Shri Vishwanath P. G. College Kalan, Sultanpur

(Affiliated)

DR. RAM MANOHAR LOHIA AVADH UNIVERSITY, AYODHYA

Structure of Syllabus for the Program: B.Sc.

Subject: ELECTRONICS

SEMESTER-WISETITLESOFTHEPAPERSINUGELECTRONICSCOURSE					
YEAR	**SEME-STER**	**COURSE CODE**	**PAPER TITLE**	**THEORY / PRACTICAL**	**CREDIT**
CERTIFICATE INBASICELECTRONICS					
FIRST YEAR	**I**	B140101T	Basic Circuit Theory and Network Analysis	Theory	4
		B140102P	Circuits and Networks Lab	Practical	2
	II	B140201T	Semiconductor Devices and Electronic Circuits	Theory	4
		B140202P	Semiconductor Devices and Circuits Lab	Practical	2
DIPLOMA INADVANCED ELECTRONICS					
SECOND YEAR	**III**	B140301T	Analog Electronics	Theory	4
		B140302P	Analog Electronics Lab	Practical	2
	IV	B140401T	Digital Electronics	Theory	4
		B140402P	Digital Electronics Lab	Practical	2
DEGREE IN BACHELOR OF SCIENCE					
THIRD YEAR	**V**	B140501T	Electromagnetic and Antenna Fundamentals	Theory	4
		B140502T	Microprocessor Programming and Interfacing	Theory	4
		B140503P	Antenna and Microprocessor Lab	Practical	2
	VI	B140601T	Communications Electronics	Theory	4
		B140602T	Linear Integrated Circuits	Theory	4
		B140603P	IC and Communication Lab	Practical	2

Semester I

Theoretical Paper

B140101T: Basic Circuit Theory and Network Analysis

Unit -I

Basic Circuit Concepts:
Voltage and Current Sources, Resistors: Fixed and Variable resistors, Construction and Characteristics, Color coding of resistors, resistors in series and parallel.

Inductors: Fixed and Variable inductors, self and mutual inductance. Faraday's law and Lenz's law of electromagnetic induction, Energy stored in an inductor, Inductance in series and parallel, testing of resistance and inductance using multi meter.

Capacitors: Principles of capacitance, Parallel plate capacitor, Permittivity, Definition of Dielectric Constant, Dielectric strength, Energy stored in a capacitor, Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic capacitor, Construction and application, capacitors in series and parallel, factors governing the value of capacitors, testing of capacitors using multi meter.

Unit -II

Circuit Analysis:

Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis , Mesh Analysis, Star-Delta Conversion.

DC Transient Analysis: RC Circuit- Charging and discharging with initial charge, RL Circuit with Initial Current, Time Constant, RL and RC Circuits with Sources, DC Response of Series RLC Circuits.

Unit -III

AC Circuit Analysis:
Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Voltage-Current relationship in Resistor, Inductor and Capacitor, Phasor, Complex Impedance, Power in AC Circuits: Instantaneous Power, Average Power, Reactive Power, Power Factor. Sinusoidal Circuit Analysis for RL, RC and RLC Circuits. Resonance in Series and Parallel RLC Circuits, Frequency Response of Series and Parallel RLC Circuits, Quality (Q) Factor and Bandwidth. Passive Filters: Low Pass, High Pass, Band Pass and Band Stop.

Unit -IV

Network Theorems:
Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem & Maximum Power Transfer Theorem.

Unit -IV

Circuit Analysis:
AC circuit analysis using Network theorems. Two Port Networks: Impedance (Z) Parameters, Admittance (Y) Parameters, Transmission (ABCD) Parameters.

Network Graph Theory: Equivalent Graph, Incidence matrix, Tie-Set and Cut Set.

Reference:

1. Dorf and Svoboda,Introduction to Electric Circuits,Wiley
2. B. C. Sarkar and S. Sarkar, Analog Electronics: Devices and Circuits (Revised edition), Damodar Group (Publishers),Burdwan, ISBN:978-93-85775-15-4 (2019)
3. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)
4. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill(2005)
5. Alexander and M. Sadiku, Fundamentals of Electric Circuits , McGraw Hill (2008)
6. Bell,ElectronicCircuits,Oxford University Press
7. Carlson,Circuits,cengage
8. Kuo,Network Analysis and Synthesis,Wiley

Practical

B140102P: Circuits and Networks Lab

Lab Experiment List:

1. Familiarization with
   (a) Resistance in series, parallel and series Parallel.
   (b) Capacitors & Inductors in series & Parallel.
   (c) Multimeter Checking of components.
   (d) Voltage sources in series, parallel and series Parallel
   (e) Voltage and Current dividers
2. Measurement of Amplitude, Frequency & Phase difference using CRO.
3. Verification of Kirchhoff's Law.
4. Verification of Norton's theorem.
5. Verification of Thevenin's Theorem.
6. Verification of Superposition Theorem. 7. Verification of the Maximum Power Transfer Theorem.
8. RC Circuits: Time Constant, Differentiator, Integrator.
9. Designing of a Low Pass RC Filter and study of its Frequency Response.
10. Designing of a High Pass RC Filter and study of its Frequency Response.
11. Study of the Frequency Response of a Series LCR Circuit and determination of its (a) Resonant Frequency (b) Impedance at Resonance (c) Quality Factor Q (d) Band Width

Semester II

Theoretical Paper

B140201T: Semiconductor Devices and Electronic Circuits

Unit -I

Semiconductor Basics & PN Junction Diode:

Introduction to Semiconductor Materials, Intrinsic Semiconductors and Extrinsic semiconductors, n type semiconductors, p type semiconductors with reference to energy levels, Donors, Acceptors, concept of Fermi Level.

Symbol, pins, unbiased diode, depletion layer, barrier potential, working in forward bias and reverse bias, concept of break down, I-V characteristics, knee voltage, break down voltage, bulk resistance, zener diode, light emitting diode, photo diode, solar cell.

Unit -II

Bipolar Junction Transistor (BJT):

Symbol, pins, basic types- PNP and NPN, unbiased transistor, Biased Transistor, transistor currents, concept of current gain, α, β of BJT, configurations CE, CB and CC, with respect to CE configuration I -V characteristics-base curve and collector curves, load line, operating point, Biasing techniques - voltage divider bias, emitter bias, collector feedback bias and base bias.

Unit -III

UJT, JFET and MOSFET:

Symbol, types, construction, working principle, I-V characteristics, Specifications parameters of: Uni-Junction Transistor (UJT), Junction Field Effect Transistor (JFET), Metal Oxide Semiconductor FET (MOSFET), comparison of JFET, MOSFET and BJT.

Unit -IV

Diode Circuits:

Half wave rectifier, transformer, full wave rectifier, bridge rectifier, choke input filter, capacitor input filter, peak inverse voltage and surge current, block diagram of power supply, zener regulator, clippers and limiters, clampers and voltage multipliers.

Unit -V

Transistor Circuits:

Transistor as a switch, transistor as an amplifier, class A operation, class B operation, Emitter follower, class B push- pull emitter follower, class C operation, Single stage RC coupled CE amplifier, voltage gain, concept of frequency response and bandwidth, JFET biasing in ohmic/active region, MOSFET in digital switching.

Reference:

1. Electronic Principles - Albert Malvino, David J. Bates , 7th Edition (2016)
2. Basic Electronics - B, Grob, Mitchel E. Schultz , 11th Editio, (2007)
3. Solid state Electronic Devices, B. G. Streetman and S. Banerjee, Pearson Education (2006)
4. Electronic Principles, Albert Malvino, David J. Bates, 7th Edition (2016)
5. Basic Electronics - B, Grob, Mitchel E. Schultz , 11th Edition, (2007)
6. Basic Electronics and Linear circuits, N. N. Bhargava, D. C. Kulshreshtha, S. C. Gupta, Tata McGraw Hill (2008)
7. Semiconductor devices, Kanaan Kano, Pearson Education (2004)

Practical

B140202P: Semiconductor Devices and Circuits Lab

Lab Experiment List:

1. Study of the I-V Characteristics of Diode Ordinary and Zener Diode.
2. Study of the I- V Characteristics of the Common Emitter Configuration of BJT and obtain voltage gain, ri, ro,α.
3. Study of the I- V Characteristics of the Common Base Configuration of BJT and obtain voltage gain, ri, ro,β.
4. Study of the I-V Characteristics of the Common Collector Configuration of BJT and obtain voltage gain, ri, ro.
5. Study of the I-V Characteristics of the UJT and SCR.
6. Study of the I-V Characteristics of JFET and MOSFET
7. Study of Characteristics of Solar Cell
8. Study of Hall Effect.
9. Study of the half wave rectifier and Full wave rectifier.
10. Designing and testing of 5V/9 V DC regulated power supply and find its load-regulation
11. Study of clipping and clamping circuits.
12. Designing of a Single Stage CE amplifier.
13. Study of Class A, B and C Power Amplifier.
14. Study of the Colpitt's Oscillator
15. Study of the Hartley's Oscillator
16. Study of the Phase Shift Oscillator
17. Study of the frequency response of Common Source FET amplifier

Semester III

Theoretical Paper

B140301T: Analog Electronics

Unit -I

Regulated Power Supply:

Rectifier Circuit : Half, full and bridge rectifier circuits with resistor load, their output waveforms, output DC voltage and power, rectifier efficiency and ripple factor; Design consideration and rating; Voltage multiplying rectifiers; Doubler, trippler and quadrupler.

Filter Circuits: Series inductor, shunt capacitor, L-section, -section and R-C filter circuits; Evaluation of output

D.C. voltage and ripple factor when they are fed with AC full wave rectifier; Design consideration.

Regulator Circuits: Load and line regulation, stabilization ratio, internal impedance and temperature coefficient of voltage regulation; Linear voltage regulator circuits; Non-feedback type; Series and shunt regulator; Design consideration of each circuit.

Controlled Rectification and Switch Mode Power Supply: SCR controlled half and full wave rectifier circuits and their analysis; Elements of SMPS, SCR control and stability in SMPS.

Unit -II

Amplifier : Basic Requirements and Principles:

Biasing and Stability : General principle of transistor amplifier; Load line and Q point, thermal stability, stability factors; Transistor biasing; Fixed bias, Collector to base bias, emitter bias and voltage divider bias circuits.

Small Signal Transistor Amplifiers: Small signal transistor amplifier circuits in different configurations and Z, Y and hybrid parameters form and their analysis; Noise and distortion in SST amplifier.

Unit -III

Amplifier:

Multistage Amplifier: Cascading of amplifier and voltage gain; R-C, L-C and T-C coupled two stage amplifier circuits and their phase and frequency response and bandwidth.

Negative Feedback Amplifier: C-E amplifier with series and shunt feedback; Emitter follower; Source follower, Cascade amplifier for transistor and FET, Darlington pair.

Unit -IV

Power Amplifiers:

Difference between voltage and power amplifier, classification of power amplifiers, Class A, Class B, Class C and their comparisons. Operation of a Class A single ended power amplifier. Operation of Transformer coupled Class A power amplifier, overall efficiency. Circuit operation of complementary symmetry Class B push pull power amplifier, crossover distortion, heat sinks.

Tuned amplifiers: Circuit diagram, Working and Frequency Response for each, Limitations of single tuned amplifier, Applications of tuned amplifiers in communication circuits. Double tuned amplifier.

Unit -V

Oscillators:

Audio Oscillators: Positive feedback and Bark Hausen criteria of sustained oscillation; Phase shift and Wien bridge oscillator.

RF Oscillator: Tuned base, Tuned collector, Hartley and Colpitt oscillator circuit and their analysis; Negative resistance oscillator; Frequency stability; Crystal controlled oscillator; Pierce and Miller circuits.

Reference:

1. Electronic Devices and Circuits by J. Millman& C. Halkias (McGraw Hill, New York)
2. Electrical Circuits and Introductory Electronics by VinodPrakash (LokBhartiPrakashan, Allahabad)
3. Electronic Fundamentals and Applications by J.D. Ryder (PHI Pvt. Ltd., New Delhi)
4. Electronic devices, David A Bell, Reston Publishing Company
5. Electronic Circuits: Discrete and Integrated, D. L. Schilling and C. Belove, Tata McGraw Hill
6. Electronic Circuit Analysis and Design, Donald A. Neamen, Tata McGraw Hill

Practical

B140302P: Analog Electronics Lab

Lab Experiment List:

1. Study of unregulated power supply.
2. Study of Zener and emitter follower regulator circuits.
3. Study of transistor series and shunt regulator circuits.
4. Study of controlled rectification using SCR.
5. To study biasing stability in BJT.
6. Phase and frequency response of RC network.
7. Phase and frequency response of low pass and high pass filter.
8. Phase and frequency response of inter-stage transformer.
9. Phase and frequency response of R-C coupled amplifier.
10. Generation and Fourier analysis of saw tooth wave.
11. Testing of electronic component by CRO and their measurement by LCR bridge.
12. Design of regulated low voltage power supply.
13. Design of low signal R-C coupled amplifier.
14. Basic knowledge of the circuits of the test instruments.
15. Identification of electronic components.
16. Study of full wave and bridge rectifier
17. Study of ac power control using SCR

Semester IV

Theoretical Paper

B140401T: Digital Electronics

Unit -I

Number Systems and Codes:
Binary Number System, Binary-to-decimal Conversion, Decimal-to-binary Conversion, Octal Numbers, Hexadecimal Numbers, The ASCII Code, The Excess-3 Code, The Gray Code, Error Detection and Correction.

Unit -II

Digital principles and logic:
Definitions for Digital Signals, Digital Waveforms, Digital Logic, Digital Computers, Digital Integrated Circuits, Digital IC Signal Levels, Digital Logic**,** The Basic Gates-NOT, OR, AND, Universal Logic Gates-NOR, NAND, AND- OR-Invert Gates, Positive and Negative Logic.

Unit -III

Combinational Logic Circuits
Boolean Laws and Theorems, Sum-of-Products Method, Truth Table to Karnaugh Map, Pairs, Quads, and Octets , Karnaugh Simplifications , Don't-care Conditions , Product-of-sums Method, Product-of-sums Simplification, Simplification by QUINE-Mc-CLUSKY Method.

Unit -IV

Arithmetic Circuits
Binary Addition, Binary Subtraction, Unsigned Binary Numbers, Sign-magnitude Numbers,2's Complement epresentation, 2's Complement Arithmetic, Arithmetic Building Blocks, The Adder-subtracter, Fast-Adder, Arithmetic Logic Unit, Binary Multiplication and Division.

Unit -V

LATCHES:
Latches, Flip-flops - SR, JK, D, T, and Master-Slave -Edge triggering Level Triggering Asynchronous Ripple or serial counter Asynchronous Up/Down counter - Synchronous counters Synchronous Up/Down counters Programmable counters Modulo n counter, Registers shift registers - Universal shift registers Shift register counters Ring counter Shift counters - Sequence generators. Logic Families.

Reference:

1. Digital System Design, Morris Mano, Pearson Education (2014)
2. Digital Principals, Schaum's outline series, Tata McGraw Hill (2006)
3. Digital Fundamentals, T. L. Floyld, Pearson Education (2013)
4. Digital Electronics, R. P. Jain, Tata McGraw Hill

Practical

B140402P: Digital Electronics Lab

Lab Experiment List:

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Verification of Demorgan's Theorems
4. Designing of all the logic gates using NOR gate IC
5. Construction of gates using discrete components Design and Verify Following:-
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

Semester V

Theoretical Paper -I

B140501T: Electromagnetics and Antenna Fundamentals

Unit -I

Vector Analysis, Poisson's Equation and Laplace Equation:

Scalars and Vectors, Unit Vector and Vector Components, Vector Field, Vector Algebra, Rectangular (Cartesian) Coordinate, Curvilinear Coordinates: Unit Vectors and Scalar Factors, Cylindrical Coordinate and Spherical Coordinate, Differential Length, Area and Volume, Line, Surface and Volume Integrals, Del Operator, Gradient of a Scalar, Divergence of a Vector and Divergence Theorem, Curl of a vector and Stokes's Theorem. Green Theorem, Laplacian of a Scalar.

Unit -II

Electrostatics:

Coulomb's Law, Electric Field and Electric Potential due to Discrete and Continuous Charge Distributations. Electric Flux Density, Gauss's Law – Maxwell's Equation and Applications, Electric Dipole, Electric Fields in Different Materials, Current and Current Density, Polarization, Dielectric Constant, Linear and Nonlinear, Homogeneous and Inhomogeneous, Isotropic and Anisotropic Dielectrics, Boundary Conditions, Poisson's and Laplace's Equations and their Derivations and Examples and their Solutions, Uniqueness Theorem, Capacitance and Capacitors, Method of Images, Electrostatic Energy and Forces, Energy Density.

Unit -III

Magnetostatics:

BiotSavart's Law and applications, Magnetic Dipole, Ampere's Circuital Law- Maxwell's Equation and Applications, Magnetic Flux and Magnetic Flux Density- Maxwell's Equation, scalar and Vector Magnetic Potentials. Magnetization in Materials and Permeability, Anisotropic Materials, Magnetic Boundary Conditions, Inductors and Inductances, Mutual and Self Inductance, Magnetic Circuits, Magnetic Energy, Forces, Torque and Moment.

Unit -IV

Time Varying Fields and Maxwell's Equation's:

Faraday's Law of electromagnetic Induction Maxwell's Equation, Stationary Circuit in Time-Varying Magnetic Field, Transformer and Motional EMF, Displacement Current, Maxwell's Equation in Differential and Integral Form and Constitutive Relation, Potential Function, Lorentz Gauge and Wave Equation for Potentials, Concept of Retarded Potentials, Electromagnetic Boundary Conditions.

Unit -V

Antenna Fundamentals:

Antenna Basics: Introduction-Definition, functions and properties of Antenna-Radiation mechanism of Antennas Antenna Parameters(qualitative study only) : Isotropic Radiator, Antenna Impedance, Radiation resistance, Radiation Pattern, Radiation Power density & Intensity, Gain, Directive Gain & Power Gain, Directive Gain and Directivity, Antenna Efficiency, Effective Area/Aperture, Antenna Bandwidth and Beam Width, Beam Efficiency, Antenna Temperature, Antenna polarization , EIRP, Fri is Transmission Formula. Principles of Horn, Parabolic dish and rectangular Patch antennas.

Reference:

1 G.S.N Raju, Antennas and Wave Propagation,

2 PEARSON.2.John D. Krauss, Antennas for all Applications, 3/e, TMH.

3 3.Constantine A Balanis, Antenna Theory and Design, 2/e, Wiley Publications.

4 4.R.E Collin, Antennas & Radio Wave Propagation, McGraw Hill, 1985.

5 5.Thomas A. Milligan, Modern Antenna Design, IEEE PRESS, 2/e, Wiley Interscience.

6 SoundaraRajan, Antenna Theory and Wave Propagation, Scietech Publishers, Chennai.

7 Rao, Elements of Engineering Electromagnetics, Pearson

8 Griffiths, Introduction to Electrodynamics, Pearson

9 Jordan and Balmain, Electromagnetic Waves and Radiating Systems, Pearson

Theoretical Paper-II

B140502T: Microprocessor and Microcontroller

Unit -I

Microprocessor:

Introduction to Microprocessor: Introduction, Applications, Basic Block Diagram, Speed, Word Size, Memory Capacity, Classification of Microprocessors (Mention Different Microprocessors being used).

8085 Microprocessor: Main Features, Architecture, Block Diagram, CPU, ALU, Registers, Flags, Stack Pointer, Program Counter, Data and Address Buses, Control Signals, Pin-Out Diagram and Pin Description.

Unit -II

8085 Instruction and Programming:

Operation Code, Operand and Mnemonics, Instruction Classification, Addressing Modes, Instruction Format, Instructions Set, Data Transfer, Arithmetic, Increment, Decrement, Logical, Branch and Machine Control Instructions, Assembly Language Programming Examples, Stack Operations, Subroutines and Delay Loops Call and Return Operations, Use of Counters, Timing and Control Circuitry, Timing Diagram, Instruction Cycle, Machine Cycle, T (Timing)-States, Time Delay.

Unit -III

Interrupts:

Structure, Hardware and Software Interrupts, Vectored and Non-Vectored Interrupts, Latency Time and Response Time.

Unit -IV

Interfacing:

Basic Interfacing Concepts, Memory Mapped I/O and I/O Mapped I/O and Isolated I/O Structure, Partial/Full Memory Decoding, Interfacing of Programmable Peripheral Interface (PPI) Chip (8255), Address Allocation Technique and Decoding, Interfacing of I/O Devices (LEDs and Toggle-Switches as Examples).

Unit –V

8051 I/O Port Programming:

Introduction of I/O Port Programming, Pin-Out Diagram of 8051 Microcontroller, I/O Port Pins Description and their Functions, I/O Port Programming in 8051 (using Assembly Language), I/O Programming: Bit Manipulation.

Reference:

1. Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, Penram.
2. B. Ram, Fundamentals of Microprocessors and Microcomputers, DhanpatRai.
3. Krishna Kant, Microprocessors and Microcontrollers: Architecture, Programming and System Design, PHI.
4. Mathur and Panda, Microprocessors and Microcontrollers, PHI.
5. Shah, 8051 Microcontrollers: MCS 51 Family and its Variants, Oxford.
6. Ayala and Gadre, The 8051 Microcontroller and Embedded System using Assembly and C, Cengage.

Practical

B140503P: Antenna and Microprocessor Lab

Lab Experiment List:

1. Program for 8 Bit Addition and Subtraction
2. Program for16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in an array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary Binary to ASCI I Conversion
12. Six letter word display.
13. Rolling display
14. Interfacing seven segment display to display any character.
15. Program to display Time(Hours and Minutes)
16. Interfacing Traffic light controller
17. Interfacing Stepper motor control
18. Interfacing Matrix Keyboard
19. Interfacing A.D.C
20. Interfacing D.A.C
21. Study of 8255 chip and generation of
    - Square wave
    - Triangular wave
    - Saw Tooth wave

Semester VI

Theoretical Paper- I

B140601T: Communication Electronics

Unit -I

AM GENERATION & TRANSMISSION:

Need for modulation, Amplitude modulation, Frequency Spectrum of the AM Wave - Modulation Index Power relations in the AM Wave AM generation AM Transmitter. - Forms of Amplitude Modulation Evolution of SSB Balanced Modulator Methods of SSB Generation Vestigial side bandTransmission.

Analog Pulse Modulation: Channel Capacity, Sampling Theorem, Basic Principles of PAM, PWM and PPM, Modulation and Detection Technique for PAM only, Multiplexing, TDM and FDM.

Unit -II

FM GENERATION & TRANSMISSION:

Frequency Modulation - Frequency Spectrum of the FM Wave Modulation Index Effect of Noise Adjacent & Co-Channel Interference Wide Band & Narrow Band FM-FM generation.

Unit –III

AM & FM RECEPTION:

AM Receiver TRF Receiver Super Heterodyne Receiver Image Frequency Rejection Frequency Changing & Tracking Choice of IF AM Detection AGC SSB Detection. FM Receiver Amplitude Limiter De-Emphasis FM Detection Balanced Slope Detector Phase Discriminator Ratio Detector. Direct andIndirect methods - FM Transmitter Pre-Emphasis.

Unit -IV

PULSE MODULATION:

PAM Modulation & Detection PWM Modulation & Detection - PPM Modulation & Detection - Sampling Theorem Quantization & Quantization Error PCM Modulation & Detection – Companding ASK, FSK, BPSK, QPSK & DPSK.

Unit -V

CELLULAR COMMUNICATION:

Concept of cellular mobile communication cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, authentication of the SIM card of the subscribers, IMEI number, concept of data encryption, architecture (block diagram) of cellular mobile communication network, CDMA technology, CDMA overview, simplified block diagram of cellular phone handset, Comparative study of GSM and CDMA, 2G, 3G and 4G concepts.

Reference:

1. Electronic Communication, Roddy and Coolen, 4th edition, PHI.
2. B. C. Sarkar and S. Sarkar, Analog Electronics: Devices and Circuits (Revised edition), Damodar Group Publishers),Burdwan, ISBN:978-93-85775-15-4 (2019)
3. Electronic Communication systems, Kennedy & Davis, IV edition-TATA McGraw Hill.
4. Advanced Electronic Communication systems, Wayne Tomasi- 6th edition, Low priced edition- Pearson education6.Blake, Electronic Communication Systems, Cengage.
7. Kundu, Analog and Digital Communications, Pearson.
8. Electronic Communication, George Kennedy, 3rd edition, TMH

Theoretical Paper-II

B140602T: Linear Integrated Circuits

Unit -I

Basic Operational Amplifier:

Concept of differential amplifiers (Dual input balanced and unbalanced output), constant current bias, current mirror, cascaded differential amplifier stages with concept of level translator, block diagram of an operational amplifier (IC 741).

Unit -II

Op-Amp parameters:

Input offset voltage, input offset current, input bias current, differential input resistance, input capacitance, offset voltage adjustment range, input voltage range, common mode rejection ratio, slew rate, supply voltage rejection ratio.

Unit -III

Op-Amp Circuits:

Open and closed loop configuration, Frequency response of an op-amp in open loop and closed loop configurations, Inverting, Non-inverting, Summing and difference amplifier, Integrator, Differentiator, Voltage to current converter, Current to voltage converter.

Comparators: Basic comparator, Level detector, Voltage limiters, Schmitt Trigger.

Signal generators: Phase shift oscillator, Wein bridge oscillator, Square wave generator, triangle wave generator, saw tooth wave generator, and Voltage controlled oscillator.

Unit -IV

Signal Conditioning circuits:

Sample and hold systems, Active filters: First order low pass and high pass butter worth filter, Second order filters, Band pass filter, Band reject filter, All pass filter, Log and antilog amplifiers.

Unit –V

Multivibrators (IC 555):

Block diagram, Astable and monostable multi vibrator circuit, Applications of Monostable and Astable multi vibrators. Phase locked loops (PLL): Block diagram, phase detectors, IC565.

Reference:

1. Operational amplifiers and Linear Integrated circuits, R. F. Coughlin and F. F. Driscoll, Pearson Education
2. Integrated Electronics, J. Millman and C.C. Halkias, Tata McGraw- Hill,
3. Electronic Principals, A.P.Malvino, Tata McGraw-Hill,
4. OP-AMP and Linear Integrated Circuits, K.L.Kishore, Pearson

Practical

B140603P: IC and Communication Lab

Lab Experiment List:

1. Study of Amplitude Modulation and Demodulation.
2. Study of Frequency Modulation and Demodulation
3. Study of Single Side Band Modulation and Demodulation
4. Study of Pulse Amplitude Modulation
5. Study of Pulse Width Modulation
6. Study of Pulse Position Modulation
7. Study of Pulse Code Modulation
8. Study of Amplitude Shift Keying
9. Study of Frequency Shift Keying
10. Study of Phase Shift Keying
11. Study of op-amp characteristics.
12. Designing of an amplifier of given gain for an inverting and non-inverting configuration using an op-amp.