

Lesson Plan

Subject : Mathematics

Semester : II B.Sc (N.M) Vector Calculus

Subject code : 12BSM123

No. of Week	Section Name	Topics
1.	Section A: Cont.	Scalar and Vector product of three vectors. Product of four vectors. Reciprocal vectors.
2.	Section A: Cont.	Vector Differentiation, Scalar valued points functions Vector valued points functions.
3.	Section A: Cont.	Derivative along a curve, directional derivatives.
4.	Section B: Cont.	Gradient of a scalar point function, geometrical interpretation of grad ϕ , character of gradient as a point function.
5.	Section B: Cont.	Divergence and curl of vector point function, characters of $\text{div } \vec{F}$ and $\text{curl } \vec{F}$ as a point function, examples.
6.	Section B: Cont.	Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.
7.	Section C: Cont.	Orthogonal curvilinear co-ordinates. Conditions for orthogonality.
8.	Section C; Cont.	Fundamental triad of mutually orthogonal unit vectors.
9.	Section C: Cont.	Gradient, divergence, curl and Laplacian operators in terms of orthogonal curvilinear co-ordinates, cylindrical co-ordinates, spherical co-ordinates.
10.	Section D:	Vector integration, line integral, surface integral, volume integral
11.	Section D: Cont.	Theorem of Gauss, Green, Stokes and problems based on these.

Books Recommended:

+ ~~DA~~

1. Jeevansong Publications : Vector Calculus
2. Murray R. Spiegel: Vector Analysis, Schaum Publishing Company, New York.
3. N. Sazan and S.N. Nigami: Introduction to vector Analysis, Pothishala Pvt. Ltd, Allahabad.
4. Shanti Narayna: A text book of vector calculus. S. Chand and Co. New Delhi.

Followed by
Dr. Parmit Karmari
Assistant Prof.
Deptt. of Mathematics
Govt P.G. College, m/Garh

Govt.P.G. College Mahendergarh
Haryana

Lesson Plan

Subject: Mathematics.

Semester: I B.sc (N.M) Ordinary Differential Equations

Subject code: 12BSM122

No. Of Week	Section Name	Topics
1.	Section A:	Geometrical meaning of a differential equation. Exact differential equations, integrating factors.
2.	Section A: Cont.	First order higher degree equations solvable for x,y,p Lagrange's equations.
3.	Section A: Cont.	Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions.
4.	Section B:	Orthogonal trajectories: in Cartesian coordinates and polar coordinates.
5	Section B: Cont.	Self orthogonal family of curves.. Linear differential equations with constant coefficients.
6.	Section B: Cont.	Homogeneous linear ordinary differential equations. Equations reducible to homogeneous linear ordinary differential
7.	Section C	Linear differential equations of second order: Reduction to normal form.
8.	Section C: Cont.	Transformation of the equation by changing the dependent variable/ the independent variable.
9.	Section C : Cont.	Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients.
10.	Section D	Ordinary simultaneous differential equations. Solution of simultaneous differential equations

11	Section D: Cont	involving operators x (d/dx) or t (d/dt) etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$. Total differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact.
12	Section D: Cont	General method of solving $Pdx + Qdy + Rdz = 0$ by taking one variable constant. Method of auxiliary equations.

Books Recommended:

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longaman (India). 1967
2. A.R.Forsyth: A Treatise on Differential Equations, Machmillan and Co. Ltd. London
3. E.A. Codington: Introduction to Differential Equations.
4. S.L.Ross: Differential Equations, John Wiley & Sons
5. B.Rai & D.P. Chaudhary: Ordinary Differential Equations; Narosa, Publishing House Pvt. Ltd.

Followed by
Dr. Parmit Kumari
Assistant Prof.
Deptt. Of Mathematics
Govt P.G. College M/garh.

Govt.P.G. College Mahendergarh
Haryana

Lesson Plan

Subject: Mathematics.
Semester: I B.sc (N.M) Sequences and Series
Subject code: 12BSM241

No. Of Week	Section Name	Topics
1.	Section A:	Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, Neighborhoods.
2.	Section A: Cont.	Interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties.
3.	Section A: Cont.	Bolzano-Weierstrass theorem, Open covers, Compact sets and Heine-Borel Theorem.
4.	Section B:	Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences.
5	Section B: Cont.	Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Sub sequential limits. Infinite series: Convergence and divergence of Infinite Series.
6.	Section B: Cont.	Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series.
7.	Section C	Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test.
8.	Section C: Cont.	De Morgan and Bertrand's test, Cauchy's Nth root test, Gauss Test.
9.	Section C : Cont.	Cauchy's integral test, Cauchy's condensation test.
10.	Section D	Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series.

11	Section D: Cont	Abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem.
12	Section D: Cont	Pringsheim's theorem (statement only), Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.

Books Recommended:

1. R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970
2. S.C. Malik : Mathematical Analysis, Wiley Eastern Ltd., Allahabad.
3. Shanti Narayan : A Course in Mathematical Analysis, S.Chand and company, New Delhi
4. Murray, R. Spiegel : Theory and Problems of Advanced Calculus, Schaum Publishing co., New York
5. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
6. Earl D. Rainville, Infinite Series, The Macmillan Co., New York

Followed by
 Dr. Parmit Kumari
 Assistant Prof.
 Deptt. Of Mathematics
 Govt P.G. College M/garh.

Govt P.G. College Mahendergadh
Haryana

Lesson Plan

Semester: I

Subject: Mathematics.
B.sc (N.M) Linear Algebra
Subject code: 12BSM362

No. Of Week	Section Name	Topics
1.	Section A:	Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space.
2.	Section A: Cont.	Finitely generated vector space, Existence theorem for basis of a finitely generated vector space.
3.	Section A: Cont.	Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.
4.	Section B:	Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces.
5.	Section B: Cont.	Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces.
6.	Section B: Cont.	Null Space, Range space of a linear transformation, Rank and Nullity Theorem
7.	Section C	Algebra of Liner Transformation, Minimal Polynomial of a linear transformation.
8.	Section C: Cont.	Singular and non-singular linear transformations, Matrix of a linear Transformation.
9.	Section C: Cont.	Change of basis, Eigen values and Eigen vectors of linear transformations.
10.	Section D	Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis.
11.	Section D: Cont	Bessel's inequality for finite dimensional

		vector spaces, Gram-Schmidt; Orthogonalization process;
12	Section D: Cont	Adjoint of a linear transformation and its properties; Unitary linear transformations.

Books Recommended:

1. I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. P.B. Bhattacharya, S.K. Jain and S.R. Nagnal : Basic Abstract Algebra (2nd edition).
3. Vivek Sahai and Vikas Bist : Algebra, Narosa Publishing House.
4. I.S. Luther and I.B.S. Passi : Algebra, Vol.-II, Narosa Publishing House.

Followed by
 Dr. Parmit Kumari
 Assistant Prof.
 Deptt. Of Mathematics
 Govt P.G. College M/garh.