B.Tech. EE IOT 5th sem

Lesson Plan

Lecture No.	Date of Delivery	Principles of Numerical Methods
1-4		Method of Least Squares -Fitting a straight line - Fitting a parabola - Fitting an exponential curve - Fitting a curve of the form y=ax+b
5-9		Calculation of the sum of the squares of the residuals.- Newton-Raphson method Gauss Elimination method - Gauss Jacobi method - Gauss-Seidel method.
10-15		Finite Differences and Interpolation: First and higher order differences - Forward differences and backward differences and Central Differences - Differences of a polynomial -Properties of operators Factorial polynomials Shifting operator E- Relations between the operators. Interpolation
16-19		Newton-Gregory Forward and Backward Interpolation formulae Divided differences Newton's Divided difference formula Lagrange's Interpolation formula Inverse interpolation.
20-25		Numerical Differentiation and Integration: Numerical Differentiation and Integration: Newton's forward and backward differences formulae to compute first and higher order derivatives - The Trapezoidal rule - Simpson's one third rule and three eighth rule.
26-31		Numerical Solutions of Ordinary Differential Equations: Solution by Taylor's series Euler's method Improved and modified Euler method Runge-Kutta methods of fourth order (No proof) - Milne's Method - Adam's Bashforth method.
32-40		Numerical Solutions of Partial Differential Equations: Classification of Partial differential equations of the second order - Difference quotients. Laplace's equation and its solution by Liebmann's process - Solution of Poisson's equation - Solutions of Parabolic and Hyperbolic equations.

B.Sc. (H) PHYSICS SEMESTER III

Lesson Plan

Lecture No.	Date of Delivery	Differential Equations
1-4		First order ordinary differential equations: Basic concepts and ideas, Exact differential equations, Integrating factors,
5-9		Bernoulli equations, Orthogonal trajectories of curves, Existence and uniqueness of solutions
10-15		Second order differential equations: Homogenous linear equations of second order, Second order homogenous equations with constant coefficients,
16-19		Differential operator, Euler-Cauchy equation. Existence and uniqueness theory, Wronskian Non-homogenous ordinary differential equations, Solution by undetermined coefficients, Solution by variation of parameters
20-25		Higher order homogenous equations with constant coefficients, solution of homogeneous system of differential equations. Partial differential equations: Basic Concepts and definitions, Mathematical problems, First order equations: Classification, Construction,
26-31		Geometrical interpretation, Method of characteristics, General solutions of first order partial differential equations, Canonical forms and method of separation of variables for first order partial differential equations,
32-40		Classification of second order partial differential equations, Reduction to canonical forms, Second order partial differential equations with constant coefficients, General solutions.

B.Tech. CE Hindi 3rd sem

Lesson Plan

Lecture No.	Date of Delivery	Differential Equations
1-4		First order ordinary differential equations: Basic concepts and ideas, Exact differential equations, Integrating factors,
5-9		Bernoulli equations, Orthogonal trajectories of curves, Existence and uniqueness of solutions
10-15		Second order differential equations: Homogenous linear equations of second order, Second order homogenous equations with constant coefficients,
16-19		Differential operator, Euler-Cauchy equation. Existence and uniqueness theory, Wronskian Non-homogenous ordinary differential equations, Solution by undetermined coefficients, Solution by variation of parameters
20-25		Higher order homogenous equations with constant coefficients, solution of homogeneous system of differential equations. Partial differential equations: Basic Concepts and definitions, Mathematical problems, First order equations: Classification, Construction,
26-31		Geometrical interpretation, Method of characteristics, General solutions of first order partial differential equations, Canonical forms and method of separation of variables for first order partial differential equations,
32-40		Classification of second order partial differential equations, Reduction to canonical forms, Second order partial differential equations with constant coefficients, General solutions.

B.Tech. CE Hindi 1st sem

Lesson Plan

Lecture No.	Date of Delivery	Differential Equations
1-4		Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties;
5-9		Applications of definite integrals to evaluate surface areas and volumes of revolutions. Rolle‟s Theorem, Mean value theorems, Taylor‟s and Maclaurin theorems with remainders;
10-15		indeterminate forms and L'Hospital's rule; Maxima and minima. Matrices, vectors: addition and scalar multiplication, matrix multiplication;
16-19		Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.
20-25		Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank- nullity theorem,
26-31		Composition of linear maps, Matrix associated with a linear map. Eigenvalues, eigenvectors,
32-40		symmetric, skew-symmetric, and orthogonal Matrices, eigenbases. Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

M.Sc. Chemistry 1st sem

Lesson Plan

Lecture No.	Date of Delivery	Differential Equations
1-4		Vectors: Examples of scalar and vectors, definitions of vectors in two, three spaces, representation and simple properties of vectors, addition and subtraction of vectors, vector addition by the method of triangles, resolution of vectors into rectangular components, addition of vectors by components, multiplication and differentiation of vectors. Scalar product of vectors, vector product
5-9		Matrices and Determinants: Definition of matrix, types of matrices, viz, row matris, column. matrix, null matrix, square matrix, diagonal matrix, addition, subtraction and multiplication hy number, matrix multiplication. Transpose and adjoint of matrix, elementary transformation, representation and applications (without development of theory) to solution of linear equations. Definition, properties and evaluation of determinants.
10-15		Logarithm: definition of logarithm, common logarithms, natural logarithms, laws of logarithm, expressing the logarithm of a mumber, simplifying expressions using laws of logarithm, change of base, calculating antilogs.
16-19		Graphical Representation of Equations: Rectangular coordinates, straight lines, slope and intercept of the equation, slope and point point equation, two point equation, parallel lines, points of intersection, distance between two points, change of origin. Curve fitting for least squares method.
20-25		Differential Calculus: Theory, rules of differentiation, powers, added and subtracted functions, constants, products, quotients, functions of a function, logarithmic differentiation, and parametric functions. Algebraic simplification, differentiation of implicit functions, graphical significance of differentiation, rate of change of slope, successive differentiation.
26-31		Partial Differentiation: The fundamental theorem, geometrical significance of partial differentiation, special cases of fundamental theorem, successive partial differentiation. Integral transforms (Fourier and Laplace). Reduction formulae. Methods of Lagrangian multipliers, Sterling's approximation, probability and errors.
32-40		Integral Calculus: Integral theory, rules of integration between limits, significance of 'e exponential equations, methods of integration, viz. algebraic simplifications, substitution, integration by parts, integration by partial fractions, coordinate transformation (eg., cartesian to spherical polar), curve sketching, integral as area