Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

Name of Program: B Tech. (Railway Engineering)

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	Credits
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTRW401		Analog Electronic Circuits	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Educational Objectives (CEOs):

The main objective of this curriculum/course is to make the students well versed with basic electronic components and circuits. The students can

1. Understand the nature and scope of modern electronics.
2. The capability to use abstractions to analyze and design simple electronic circuits.
3. An understanding of how complex devices such as semiconductor diodes and field-effect transistors are modeled and how the models are used in the design and analysis of useful circuits.
4. The capability to design and construct circuits, take measurements of circuit behavior and performance, compare with predicted circuit models and explain discrepancies.
5. The primary objective of this course is to develop an in-depth understanding of the design principles and applications of integrated analog circuits

Course Outcomes (COs):

Students who are successful in this class will be able to:

1. Understand the basic physics of carrier transport in bulk semiconductors and real device structures. 2. Understand the fundamentals of operation of the main semiconductor electronic devices.
2. Understand the basic parameters of electronic devices, their performance, and limiting factors.
3. Understand the basic principles of electronic device operation with emphasis on bipolar transistors, and unipolar microwave devices.
4. 5 applying theory and realize analog filter circuits, Understand the circuit operation of the 555 timer IC and regulator IC and identifying the faulty components within a circuit.

Syllabus

UNIT I

Semiconductor Diodes:

Theory of P-N junction, temperature dependence and break down characteristics, junction capacitances, Zener diode, Varactor diode, Tunnel diode, PIN diode, LED, Photo diode, Schottky diode, Diode

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applications: series –parallel configurations, full wave and half wave rectification, voltage multiplier circuits, diode testing.

UNIT II

Transistors:

BJT, types& configuration, working principal, characteristics, and region of operation, load line, biasing methods, Small signal analysis of transistor (low frequency) using h-parameters, thermal runaway and thermal stability.FET, MOSFET, Transistor as an amplifier, gain,bandwidth, frequency response.

UNIT III

Feedback amplifiers and Oscillators:

Feedback amplifier, negative feedback, voltage-series, voltage shunt,current series and current shunt feedback, Sinusoidal oscillators, L-C (HartleyColpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers, their efficiency and power Dissipation, Push-pull and complimentary symmetry push-pull amplifier.

UNIT IV

Wave Shaping circuits:

Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Multivibrators, Bistable, Monostable, Astable multivibrators. Clipper and clamper circuit, Differential amplifier, calculation of differential, common mode gain and CMRR using h- parameters, Darlington pair, Boot strapping technique. Cascade and cascade amplifier.

UNIT V

Operational Amplifier:

Operational amplifier basics, practical Op-amp circuits & characteristics, slew rate , bandwidth, offset voltage ,basic current, application, inverting, noninverting amplifier, summer, average, differentiator, integrator, differential amplifier, instrumentation amplifier, log and antilog amplifier, voltage to current and current to voltage converters, comparators Schmitt trigger , active filters, 555 timer and its application.

List of experiments:

1. Design & measure the frequency response of an RC coupled amplifier using discrete components.
2. Design a two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth.
3. Study the effect of voltage series, current series, voltage shunt and current shunt feedback on amplifier using discrete components.
4. Design & realize inverting, non-inverting and buffer amplifier using 741 op-amps.
5. Verify the operation of a differentiator circuit using op amp IC 741 and show that it acts as a high pass filter.
6. Verify the operation of a integrator circuit using op amp 741 and show that it acts as a low pass filter.
7. Design & Verify the operation of adder and subtractor circuit using op amp 741.
8. Plot frequency response of AC coupled amplifier using op amp 741 and study the effect of negative feedback on the bandwidth and gain of the amplifier.

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9. Study of IC 555 as astable and monostable multivibrator.
10. Design & realize using op amp 741, wein-bridge oscillator

Text books:

1. A.S. Sedra & K.C.Smith, Microelectronics Circuits, Oxford University Press (1997)
2. Robert L. Boylestad & Louis Nashelsky, Electronic Devices & Circuit Theory.

Reference books:

1. Michael Shur, *Introduction to Electronic Devices*, John Wiley & Sons Inc., 2000.
2. R. T. Howe and C. G. Sodini, *Microelectronics: An Integrated Approach*, Prentice-Hall Inc. 1997.
3. Jacob Millman, and C.C. Halkias, "Electronic devices and circuits", TMH Publications.
4. Ben G. Streetman, *Solid State Electronic Devices*, PHI, 5th Ed, 2001.

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Name of Program: B Tech. (Railway Engineering)

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	Credits
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTME401		Fluid Mechanics	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Educational Objectives (CEOs):

1. The course is designed to give fundamental knowledge of fluid, its properties and behavior under various conditions.
2. Understand the basic concept of fluid mechanics.

Course Outcomes (COs): Upon completion of this course students will be able to:

1. Understand statics, dynamics and various approaches to fluid mechanics.
2. Understand fundamentals of flow through pipes
3. Understand basics of compressible flow
4. Correlate fundamentals of fluid mechanics with various mechanical systems

UNIT I

FLOW AND FLUID PROPERTIES:

Viscosity, relationship between stress and strain-rate for Newtonian fluids, incompressible and compressible flows, differences between laminar and turbulent flows. Hydrostatics forces: Buoyancy and floatation, manometry, forces on submerged and floating bodies, stability conditions.

UNIT II

KINEMATICS:

Types of fluid flow, rate of flow or discharge continuity equation, velocity and acceleration, velocity potential function and stream function, types of motion, vortex flow.

IDEAL FLOW:

Uniform flow, source flow, sink flow, free vortex flow. Integral analysis: Control volume analysis for mass, momentum and energy.

UNIT III

DIFFERENTIAL ANALYSIS:

Differential equations of mass and momentum for incompressible flows: inviscid - Euler equation and viscous flows - Navier-Stokes equations, Bernoulli's equation from eular's equation and assumptions, concept of fluid rotation, vorticity, stream function, Exact solutions of Navier-Stokes equation for

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Coquette Flow and Poiseuille flow. orifices and mouthpieces: classifications of and flow through orifice, hydraulic coefficients, experimental determination of hydraulic coefficients, classification and flow through convergent and divergent mouthpiece.

UNIT IV

DIMENSIONAL ANALYSIS:

Introduction, secondary or derived quantities, methods of dimensional analysis, model analysis, similitudes-types of similarities, dimensionless numbers, models law and Concept of geometric, kinematic and dynamic similarity, some common non-dimensional parameters and their physical significance: Reynolds number, Froude number and Mach number. **Internal Flows:** Fully developed pipe flow, various losses in pipe flow, and empirical relations for laminar and turbulent flows: friction factor and Darcy-Weisbach relation.

UNIT V

PRANDTL BOUNDARY LAYER EQUATIONS:

Concept and assumptions, qualitative idea of boundary layer and separation, streamlined and bluff bodies, drag and lift forces. Flow measurements: Basic ideas of flow measurement using venturimeter, pitot-static tube and orifice plate.

References:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, S.K.Kataria & Sons
2. Fluid Mechanics and Hydraulic Machines by R.K. Bansal, Laxmi Publications
3. Fluid Mechanics and Hydraulic Machines by R.K. Rajput, S.Chand & Co.
4. Fluid Mechanics by Frank .M. White, McGraw Hill Publishing Company Ltd.
5. Fundamentals of Fluid Mechanics by Munson, Wiley India Pvt. Ltd
6. Fluid Mechanics by A. K. Mohanty, PHI Learning Pvt. Ltd.
7. Laboratory Manual Hydraulics and Hydraulic Machines by R V Raikar

List of laboratory experiments:

1. To understand pressure measurement procedure and related instruments/devices.
2. To study metacentric height of floating body.
3. Verification of Bernoulli's theorem.
4. To study the velocity of flow using Pitot tube.
5. To determine the Coefficient of discharge through different flow meters. (Any two out of Orifice meter, Venturi meter and Nozzle meter.)
6. To determine the different types of flow Patterns by Reynolds's experiment.
7. To study the Friction factor for the different pipes.
8. To study the loss coefficients for different pipe fittings.

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			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTEE404		Electromagnetic Field Theory	60	20	20	-	-	3	0	-	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Educational Objectives (CEOs):
To lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles. To provide the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields.

Course Outcomes (COs):
After the successful completion of this course students will be able to:

1. Use different coordinate system and apply them to solve real time multidisciplinary issues
2. Apply vector calculus to understand the behavior of static electric fields in standard configurations
3. Apply vector calculus to understand the behavior of static magnetic fields in standard configurations
4. Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems
5. Describe and analyze electromagnetic wave propagation in free-space

Syllabus

UNIT I
Electrostatics – I
Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields –Gradient, Divergence, Curl – theorems and applications - Coulomb's Law – Electric field intensity – Field due to discrete and continuous charges – Gauss's law and applications.

UNIT II
Electrostatics – II

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Electric potential – Electric field and equipotential plots, Uniform and Non-Uniform field, Utilization factor – Electric field in free space, conductors, dielectrics - Dielectric polarization - Dielectric strength - Electric field in multiple dielectrics – Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.

UNIT III

Magnetostatics

Lorentz force, magnetic field intensity (H) – Biot–Savart's Law - Ampere's Circuit Law – H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization, Magnetic field in multiple media – Boundary conditions, scalar and vector potential, Poisson's Equation, Magnetic force, Torque, Inductance, Energy density, Applications.

UNIT IV

Electrodynamic Fields

Magnetic Circuits - Faraday's law – Transformer and motional EMF – Displacement current - Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory – Applications.

UNIT V

Electromagnetic Waves

Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance, propagation constant – Waves in free space, lossy and lossless dielectrics, conductors- skin depth - Poynting vector – Plane wave reflection and refraction – Standing Wave ratio– Transmission lines – Line equations – transmission line parameters

TEXT BOOKS:

1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 4 th Edition ,Oxford University Press Inc.First India edition, 2009.
2. Ashutosh Pramanik, 'Electromagnetism – Theory and Applications', PHI Learning Private Limited, New Delhi, Second Edition-2009.
3. K.A. Gangadhar, P.M. Ramanthan ' Electromagnetic Field Theory (including Antennaes and wave propagation', 16th Edition, Khanna Publications, 2007.

REFERENCE BOOKS:

1. Joseph. A.Edminister, 'Schaum's Outline of Electromagnetics, Third Edition (Schaum's Outline Series), Tata McGraw Hill, 2010
2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', Tata McGraw Hill 8th Revised edition, 2011.
3. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.
4. Bhag Singh Guru and Hüseyin R. Hiziroglu "Electromagnetic field theory Fundamentals", Cambridge University Press; Second Revised Edition, 2009.
5. Pramanik, Electromagnetism, Theory and Applications, Prentice Hall of India.

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			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTME402		TOM	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Educational Objectives (CEOs):

1. To familiarize students with basic types of mechanisms, joints and degrees of freedom to perform position, velocity and acceleration analysis using graphical and analytical methods.
2. To provide students an understanding of different types of mechanisms and to teach the basics of synthesis of simple mechanisms and also teach students the kinematic analysis of cam-follower motion.
3. To provide basic concept gyroscope, which allows the calculation of orientation and rotation; designers have incorporated them into modern technology. Select Suitable Drives and appropriate power Transmission Mechanisms for a particular application.

Course Outcome (COs):

1. Students will be able to define systematically design and develop mechanisms to perform a specified task and demonstrate an understanding of the concepts of various mechanisms and pairs.
2. Students will be able to do the velocity and acceleration analysis of simple mechanisms.
3. Students will be able to explain effectively present written, oral, and graphical solutions to design problems & develop ability to come up with innovative ideas and design a layout of cam for specified motion.
4. Students will be able demonstrate an understanding of principle of gears.
5. Students will be able to synthesis simple gyroscopic forces and couple, and gyroscopic effect in airplanes, ship and vehicle.

Syllabus

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UNIT I

Mechanisms and Machines:

Mechanism, machine, plane and space mechanism, kinematic pairs, kinematic chains their classification, degrees of freedom, Grubler's criterion, kinematics inversions four bar mechanism and slider crank mechanism, equivalent linkages, pantograph, straight line motion mechanism, Devis and Ackermann's steering mechanism, Hooke;s joint.

UNIT – II

Motion:

kinematics of Plane motion, Absolute & Relative motion, Displacement, Velocity and Acceleration Analysis by Graphical & Analytical methods, Velocity image, Velocity of rubbing, Kennedy's Theorem, Acceleration image, Acceleration polygon, Coriolis acceleration component, Klein's construction, Velocity and Acceleration Analysis using complex Raven's methods..

UNIT – III

Cams and Followers:

Types of cams and followers - Definitions related cam profile - Derivatives of follower motion – High speed cams – Undercutting - Graphical disk cam profile design – Simple harmonic motion, Constant acceleration and deceleration, constant velocity, Cycloidal motion for knife edge and roller (in-line and offset), flat faced and oscillating followers -Tangent cam.

Lifting Machine: Introduction, Mechanical Advantage, Velocity Ratio, System of pulleys.

UNIT – IV

Gears and Gear Train:

Spur gear terminology and definitions - Law of toothed and involute gearing -Interchangeable gears - Gear tooth action - Interference and undercutting - Basics of nonstandard gear teeth Helical – Bevel – Worm - Rack and pinion gears, cycloidal tooth properties - Comparison of involute and cycloidal tooth forms. Gear trains – Speed ratio, train value – Parallel axis gear trains – Epicyclic Gear Trains – Sun and Planet Gear -Differentials – Automobile gear box.

UNIT-V

Belt Rope & Chain Drive:

Types of Belts, Velocity ratio of a belt drive, Slip in belts, Length of
open belt and crossed belt, Limiting ratio of belt-Tensions, Power transmitted by a belt, Centrifugal tension, Maximum tension in a belt, Condition for maximum power transmitted, Initial tension in a belt, Creep in belt, Applications of V-Belt, Rope and Chain drives.

Gyroscope:

Gyroscopic Action in Machines, Angular Velocity and Acceleration, Gyroscopic
torque/ couple, Gyroscopic effect on Naval Ships, Stability of Two and Four Wheel Vehicles, Rigid disc at an angle fixed to a rotating shaft.

Text Books:

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1. S.S. Rattan, (2009), "Theory of Machines", Third Edition, Tata McGraw-Hill.
2. Ambekar A.G, (2007) "Mechanism and Machine Theory" Prentice Hall of India, New Delhi.
3. Thomas Bevan; Theory of Machines; Pearson Education
4. Rattan SS; Theory of machines; MC Graw Hills

Reference Books:

1. Ambekar AG; Mechanism and Machine Theory; PHI. Eastern Economy Edition 2015
2. Uicker & Shigley, Theory of machines & Mechanism Second Edition Oxford University Press
3. Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi
4. Rao J S and Dukkipati; Mechanism and Machine Theory; New Age Delhi.

List of Experiments:

1. To synthesize and demonstrate the inversion of four bar mechanism through animation and model.
2. To synthesize and demonstrate the inversion of single slider and double slider crank mechanism through animation and model.
3. To construct and demonstrate the steering mechanism based on Davis & Ackerman's steering mechanisms principles.
4. To Find out velocity & acceleration of slider crank mechanism by Klin"s Construction.
5. To draw the cam profile.
6. To draw Involute profile of a gear by generating method.
7. To find out velocity ratio of various gear trains.
8. To study working of sun and planet epicycle gear train mechanism using models
9. To study various types of belt drives & find out the velocity ratio of the drive.
10. To finds out gyroscopic couple.

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			Theory			Practical		L	T	P	Credits
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
		Applied									
BTMA301	Compulsory	Mathematics-III	60	20	20	-	-	3	1	0	4

Course Objective:
To introduce the students with the Fundamentals of the Calculus of the Complex Variable, Random Variable and Fourier analysis.

Course Outcomes: After the successful completion of this course students will be able to

1. understand and apply the basics of the Calculus of the Complex variables.
2. know the fundamentals of the Probability Theory and Random Process.
3. apply the concepts of the Fourier Analysis
4. know the techniques of the Fourier Transform.
5. find the solution of the PDE.

Syllabus

UNIT I

Complex Analysis

Complex numbers, geometric representation, powers and roots of complex numbers. Functions of a complex variable: Limit, Continuity, Differentiability, Analytic functions, Cauchy-Riemann equations, Harmonic functions, Harmonic conjugates. Elementary Analytic functions (polynomials, exponential function, trigonometric functions), Complex integration, Cauchy's integral theorem, Cauchy's integral formula. Taylor series and Laurent series. Zeros, Singularities and its classifications, Residues, Residue theorem and its applications.

UNIT II

Probability Theory and Random Process

Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains, Poisson process, Correlation and Regression; Expectation and Variance

UNIT III

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Fourier series

Fourier Integral, Fourier series of 2p periodic functions, Fourier series of odd and even functions, Half-range series, Convergence of Fourier series, Gibb's phenomenon, Differentiation and Integration of Fourier series, Complex form of Fourier Series.

UNIT IV

Fourier Transformation

Fourier Integral Theorem, Fourier Transforms, Properties of Fourier Transform, Convolution and its physical interpretation, Statement of Fubini's theorem, Convolution theorems, Inversion theorem

UNIT V

Partial Differential Equations

Introduction to PDEs, basic concepts, Linear and non-linear first order PDE, Higher order linear homogeneous PDE, Separation of variable and its application to the one dimensional wave and heat equation.

Text Books:

1. R. V. Churchill and J. W. Brown, Complex Variables and Applications, 5th Edition, McGraw-Hill, 1990.
2. K. Sankara Rao, Introduction to Partial Differential Equations, 2nd Edition, 2005.
3. G. R. Grimmett and D. R. Stirzaker, Probability and Random Processes, Oxford University Press, 2001.
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2000.
5. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Edition, Wiley, 1968.
6. K. S. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications, Prentice Hall of India, 1998.
7. A. Papoulis and S. Unnikrishna Pillai, Probabilities, Random Variables and Stochastic Processes, 4th Edition, Tata McGraw-Hill, 2002.
8. S.M. Ross, Stochastic Processes, 2nd Edition, Wiley, 1996.
9. J. Medhi, Stochastic Processes, New Age International, 1994.
10. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

Reference Books:

1. J. H. Mathews and R. W. Howell, Complex Analysis for Mathematics and Engineering, 3rd Edition, Narosa, 1998.
2. I. N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, 1957.
3. E. Kreyszig, Advanced Engineering Mathematics, 5th / 8th Edition, Wiley Eastern / John Wiley, 1983/1999

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BTEE304		Signals & Systems	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Objectives:

The objective of this course is to have an introduction to approaches of signals & systems analysis with an increased emphasis on the frequency response and Analysis of system with continuous signal and discrete time signal. To enable the students to understand the fundamentals of Signals, their Time & Frequency characteristics.

Course Outcomes: Upon completion of this course students will be able to

1. Classify both continuous and discrete time signals and systems.
2. Analyze continuous signals in complex plain.
3. Understand Laplace transform
4. Analyze Z transform
5. Understand the random signals and systems.

Syllabus

UNIT-I

Introduction to signal and systems: Continuous and discrete time signals: Classification of Signals Periodic aperiodic even odd energy and power signals Deterministic and random signals complex exponential and sinusoidal signals periodicity unit impulse unit step Transformation of independent variable of signals: time scaling, time shifting. System properties: Linearity, Causality, time invariance and stability, Dirichlet's conditions, Determination of Fourier series coefficients of signal.

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UNIT-II

Signal Transformation: Fourier transformation of continuous and discrete time signals and their properties, Laplace transformation-analysis with examples and properties. Parseval's theorem; Convolution in time (both discrete and continuous) and frequency domains with magnitude and phase response of LTI systems

UNIT-III

The Laplace Transform. The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the Laplace Transform. Analysis and Characterization of LTI Systems Using the Laplace Transform. System Function Algebra and Block Diagram Representations. The Unilateral Laplace Transform.

UNIT-IV

Z-Transforms: Basic principles of z-transform, z-transform definition, Relationship between z-transform and Fourier transform, region of convergence properties of ROC, Properties of z-transform, Poles and Zeros, inverse z-transform using Contour integration, Residue Theorem, Power Series expansion and Partial fraction expansion

UNIT-V

Random Signals & Systems: Definitions, distribution & density functions, mean values & moments, function of two random variables, concepts of correlation, random processes, spectral densities, response of LTI systems to random inputs.

Text books:

1. Signals and Systems 2/E, 1996 Alan V. Oppenheim, Alan S. Willsky, with S. Hamid Prentice Hall .
2. Digital signal processing –Principles, algorithms and applications 3rd Edition, 1996 J. G. Proakis, D. G. Manolakis PHI

Reference books:

1. Outline of Signals and Systems 1st , 1995 Hwei Hsu,Schaum's McGraw-Hill
2. Signals & Systems 2nd Edition, 2002 Simon Haykin and Van Veen Wiley
3. Signals & Systems Analysis Using Transformation Methods & MAT Lab 2003 Robert TMH
4. Signals, Systems and Transforms 3rd Edition, 2004. C. L. Philips, J.M.Parr and Eve A.Riskin Pearson education
5. Signals & Systems 2001. I. J. Nagrath, S.N.Sharan, R.Ranjan, S.Kumar

List of Experiments:

1. Introduction to MATLAB.
2. Write a program to generate continuous time signals (i) Sine wave (ii) Cosine Wave (iii) Square wave (iv) Triangular wave
3. Write a program to generate the discrete sequences (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.
4. Find the Fourier transform of a square pulse .Plot its amplitude and phase spectrum.

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5. Write a program to convolve two discrete time sequences. Plot all the sequences. Verify the result by analytical calculation.
6. Generate a discrete time sequence by sampling a continuous time signal.
7. Write a program to find the autocorrelation and cross correlation of sequences.
8. Write a program to generate a random sinusoidal signal and plot four possible realizations of the random signal.
9. To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
10. To develop program for computing Z-transform and Inverse Z-transform.

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