Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) CIVIL ENGINEERING
MA 21006:MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Formation of partial differential equations	02
2	Partial differential equation of first order and first degree, i.e., Pp+Qq = R	02
3	Linear homogeneous partial differential equation of nth order with constant coefficient	02
4	Separation of variables, Applications to simple problem	02
	UNIT 2	
5	Random Variables of Discrete and Continuous type	01
6	Distribution Function and Density Function	02
7	Functions of two random variables, Bivariate probability with conditional and marginal probability distribution	03
8	General concepts and definition of Random Processes, Classification of Random Process and some problems	02
	UNIT 3	
9	Brief idea of sampling, t, F and χ^2 distributions and their applications	02
10	ANOVA	02
11	Statistical Quality Control and Control Charts	02
12	Sampling inspection, Acceptance sampling, Producer's and Consumer's risk, O.C. curve	02
	UNIT 4	
13	Difference table, Operators E and Δ	02
14	Newton's forward and backward interpolation formula	02
15	Lagrange's interpolation formula, Differentiation and Integration	02
16	Difference Equations with constant coefficients	02
	UNIT 5	
17	Solution of Algebraic and Transcendental equations using Bisection method, Regula-Falsi method and Newton Raphson method	03
18	Numerical Solution of simultaneous equations: Direct Methods – Gauss Elimination method, Gauss Jordon method	03
19	Iterative methods: Jacobi's method, Gauss Seidel method	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) IPE & Mechanical
MA 23003/ 26004:MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Formation of partial differential equations	02
2	Partial differential equation of first order and first degree, i.e., Pp+Qq = R	02
3	Linear homogeneous partial differential equation of nth order with constant coefficient	02
4	Separation of variables, Applications to simple problem	02
	UNIT 2	
5	Expansion of functions in a Fourier series	02
6	Half range series Sine and Cosine series and change of interval	02
7	Fourier Integral	01
8	Fourier transforms: Sine and Cosine transforms	02
9	Fourier transforms application to solution of Linear Partial Differential Equations	01
	UNIT 3	
10	Definition of Laplace Transform, Laplace Transform of elementary and periodic functions	02
11	properties of Laplace Transform including Laplace Transform of derivatives	01
12	Inverse Laplace Transform and its properties, Convolution Theorem	02
13	Application of Laplace Transform to ordinary differential equations with constant and variable coefficients, Simultaneous differential equations	03
	UNIT 4	
14	Difference table, Operators E and Δ	02
15	Newton's forward and backward interpolation formula	02
16	Lagrange's interpolation formula, Numerical Differentiation and Integration(Trapezoidal rule, Simpson's 1/3 rule ,Simpson's 3/8 rule and Weddle's rule)	04
	UNIT 5	
17	Brief idea of sampling, t, F and χ^2 distributions and their applications	02
18	ANOVA	02
19	Statistical Quality Control and Control Charts	02
20	Sampling inspection, Acceptance sampling, Producer's and Consumer's risk, O.C. curve	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) ELECTRICAL/ELEX &TC/ ELEX &INSTRUMENTATION
MA 22014 / MA 25014 / MA 27014/MA 2T14/MA 2E24: MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Formation of Partial Differential Equations	02
2	Partial Differential Equations of first order and first degree i.e., Pp+Qq=R	02
3	Linear Homogeneous Partial Differential Equations of nth order with constant coefficient.	02
4	Separation of Variables, Application to Vibration of String and Transmission Line Equation	02
	UNIT 2	
5	Fourier Series:Definition and Derivations	01
6	Fourier Series of Odd and even functions, Half-Range Series, Change of Scale	02
7	Fourier Integral, Numerical Harmonic Analysis., Fourier Transforms, Sine and Cosine Transform	03
8	Applications of Fourier Transforms to solution of Partial Differential Equations.	02
	UNIT 3	
9	Laplace Transform :Definition, Laplace Transform of elementary and periodic functions	02
10	Properties of Laplace Transform and transforms of derivatives	02
11	Inverse Laplace Transform and its properties, Convolution Theorem	02
12	Application of Laplace Transform to solution for linear differential equations with constant and variable coefficients, Simultaneous differential equations.	02
	UNIT 4	
13	Calculus of Finite Differences: Difference table, Operators E and Δ	02
14	Newton's forward and backward interpolation formula, Lagrange's interpolation formula	02
15	Numerical differentiation and integration	02
16	Difference equations with constant coefficients	02
	UNIT 5	
17	Numerical Methods:Solution of Algebraic and Transcendental equations : Bisection method , Regula-falsi method and Newton Raphson method	02
18	Numerical Solution of simultaneous equations: Gauss Elimination method , Gauss Seidel method	02
19	Numerical solution of ordinary differential equations: Taylor's, Picard's methods	02
20	Runge- Kutta method	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) Computer Science Engineering
MA 24003:MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Formation of partial differential equations	02
2	Partial differential equation of first order and first degree, i.e., Pp+Qq = R	02
3	Linear homogeneous partial differential equation of nth order with constant coefficient	02
4	Separation of variables, Applications to simple problem	02
	UNIT 2	
5	Expansion of functions in a Fourier series	02
6	Half range series Sine and Cosine series and change of interval	02
7	Fourier Integral	01
8	Fourier transforms: Sine and Cosine transforms	02
9	Fourier transforms application to solution of Linear Partial Differential Equations	01
	UNIT 3	
10	Definition of Laplace Transform, Laplace Transform of elementary and periodic functions	02
11	properties of Laplace Transform including Laplace Transform of derivatives	01
12	Inverse Laplace Transform and its properties, Convolution Theorem	02
13	Application of Laplace Transform to ordinary differential equations with constant and variable coefficients, Simultaneous differential equations	03
	UNIT 4	
14	Introduction to Number Theory, Basic properties of Number Theory	02
15	Divisibility Theory, Theorems based on Divisibility Theory	02
16	Congruences, Basic properties of Congruences	02
17	Theorems based on Congruences, Applications of Congruences	02
	UNIT 5	
18	Simplex Method for Maximization and Minimization	02
19	Revised Simplex Method and Duality Theorem	02
20	Non-Linear Optimization, Kuhn-Tucker condition	02
21	Fibonacci Search, Quadratic Interpolation	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) IT Engineering
MA 28005:MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Formation of partial differential equations	02
2	Partial differential equation of first order and first degree, i.e., $Pp+Qq = R$	02
3	Linear homogeneous partial differential equation of nth order with constant coefficient	02
4	Separation of variables, Applications to simple problem	02
	UNIT 2	
5	Expansion of functions in a Fourier series	02
6	Half range series Sine and Cosine series and change of interval	02
7	Fourier Integral	01
8	Fourier transforms: Sine and Cosine transforms	02
9	Fourier transforms application to solution of Linear Partial Differential Equations	01
	UNIT 3	
10	Definition of Laplace Transform, Laplace Transform of elementary and periodic functions	02
11	properties of Laplace Transform including Laplace Transform of derivatives	01
12	Inverse Laplace Transform and its properties, Convolution Theorem	02
13	Application of Laplace Transform to ordinary differential equations with constant and variable coefficients, Simultaneous differential equations	03
	UNIT 4	
14	Graph Theory: Definitions and basic properties, Isomorphism, Euler Circuits and Hamiltonian cycle	02
15	Digraphs, Trees- properties, spanning trees, Planer graphs	02
16	Shortest path problem, Dijkstra algorithm, Shortest spanning tree-Kruskal and prim algorithm	02
17	Flow augmented paths-Ford-Fulkerson algorithm, cut sets. Max. Flow min. cut Method theorem	02
	UNIT 5	
18	Simplex Method for Maximization and Minimization	02
19	Revised Simplex Method and Duality Theorem	02
20	Non-Linear Optimization, Kuhn-Tucker condition	02
21	Fibonacci Search, Quadratic Interpolation	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) BIO-MEDICAL ENGINEERING
MA 29024:MATHEMATICS – III

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Vector Spaces and Subspaces	02
2	Linear Independence, Basis and Dimension, Four Fundamental Subspaces	02
3	Orthogonal Vector and Subspaces	02
4	Orthogonal Bases and Gram-Schmidt	02
	UNIT 2	
5	Calculus of Finite Differences: Difference operator, Shift operator	02
6	Newton's forward & backward interpolation, Lagrange's Interpolation	02
7	Numerical Differentiation and Integration	02
8	Difference equations	02
	UNIT 3	
9	Formation of partial differential equations	02
10	Partial differential equation of first order and first degree, i.e., $Pp+Qq = R$	02
11	Linear homogeneous partial differential equation of nth order with constant coefficient	02
12	Separation of variables, Applications to simple problem	02
	UNIT 4	
13	Fourier Analysis : Euler's formula, Drichlet's condition, Function having point of discontinuity, change of intervals	02
14	Fourier series of Odd and Even functions, Half-Range series	01
15	Fourier integrals, Fourier sine and Cosine integrals, Complex form of Fourier integral	03
16	Fourier transform and its application	02
	UNIT 5	
17	Laplace Transform (LT), Laplace Transform of elementary and periodic functions	02
18	Properties of Laplace Transform	02
19	Inverse Laplace transform, Convolution Theorem	02
20	Application of Laplace Transform to the solution of Ordinary Differential equations	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) ELECTRICAL/ELEX & TELECOMMUNICATION/ ELEX & INSTRUMENTATION
MA 22563 / MA 25563 / MA 27563/MA 2E74: Mathematics-IV

Total No. of Units: 5   Total No. of Lectures:40

<u>LECTURE PLAN</u>

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Functions of Complex Variables: Analytic function, Cauchy-Riemann equations and Harmonic functions: Conjugate functions and their applications	02
2	Complex integrals:Cauchy's integral theorem and integral formula	02
3	Singularities, poles residues, residue theorem, Contour integration for simple cases	02
4	conformal mapping and its application to two-dimensional problems in electric field	02
	UNIT 2	
5	Modern definition of probability and Random variables	02
6	Distribution function and Density Function	02
7	Random Variables of Discrete and Continuous type, Functions of two random variables	02
8	Bivariate probability with conditional and marginal probability distribution	02
	UNIT 3	
9	General concepts and definition of stochastic processes	02
10	Mean, Auto-correlation and auto-covariance, Classification of Stochastic Process and some problems	02
11	Probability vectors, Stochastic Matrix, Fixed Point of a Matrix	02
12	Definition of Markov Chain, Transition matrix and Graph, some theorems and applications	02
	UNIT 4	
13	Basic concepts of reliability, Failure law and Bath Tub Curve	02
14	Evaluation of Reliability of a component from Test Data	02
15	System Reliability, Components in Series and parallel	02
16	Redundancy, Non-Series Parallel System	02
	UNIT 5	
17	Graph Theory: Definitions and basic properties	02
18	Isomorphism, Euler Circuit and Hamiltonian cycle	02
19	Digraphs. Trees- properties, spanning trees	02
20	Planer graphs,Shortest path problem, Dijkstra algorithm, spanning tree-Kruskal and Prim algorithm	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) Computer Engineering
MA 24554: MATHEMATICS-IV

Total No. of Units: 5   Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Numerical Analysis and Difference Equation : Finite Differences Operators	02
2	Interpolation Formulae with equal and unequal Intervals	02
3	Numerical Differentiation and Integration	02
4	Difference Equations : Formation of Difference Equations, Homogeneous and Non-Homogeneous Difference Equations with constant coefficient .	02
	UNIT 2	
5	Numerical Solutions of Algebraic and Transcendental Equations : Bisection Method , Regula-falsi Method and Newton-Raphson Method	02
6	Numerical Solution of Simultaneous Equations : Gauss Elimination Method, and Gauss-Seidal Iterative Method	02
7	Numerical Solution of Ordinary Differential Equations : Taylor's Series, Picard's Successive Approximation Method	02
8	Runge-Kutta Method, Predictor Corrector Method : Milne's Method	02
	UNIT 3	
9	Stochastic Process: Modern Definition of Probability, Random variables,	02
10	Distribution Function and Density Function,	02
11	Concept of Stochastic Process, Classification of Stochastic Process,	02
12	Mean, Auto Correlation and Covariance	02
	UNIT 4	
13	Markov Chain: Probability Vector, Stochastic Matrix	02
14	Fixed Point of a Matrix, and Definition of Markov Chain	02
15	Transition Matrix	01
16	Some Theorems and problems	03
	UNIT 5	
17	Reliability: Basic Concepts, Failure law, Bath Tub Curve	02
18	Evaluation of Reliability of a component from Test Data, System Reliability	02
19	Components in Series and parallel, Redundancy, Non-Series Parallel System	02
20	A brief idea of Software Reliability - Markovian approach for Reliability Evaluation.	02

Shri G.S Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II Year Mechanical Engg.
MA 26555: MATHEMATICS- IV

Total No. of Units: 5   Total No. of Lectures: 40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1.	Special Functions: Method of Frobenius series solution for Bessel	02
2.	Method of Frobenius series solution for Legendre's Differential Equations	02
3.	Recurrence relation	02
	Generating functions and Orthogonality of Bessel's function and Legendre's function	02
	UNIT 2	
4.	Vector Calculus: Gradient, Divergence and Curl	03
5.	Vector Identities, Directional derivative, line, surface and volume integrals,	03
6.	Applications to Gauss, Stokes and Green's theorem	02
	UNIT 3	
7.	Functions of Complex Variables-I ,Analytic Functions, Cauchy-Continuity, Analytic Functions.	03
8.	Cauchy Riemann equations in Cartesian and Polar Coordinates, Harmonic and Conjugate Harmonic functions.	02
9.	Complex Integration – Cauchy's Integral Theorem and Cauchy Integral Formula.	03
	UNIT 4	
10.	Functions of Complex Variables-II: Taylor's series (Theorem), Laurent Series (Theorem),	03
11.	Zeros and poles, Residue Theorem, Evaluation of simple Real Integrals.	02
12.	Conformal Mapping-Mapping of Elementary functions $w = z^n$, z^2, e^2, sinz. Bilinear Transformations.	03
	UNIT 5	
13.	Numerical solution of linear and non-linear algebraic equations: Bisection (or Bolzano) method, method of false position, Newton Raphson method	02
14.	Solution of Simultaneous algebraic equations: Direct method- Gauss Elimination method, Gauss Jordan method	02
15.	Iterative method-Jacobi's method, Gauss Seidal method	02
16.	Numerical Solution of Ordinary Differential Equations: Taylor's Method, Picard's Method and Runge-Kutta Method.	02

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. II YEAR (4YDC) BIO-MEDICAL ENGINEERING
MA 29501: MATHEMATICS – IV

Total No. of Units: 5　　　　　　　　　　Total No. of Lectures:40

LECTURE PLAN

S.No.	Topic	No. of Lectures
	UNIT 1	
1	Modelling of Biological Systems through Ordinary Differential Equations: Growth and Decay, Dynamics of Tumour Growth	03
2	Radioactivity and Carbon Data, Temperature Rate of Change	03
3	Biological Growth, A problem in Epidemiology, Detection of Diabetes	02
	UNIT 2	
4	Stochastic Process: Modern Definition of Probability, Random Experiments, Sample Space	02
5	Random variables, Distribution Function and Density Function	03
6	Concept of stochastic process, Mean, Auto Correlation and Covariance, Classification of Stochastic Process	03
	UNIT 3	
7	Probability Vector, Stochastic Matrix, Fixed Point of a Matrix	03
8	Definition of Markov Chain, Transition Matrix, Some Theorems and problems	03
9	Queuing Theory, Birth and Death Process	02
	UNIT 4	
10	Reliability: Basic Concepts, Failure law, Bath Tub Curve	03
11	Evaluation of Reliability of a component from test data, System Reliability, Components in Series and Parallel	03
12	Redundancy, Non-Series Parallel system, A brief idea of Software Reliability	02
	UNIT 5	
13	Graph Theory : Definitions and basic properties, Isomorphism	02
14	Euler Circuits and Hamiltonian cycle, Digraphs	02
15	Trees- properties, Spanning Trees, Planer graphs	02
16	Shortest Path Problem, Dijkstra Algorithm, Spanning Tree-Kruskal and Prim Algorithm	02