

B.Sc. B.Ed. Second Year Integrated Course

Academic Session 2024-25

TEACHING AND EXAMINATION SCHEME

Subject/Paper	Period/Week		Exam. Hours	Theory Paper	Summative Test
	L	P			
MATHEMATICS					
Paper I	3	-	3	60	15
Paper II	3	-	3	60	15
Paper III	3		3	60	15



Professor & Head
Department of Mathematics & Statistics
JNV University, Jodhpur

B.Sc. B.Ed. Second Examination – 2025
MATHEMATICS

Paper I	: Co-ordinate Geometry of 3-Dimensions and Vector Calculus.
Paper II	: Numerical Analysis and Linear Programming.
Paper III	: Differential Equations.

Exam. Hours: 03:00

Max. Marks: 60

Paper – I
Co-ordinate Geometry of 3-Dimensions and Vector Calculus.

Note: Each theory paper is divided in three parts i.e., Section – A, Section – B and Section – C

Section A will consist of 10 compulsory questions. There will be two questions from each unit and answer (30 words). Each question carries 1 mark.

Section B will consist of 10 questions. Two questions from each unit and the examinee will answer (250 words) one question from each Unit. Each question carries 4 marks.

Section C will consist of 5 questions, one from each unit. The examinee will answer any 03 questions (with answer limit of 500 words). Each question carries 10 marks.

Unit 1 : Sphere, Cone and Cylinder (Rectangular Coordinates only)

Unit 2 : The Central Conicoids (referred to principal axes). Tangents and tangent planes, Polar planes and polar lines, Section with a given centre, Enveloping cone, Enveloping cylinder and related problems.

Unit 3 : Equations of the normal to an ellipsoid, number of normals from a given point to an ellipsoid, Cone through six normals, Conjugate diameter and diametral planes and their properties. Cone as a Central surface. Paraboloids.

Unit 4 : Plane Sections of Conicoids, Umbilics, Generating lines of hyperboloid of one sheet and its properties.

Unit 5 : Vector Calculus : Curl, Gradient and Divergence & Identities involving these operators. Theorems of Stoke, Green and Gauss (Statement, application and verification only).

SUGGESTED BOOKS

Gupta, Juneja : Vector Analysis; Ramesh Book Depot, Jaipur.
Gokhroo, Saini, Bhati : Vector Calculus (Hindi Ed.); Navkar Prakashan, Ajmer
Bhargava, Banwari Lal : Vector Calculus (Hindi Ed.); Jaipur Publishing House, Jaipur
Bell, R.J.T.: Coordinate Geometry of Three dimensions; Macmillan India Ltd., New Delhi
Vasistha, Agarwal : Analytical Solid Geometry; Pragati Prakashn, Meerut
Gokhroo, Saini & Rathi : Analytical 3-D Geometry (HindiEd); Jaipur Pub. House, Jaipur
Bansal, Bhargva, Agarwal : 3-D Coordinate Geometry II; Jaipur Pub. House, Jaipur



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Paper II

Numerical Analysis and Linear Programming

Note: Each theory paper is divided in three parts i.e., Section – A, Section – B and Section – C

Section A will consist of 10 compulsory questions. There will be two questions from each unit and answer (30 words). Each question carries 1 mark.

Section B will consist of 10 questions. Two questions from each unit and the examinee will answer (250 words) one question from each Unit. Each question carries 4 marks.

Section C will consist of 5 questions, one from each unit. The examinee will answer any 03 questions (with answer limit of 500 words). Each question carries 10 marks.

Unit 1: Difference operators and factorial notation, Differences of polynomial, Newton's formulae for forward and backward interpolations. Divided differences, relation between divided differences and Simple difference. Newton's general interpolation formulae, Lagrange interpolation formula.

Unit 2: Central differences, Gauss, Stirling and Bessel interpolation formulae. Numerical Differentiation. Numerical integration, Trapezoidal, Simpson's and Weddle's rules.

Unit 3: Solution of linear difference equations with constant and variable coefficients. Solution of Algebraic and Transcendental equations, Iterative, Regula Falsi and Newton Raphson methods.

Unit 4: Convex sets and their properties. The simplex technique and its application to simple L.P. problems. The Big M-Method.

Unit 5: Two Phase Method, Revised Simplex Method. Concepts of duality in linear programming. Framing of dual programming. Elementary theorems of duality. Integer Programming Problem (IPP).

SUGGESTED BOOKS

- Gokhroo, Saini : Linear Programming (Hindi Ed.), Navkar Prakashan, Ajmer.
Mittal, Sethi : Linear Programming, Pragati Prakashan, Meerut
Goyal, Mittal : Numerical Analysis, Prograti Prakashan, Meerut
Bansal, Bhargava : Numerical Analysis (Hindi Ed.); Jaipur Publishing House, Jaipur
Saxena, H.C. : Numerical Analysis; S.Chand & Co., New Delhi
Gokhroo : Numerical Analysis (Hindi Ed.); Navkar Prakashan, Ajmer
Bhargava, Sharma, Bhati : Linear programming (Hindi Ed.); Jaipur Publishing House, Jaipur.



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Paper III
Differential Equations

Note: Each theory paper is divided in three parts i.e., Section – A, Section – B and Section – C

Section A will consist of 10 compulsory questions. There will be two questions from each unit and answer (30 words). Each question carries 1 mark.

Section B will consist of 10 questions. Two questions from each unit and the examinee will answer (250 words) one question from each Unit. Each question carries 4 marks.

Section C will consist of 5 questions, one from each unit. The examinee will answer any 03 questions (with answer limit of 500 words). Each question carries 10 marks.

Unit 1: Exact and reducible to exact differential equations of first order and first degree. First order higher degree differential equations solvable for x, y, p . Clairaut's form and singular solutions.

Unit 2: Linear differential equations with constant coefficients, Homogeneous linear differential equations with variable coefficients. Simultaneous differential equations, Total differential equations of the form $Pdx + Qdy + Rdz = 0$, by method of inspection and method for homogeneous equations.

Unit 3: Linear differential equations of second order of the form $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$.

Exact Linear differential equations of n^{th} order. Exact Non-Linear differential equations. Differential equations of the various forms e.g., (i) $\frac{d^2y}{dx^2} = f(y)$ (ii) Equations not containing y directly (iii)

Equations not containing x directly and other forms. Method of variation of parameters to the solution of second order linear differential equations.

Unit 4: Series solutions of Second Order Linear differential equations, Power series method, Bessel and Legendre equations. Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit (general) method of solution.

Unit 5: Partial differential equations of second and higher order. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's method of integrating $Rr + Ss + Tt = V$.

SUGGESTED BOOKS

Sharma, Gupta : Differential Equations; Krishna Prakashan, Meerut

Ray, Chaturvedi : Differential equations; Kedar Nath, Ram Nath & co., Agra.

Bansal, Dhami : Differential equations (Vol. II); Jaipur Publishing House, Jaipur

Gokhroo, Saini, Kumbhat : Differential equations (Hindi Ed.); Navkar Prakashan, Ajmer

Gokhroo, Saini, Oza : Partial differential equations; Jaipur Publishing House, Jaipur.



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