010.
5. A first course in Complex Analysis with applications by Dennis G.Zilland Patrick Shanahan- Jhons and Bartlett publishers. Fundementals of Complex Analysis by Saff- E.B. and A.D. Snidder- pearson

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

CONTROL SYSTEMS – B44EC2

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

Prerequisite:
Ordinary Differential Equations & Laplace Transform, Mathematics I

COURSE OBJECTIVES:
1. To understand the different ways of system representations such as Transfer function representation to assess the system dynamic response.
2. To assess the system performance using Time domain analysis and Methods for improving it.
3. To assess the system performance using Frequency domain analysis and techniques for improving the performance.
4. To design various Controllers and Compensators to improve system performance
5. To understand the different ways of System behaviour using State space representation for continuous systems.

COURSE OUTCOMES:
After completion of this course the student is able to

1. Understand the System performance by selecting a suitable Controller and/or a Compensator for a specific application

2. Apply various Time Domain techniques to assess the system performance

3. Apply various Frequency Domain techniques to assess the system performance

4. Apply various control strategies to different applications

5. Test system Controllability and Observability using State space representation and applications of state space representation to various systems.

UNIT – I:
Introduction: Concepts of Control Systems- Open Loop and Closed Loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback, Mathematical models – Differential equations - Impulse Response and transfer functions - Translational and Rotational mechanical systems.
Transfer Function Representation: Block diagram representation of systems considering electrical systems as examples - Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula. Signal flow graphs to the Electrical Networks. Construction of Signal flow graph from Block diagram.

UNIT-II:

Time Response Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems. Effects of Adding poles and zeros to the Second order system.

UNIT – III:

Stability Analysis: The concept of stability –Effects of Location of poles on stability, Relative stability, Routh-Hurwitz criterion, Limitations of Routh's stability.

Root Locus Technique: The root locus concept - construction of root loci-Root contours, effects of adding poles and zeros to G(s) H(s) on the root loci.

Frequency Response Analysis: Introduction, Correlation between time and frequency response, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – IV:

Stability Analysis In Frequency Domain: Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability - Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams. All pass and minimum phase systems.

Classical Control Design Techniques: Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers, Tuning of PID controllers.

UNIT – V:

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Signal flow graphs and Electrical networks, Caley- Hamilton theorem, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties. Concepts of Controllability and Observability.

TEXT BOOKS

1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009
2. ."B. C. Kuo", "Automatic Control Systems", John wiley and sons, 8th edition, 2003.

REFERENCE BOOKS

1. "N. K. Sinha", "Control Systems", New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. "NISE", "Control Systems Engineering", John wiley, 6th Edition, 2011.
3. "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
4. "S Palani", "Control Systems Engineering", McGraw Hill Education private limited, 2nd Edition, 2010.

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

ANALOG COMMUNICATIONS – B44EC3

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

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 these techniques.
3. To acquire knowledge to analyze the noise performance of analog modulation techniques.
4. To acquire theoretical knowledge of each block in AM and FM receivers.
5. To understand the pulse modulation techniques.

COURSE OUTCOMES: After completion of this course the student is able to

1. Analyze and design various Modulation and Demodulation analog systems.

2. Understand the characteristics of noise present in Analog systems.

3. Study of signal to Noise Ration (SNR) performance, of various Analog Communication systems.

4. Analyze and design the various Pulse Modulation Systems.

5. Understand the concepts of Multiplexing: Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM).

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.

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.

TEXTBOOKS

1. Communication Systems by Simon Haykins John Wiley & Sons, 4^{th} Edition.
2. Electronics & Communication System – George Kennedy and Bernard Davis, McGraw Hill Education 2004.

REFERENCES BOOKS

1. Communication theory, thomas,2^{nd} 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

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

LINEAR AND DIGITAL IC APPLICATIONS – B44EC4

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

COURSE OBJECTIVES:

This main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of waveform generation.
6. To understand and implement the working of basic digital circuits.

COURSE OUTCOMES:

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

1. Understand Operational Amplifiers with Linear Integrated Circuits.
2. Design circuits using Operational Amplifiers for various Applications.
3. Design different ADC's and DAC's.
4. Understand different families of Digital Integrated Circuits and their Characteristics.
5. Design Combinational and Sequential circuits using IC's.

UNIT - I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators - Triangular, Sawtooth, Square wave, IC555 Timer - Functional Diagram,

Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT - V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXTBOOKS

1. Communication Systems - Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS

1. Electronic Communications - Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.
2. Electrnic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication - K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

PROBABILITY THEORY AND STOCHASTIC PROCESS – B44EC5

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

COURSE OBJECTIVES:

The primary objective of this course is:

1. Understand the principles of random signals and methods of characterizing systems having random input signals.
2. Understand the elementary aspects of probability theory.
3. Understand the relative frequency definition of probability and also the axiomatic definition.

COURSE OUTCOMES: Upon completion of the subject, students will be able to compute:

1. Students can understand the basics of probability, events and random experiments.
2. They can analyze that the random variable is always a numerical quantity.
3. Students can understand the multiple random variables and relate through examples to real problems.
4. They can understand the concept of random processes in both deterministic and non-deterministic types
5. Understanding of Power density spectrum and its properties

UNIT-I:

Probability and Random Variable

Probability: Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables.

UNIT -II:

Distribution & Density Functions and Operation on One Random Variable – Expectations

Distribution & Density Functions: 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.

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 and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non- monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT-III:

Multiple Random Variables and Operations

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.

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 Stationarity 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 and its Properties, Linear System Response of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions, Gaussian Random Processes, Poisson Random Process.

UNIT-V:

Stochastic Processes – Spectral Characteristics: Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Spectral Density of Input and Output of a Linear System.

TEXT BOOKS

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4Ed., 2001, TMH.
2. Probability and Random Processes – Scott Miller, Donald Childers, 2 Ed, Elsevier, 2012.

REFERENCE BOOKS

1. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 Ed., TMH.
2. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press
3. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, 3 Ed., PE
4. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, 3 Ed., 1999, Oxford.
5. Statistical Theory of Communication - S.P. Eugene Xavier, 1997, New Age Publications. 3rd Edition

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

ANALOG COMMUNICATIONS LAB – B44EC6

B.Tech. IV Semester. **L/T/P/C**
0/0/2/1.5

COURSE OBJECTIVES: This Lab aims to

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:

1. Design Analog Communication systems to meet desired needs.
2. Convert Analog Signals to digital while satisfying certain specifications.
3. Analyze the Signal Transmission and Receiving fundamental concepts.
4. 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 analysis 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

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

LINEAR AND DIGITAL IC APPLICATIONS LAB – B44EC7

B.Tech. IV Semester. **L/T/P/C**
0/0/2/1.5

Note: Minimum of 12 experiments has to be conducted (six from each part).

COURSE OBJECTIVES:

The main aim of this lab is to verify the functionality of:

1. Linear and non-linear applications of operational amplifiers (741).
2. Applications of 555 timers and 565 PLL
3. Voltage regulators using 78xx, 79xxand IC 723.
4. Combinational circuits with TTL 74xx ICs
5. Sequential circuits with TTL 74xx ICs and RAM.

COURSE OUTCOMES: Upon completion of the lab, students will be able to:

1. Understand various applications using operational amplifier (741).
2. Design circuits using IC 555 and IC 565 for various applications.
3. Design circuits using voltage regulators.
4. Design the applications of Combinational and Sequential circuits using 74xx series.
5. Understand the concept of RAM (read and write operation) using 74189.

List of Experiments:

Part-1: TO VERIFY THE FOLLOWING FUNCTIONS

1. Adder, Subtractor, Comparator using IC 741 Op-Amp.
2. Integrator and Differentiator using IC741 Op-Amp.
3. Active Low Pass & High Pass Filters (first order).
4. RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp.
5. IC 555Timer - Monostable and Astable Operations.
6. Schmitt trigger circuit using IC 741.
7. IC565-PLL Applications.
8. Voltage regulator IC 723, three terminal voltage regulators-7805, 7809, 7912.

Part-2: TO VERIFY THE FUNCTIONALITY of the following 74 series TTL ICs.

1. D Flip-Flop (74LS74) and JK Master- Slave Flip-Flop (74LS73).
2. Decade counter (74LS90).
3. UP-Down Counter (74LS192).

4. Universal Shift Registers - 74LS194 /
195. 5. 3-8 Decoder – 74LS138.
6. 4 Bit Comparator – 74LS85.
7. 8X1 Multiplexer -74151 and 1X8 Demultiplexer - 74155.
8. RAM (16X4) – 74189 (read and write operations).

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

PULSE AND DIGITAL CIRCUITS LAB – B44EC8

B.Tech. IV Semester **L/T/P/C**
0/0/2/1.5

COURSE OBJECTIVES:

This Lab aims to:

1. Ability to design an Integrator & Differentiator using R, L&C circuits.
2. Ability to design Clipping, Clamping, and Pulse **Generator** 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:

1. Design RC circuits.

2. Design Multi vibrators for various Applications.

3. Design Time Base Generators and Relaxation Oscillators.

4. Design different types of Digital Circuits by using Logic Gates and Flip-Flops.

List of Experiments:

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. Comparison Operation of 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 thanone.
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.

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING - R18

DISASTER MANAGEMENT – B44HS5

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

UNIT - I:

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

UNIT - II:

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man indeced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endongenous Hazards - Exogenous Hazards

UNIT - III:

Endogenous Hazards - Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjusment, perception & mitigation of earthquake.

UNIT - IV:

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters

Infrequent events: Cyclones - Lightning - Hailstorms

Cyclones: Tropical cyclones & Local stroms - Destruction by tropical cyclones & local stroms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods - Droughts - Cold waves - Heal waves Floods :- Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation) Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion

Soil Erosion: Mechanics & forms of Soil Erosion - Factors 7 causes of Soil Erosion - Conservation measures of Soil Erosion.

Chemical hazards / disasters: Release of toxic chemicals, nuclear explosion - Sedimentation processes Sedimentation processes: - Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation

Biological hazards / disasters: Population Explosion.

UNIT - V:
Emerging approaches in Disaster Management - Three stages

1. Pre-disaster Stage (preparedness)
2. Emergency Stage
3. Post Disaster stage - Rehabilitation

TEXT BOOKS

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman -Cengage Learning

REFERENCES BOOKS

1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H. K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
6. R. B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
8. A. S. Arya Action Plan For Earthquake, Disaster, Mitigation in V. K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R. K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
10. M. C. Gupta Manuals on Natural Disaster Management in india, National Centre for Disaster Management, IIPA, New Delhi, 2001.