II Year – I Semester
Human Values and Professional Ethics

Unit – I: Introduction –Need, Basic Guidelines and Content

1. Understanding the need , basic guidelines, content and process for value Education
2. Self Exploration – What is it? – its content and process: 'Natural Acceptance' and Experiential Validation – as the mechanism for self explanation
3. Continuous Happiness and Prosperity – A look at basic Human Aspirations

Unit – II: Process for Value Education

1. Right Understanding, Relationship and Physical Facilities – basic requirements for fulfillment of aspirations of every human being with their correct priority
2. Understanding Happiness and prosperity correctly – A critical appraisal of the current scenario
3. Method to fulfill the above human aspirations; understanding and living in harmony at various levels

Unit – III: Understanding Harmony in the Human Being

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
2. Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha
3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

Unit –IV: Harmony in Myself

1. Understanding the characteristics and activities of 'I' and harmony in 'I'
2. Understanding the harmony of I with the Body: Sanyam and Swasthya: correct appraisal of Physical needs, meaning of Prosperity in detail
3. Programs to ensure Sanyam and Swasthya – practice exercises and Case Studies will be taken up in Practice Sessions

Unit – V: Understanding Harmony in the Family and Society – harmony in Human - Human Relationship

1. Understanding harmony in the family – the basic unit of human interaction
2. Understanding values in human relationship; meaning of Nyaya and Program for its fulfillment to ensure Ubhay-tripti
3. Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Text Books

- R R Gaur, R,Sangal, G.P Bagaria, 2009, A Foundation Course in value Education(English)
- Pradeep Kumar Ramancharla, 2013, A foundation course in value education (Telugu)
- R R Gaur, R Sangal G P Bagaria, 2009, Teacher's Manual (English)
- Pradeep Kumar Ramancharla, 2013, Teacher's Manual (Telugu)

Reference Books

- Ivan IIIich, 1974, Energy& Equity, The Trinity Press, Worcester, and harper Collins, USA
- E.F. Schumacher, 1973, small is Beautiful; a study of economics as if people mattered,
- Blond & Briggs, Bratain
- A Nagraj, 1998, Jeevan vidya to Na Prayanam, Hyderabad
- R.Pradeep Kumar, 2013, Jeevan Vidya to Na Prayanam, Hyderabad
- Sussan George, 1076, How the other half Dies, Penguin Press, Peprinted 1986, 1991

PL Dhar, RR Gaur, 1990, Science and Humanism, common wealth publishers

II Year – I Semester
Electronic Devices and Circuits

Unit - I

Junction Diode Characteristics : Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode. Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, Zener diode applications, LED, Photo diode, Tunnel Diode, SCR, UJT. Construction, operation and characteristics of all the diodes are required to be considered.

Unit - II

Rectifiers and Filters: Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

Unit - III

BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, Photo transistor, typical transistor junction voltage values. FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

Unit - IV

Transistor Biasing and Thermal Stabilization : Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in VBE, Ic, and β, Stability factors, (S, S', S'), Bias compensation, Thermal runaway, Thermal stability. FET Biasing- methods and stabilization.

UNIT-V

Small Signal Low Frequency Transistor Amplifier Models: BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers. FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
2. Integrated Electronics- Jacob Millman, C. Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.

Reference Books

1. Electronic Devices and Circuits-K. Satya Prasad, VGS Book Links.
2. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition
3. Electronic Devices and Circuits , Bell, Oxford

II Year – I Semester
Engineering Drawing

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II

ORTHOGRAPHIC PROJECTIONS IN FIRST ANGLE

PROJECTION: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points: including Points in all four quadrants.

Projections of Lines: Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

PROJECTIONS OF PLANES: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

PROJECTIONS OF SOLIDS: Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

SECTIONS AND SECTIONAL VIEWS: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

DEVELOPMENT OF SURFACES: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

INTERSECTION OF SOLIDS:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

ISOMETRIC PROJECTIONS : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

TRANSFORMATION OF PROJECTIONS : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

PERSPECTIVE PROJECTIONS : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

Engineering Drawing By John. PHI Learning Publisher

II Year – I Semester
Signals and Systems

Unit - I

INTRODUCTION: 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. 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 SERIES AND FOURIER TRANSFORM: Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlets conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum. 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.

Unit - III

SAMPLING THEOREM Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling Aliasing, Introduction to Band Pass sampling.

Unit - IV

ANALYSIS OF LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time. Cross-correlation and auto-correlation of functions, properties of correlation function, Energy density spectrum, Parsevals 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 : Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms,

constraints on ROC for various classes of signals, Properties of L.Ts, Relation between L.Ts, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z-TRANSFORMS : Fundamental difference between continuous-time and discrete-time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time 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, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals & Systems- Narayan Iyer and K Satya Prasad, Cenage Pub.

Reference Books

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

II Year – I Semester
Network Analysis

Unit – I

Mesh and node analysis and problems relating to mesh and node analysis.

Steady State Analysis of A.C Circuits : Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving. (Text Books: 1,2, Reference Books: 3)

Unit - II

Coupled Circuits : Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, Conductively coupled equivalent circuits- problem solving. Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, general caseresistance present in both branches, anti resonance at all frequencies. (Text Books:2,3, Reference Books: 3)

Unit - III

Network Theorems: Thevinins, Nortons, Millimans, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens- problem solving using dependent sources also. (Text Books: 1,2,3, Reference Books: 2)

Unit - IV

Two-port networks : Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Inverse h-parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascading of two port networks, series connection of two port networks, problem solving including dependent sources also. (Text Books: 1,2, Reference Books: 1,3)

UNIT-V

Transients : First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, second order differential equations, homogeneous, nonhomogenous, problem solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Solutions using Laplace transform method. (Text Books: 1,2,3, Reference Books: 1,3)

Text Books

1. Network Analysis ,ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju, Cengage Learning
3. Electric Circuit Analysis by Hayt and Kimmarle, TMH

Reference Books

1. Network lines and Fields by John. D. Ryder 2nd edition, Asia publishing house.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers.
3. Network Analysis and Filter Design by Chadha, Umesh Publications.

II Year – I Semester
Introduction to Information Technology

Unit 1 **DATA AND INFORMATIOM:** Introduction, Types of Data, A Simple Model of a Computer, Data Processing Using a Computer, Desktop Computer, The Organization of the Book.

ACQUISTION OF NUMBERS AND TEXTUAL DATA: Introduction, Input Units, Internal Representation of Numeric Data, Representation of Characters in Computers, Error-Detecting Codes.

ACQUIRING IMAGE DATA: Introduction, Acquisition of Textual Data, Acquisition of Pictures, Storage Formats for Pictures, Image Compression Fundamentals, Image Acquisition with a Digital Camera.

Unit 2 **ACQUIRING AUDIO DATA:** Introduction, Basics of Audio Signals, Acquiring and Storing Audio Signals, Compression of Audio Signals.

ACQUISTION OF VIDEO: Introduction, Capturing a Moving Scene with a Video Camera, Compression of Video Data, MPEG Compression Standard.

DATA STORAGE: Introduction, Memory Cell, Physical Devices Used as Memory Cells, Random Access Memory, Read Only Memory, Secondary Memory, Floppy Disk Drive, Compact Disk Read Only Memory(CDROM), Archival Memory.

OUTPUT DEVICES: Introduction, Video Display Devices, Flat Panel Displays, Printers, Audio Outputs.

CENTRAL PROCESSING UNIT: Introduction, The Structure of a Central Processing Unit, Specification of CPU, Interconnection of CPU with Memory and I/O Units, Embedded Processors.

COMPUTER SOFTWARE: Introduction, Operating System, Programming Language, A Classification of Programming Languages.

Unit 3 **COMPUTER NETWORKS:** Introduction, Local Area Network(LAN), Applications of LAN, Wide Area Network(WAN), Internet, Naming Computers Connected to Internet, The Future of Internet Technology.

COMPUTER SECURITY : Introduction, Computer Security: Definition, Malicious Programs, Cryptography, Digital Signature, Firewall, Users Identification and Authentication.

Unit 4 **PROCESSING NUMERICAL DATA :** Introduction , Use of Spreadsheets, Numerical Computation Examples.

PROCESSING AND DISPLAYING TEXTUAL DATA: Introduction, Word Processor, Desktop Publishing, Page Description Language, Markup Languages.

PROCESSING MULTIMEDIA : Introduction, Graphics Processing, Audio Signal Processing.

SOME INTERNET APPLICATIONS: Introduction, E-mail, Information Browsing Service, The World Wide Web, Information Retrieval from the World Wide Web, Other Facilities Provided by Browsers, Audio on the Internet, Pictures, Animation and Video via Internet.

Unit 5 **BUSINESS INFORMATION SYSTEMS:** Introduction, Types of Information Needed by Organizations, Why Should We Use Computers in Businesses? , Management Structure and their Information Needs, Design of an Operational Information System, System Life Cycle, Computer System for Transaction Processing.

ELECTRONIC COMMERCE: Introduction, Business to Customer E-Commerce, Business to Business E-Commerce, Customer to Customer E-Commerce, Advantages and Disadvantages of e-commerce. E-Commerce System Architecture, Digital Signature, Payment Schemes in e-commerce, Electronic Cheque Payment in e-commerce.

SOCIETAL IMPACTS OF INFORMATION TECHNOLOGY: Introduction, Privacy, security and Integrity of Information, Disaster Recovery, Intellectual Property Rights, Careers in Information Technology.

Text books

	Author	Title	Publisher
1	V. Rajaraman	Introduction to Information Technology	PHI

Reference books

	Author	Title	Publisher
1	ITL Education Solutions Limited	Introduction to Information Technology	Pearson Education
2	Norton	Introduction to Computers (sixth edition)	Tata McGraw Hill
3	Turban/Rainer/Potter	Introduction to Information Technology second edition	WILEY (WSE)

II Year – I Semester
Network and Electrical Technology Lab

Cycle -1

1. Verification of superposition and reciprocity theorems
2. Verification of maximum power transfer theorem
3. Verification of thevenin's and Norton's theorem
4. Swinburne's test on a DC Shunt Machine
5. Brake test on DC shunt motor

Cycle – 2

1. Brake test of 3-phase squirrel cage induction motor
2. OC & SC phase tests on a single-phase transformer
3. Magnetization characteristics of DC Shunt generator
4. Regulation of three phase alternator
5. Determination of two port network parameters

II Year – I Semester
Electronic Devices and Circuits Lab

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

.

PART B: List of Experiments (For Laboratory Examination-Minimum of Ten Experiments)

1. P-N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias& Reverse bias)
   Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
   Part A: V-I Characteristics
   Part B: Zener Diode as Voltage Regulator
3. Ripple factor and efficiency of a rectifier (HWR and FWR) with and without capacitor filter
4. Input and Output characteristics of a BJT(CE Configuration)
5. Drain and Transfer characteristics of a JFET.
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier.

PART C: Equipment required for Laboratory

1. Boxes
2. Ammeters (Analog or Digital)
3. Voltmeters (Analog or Digital)
4. Active & Passive Electronic Components
5. Regulated Power supplies

6. Analog/Digital Storage Oscilloscopes
7. Analog/Digital Function Generators
8. Digital Multimeters
9. Decade Résistance Boxes/Rheostats
10. Decade Capacitance

II Year – II Semester
Probability and Statistics

Unit 1 **Basic Probability :** Random Experiments, Sample spaces, Events, Axioms of Probability, Important Theorems of Probability, Conditional Probability, Theorem on Conditional Probability, Independent Events, Bayes Theorem

Descriptive Statistics : Measures of Central tendency, Mean, Median, Mode, Measure of dispersion, Variance and standard deviation, Percentiles, Interquartile Range, Skewness.

Unit 2 **Discrete Random Variables :** Random Variables, Discrete Probability distribution, Distribution functions for random variables, distribution functions for discrete random variables, Expected Values, Variance and Standard Deviation, Theorems on expectation, Theorems on variance

Continuous Random Variables : Continuous Random variables, Continuous probability distribution, distribution functions for continuous random variables, Expected Values, Variance, Properties of Expected values and variances

Unit 3 **Examples of Random Variables:** Binomial Distribution, properties of binomial distribution, Normal Distribution, Examples of Normal Distribution, Poisson Distribution, Relation between Normal and Binomial distributions, Central limit Theorem.

Sampling Theory : Population and sample, Sampling, Random sampling, Random Numbers, Population parameters, Sampling statistics, Sampling distributions, Sample mean and sample variance.

Unit 4 **Estimation Theory :**Point Estimates and Interval Estimates, Confidence Intervals for means, Confidence Intervals for proportions, Confidence Intervals for differences and sums

Test of Hypothesis and Significance : Test of hypothesis and significance, Type I and Type II Errors, Level of Significance, Test involving the Normal distribution, p value, One-tailed and two-tailed tests

Unit 5 **Curve Fitting, Correlation and Regression :** Curve Fitting, Regression, Method of least squares, least squares line, standard error of estimate, the linear correlation coefficient, generalized correlation coefficient, Correlation and dependence.

Other Probability Distributions : Uniform distribution, gamma distribution, the F-distribution

Text Book

1. Probability and Statistics, Schaum's easy Outlines McGRaw – Hill

Reference Books :

1. Introduction to Probability and Statistics, William Mendenhall, Robert J Beaver, Barbara M Beaver, Twelth Edition, Thomson.

II Year – II Semester
Pulse and Digital Wave shaping

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.

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, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

UNIT II

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.

UNIT III

Multivibrators : Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Time Base Generators : General features of a Time base Signal, Methods of Generating Time Base Waveform, Miller and Bootstrap Time base Generators-Basic Principles, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

UNIT IV

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuit, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

UNIT V

Sampling Gates : Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits, Six Diode Gate, Application of Sampling Gates

Realization of Logic Gates Using Diodes & Transistors:AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML 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, TMH.
2. Solid State Pulse circuits –David A. Bell, 4 ed., 2002 PHI.

REFERENCE BOOKS:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.
4.Wave Generation and Shaping - L. Strauss.

II Year – II Semester
Control 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

UNIT II

TRANSFER FUNCTION REPRESENTATION :Transfer Function of DC Servo motor – AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra –Representation by Signal flow graph – Reduction using Mason's gain formula.

UNIT-III

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.

STABILITY ANALYSIS IN S-DOMAIN : The concept of stability – Routh's stability criterion – qualitative stability and conditional stability –limitations of Routh's stability

UNIT – IV

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

FREQUENCY RESPONSE ANALYSIS : Introduction, 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.

STABILITY ANALYSIS IN FREQUENCY DOMAIN : Polar Plots-Nyquist Plots-Stability Analysis.

UNIT – V

CLASSICAL CONTROL DESIGN TECHNIQUES : Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

State Space Analysis of Continuous Systems : Concepts of state, state variables and state model, derivation of state models from block diagrams,Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties –Concepts of Controllability and Observability

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition,1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

II Year – II Semester
Electro Magnetic Waves and Transmission Lines

Unit - I

Electrostatics: Coulomb's Law, Electric Field Intensity Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance' Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy. Illustrative Problems.

Unit - II

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. Polarization. Illustrative Problems.

Unit - IV

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. Poynting Vector and Poynting Theorem Applications, Power Loss in a Plane Conductor. Illustrative Problems.

Unit - V

Transmission Lines - I : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading. Illustrative Problems.

Transmission Lines II : Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements À/4, À/2, À/8 Lines Impedance Transformations. Smith Chart Configuration and Applications, Single and Double Stub Matching. Illustrative Problems.

Text Books

1. Elements of Electromagnetic Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

Reference Books

1. Electromagnetic Fields and Wave Theory GSN Raju, Pearson Education 2006
2. Engineering Electromagnetics Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
3. Engineering Electromagnetics William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Transmission Lines and Networks Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.

II Year – II Semester
Analog Communications

Unit - I

AMPLITUDE MODULATION : Introduction to communication system, Need for modulation, 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.

Unit - II

DSB & SSB 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. 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 side band 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 - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

Unit - IV

NOISE: Noise in Analog communication System, Noise in DSB & SSB System, Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

Unit - V

TRANSMITTERS & RECEIVERS: Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter. Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

PULSE MODULATION : Time Division Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM.

Text Books

1. Principles of Communication Systems H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.
2. Communication Systems B.P. Lathi, BS Publication, 2006.

Reference Books

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.
2. Electronics & Communication System George Kennedy and Bernard Davis, TMH 2004.
3. Communication Systems R.P. Singh, SP Sapre, Second Edition TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.

II Year – II Semester
Computer Organization

Unit 1 **Data Representation**: Block diagram of computer architecture. Data types, Complements, Fixed-point Representation, Floating-point representation, other binary codes, Error detection Codes.

Unit 2 **Register Transfer and Micro operations**: Register transfer language, Register transfer, Bus & memory Transfers, Arithmetic micro operations, logic micro operations, Shift micro operations, Arithmetic Logic Shift Unit

Basic Computer Organization and Design: Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-output Interrupt

Unit 3 **Micro programmed Control**: Control memory, Address Sequencing, Micro program Example, Design of control Unit.

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control

Unit 4 **Computer Arithmetic**: Introduction, Addition and subtraction, Multiplication algorithm, Floating point arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.

Unit 5 **Input-Output Organization**: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory

Text books

	Author	Title	Publisher
1	M. Morris Mano	Computer System Architecture	3rd Edition, Pearson Education (2008). **Chapters :** 1, 2, 3, 4, 5.1 to 5.7, 7, 8.1 to 8.7, 10.2 to 10.5, 11.1 to 11.5, 12.1 to 12.5

Reference books

	Author	Title	Publisher
1	V. Rajaraman, T. Radha Krishnan	Computer Organization and Architecture	PHI
2	Behrooz Parhami	Computer Architecture	Oxford (2007)
3	ISRD group	Computer Organization	ace series, TMH (2007)
4	William Stallings	Computer Organization and Architecture – Designing for Performance	Pearson Education (2005)
5	P.Chakraborty	Computer Architecture and Organization	Jaico Books (2008)

II Year – II Semester
Analog Communications Lab

1. Amplitude Modulation and Demodulation
2. DSB SC Modulation and Demodulation
3. SSB SC Modulation and Demodulation
4. Frequency Modulation and Demodulation
5. Pre Emphasis - De Emphasis Circuits
6. Verification of Sampling Theorem
7. PAM generation and Reconstruction
8. PWM and PPM: Generation and Reconstruction
9. Frequency Division Multiplexing
10. Design of Mixer
11. Synchronous Detector.
12. Phase Locked Loop.
13. Diode Detector Characteristics.
14. AGC Characteristics.
15. Squelch Circuit.

II Year – II Semester
Pulse and Digital Wave shaping Lab

1. Linear wave shaping (RC Integrator & RC differentiator).
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Half adder & Full adder.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.
14. Constant Current Sweep Generator using BJT