B.Sc. B.Ed. Fourth Year Integrated Course

Academic Session 2024-25

TEACHING AND EXAMINATIION 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

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

B.Sc. B.Ed. Fourth Year Examination 2025
MATHEMATICS

Paper I : Analysis and Laplace Transforms
Paper II : Mechanics II (Dynamics of Rigid Bodies and Hydrostatics)

Exam. Hours: 03:00 **Max. Marks: 60**

Paper – I

Analysis and Laplace Transforms

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 : Dedekinds theory of real numbers. Linear sets. Upper and Lower bounds, Limiting points, Weierstrass's theorem. Derived sets, Enumerable Sets, Open and Closed sets.

Unit 2 : Theory of Riemann integration, Darboux theorem. Fundamental theorem of integral calculus, Mean value theorem of integral calculus.

Unit 3 : Functions, Limits, and continuity. Differentiability, Concept of an analytic function, Cartesian and Polar form of Cauchy-Riemann equations. Harmonic function, Conjugate function, Laplace's differential equations, Construction of analytic functions. Power Series: Absolute convergence of power series, circle and radius of convergence of power series, sum function of a power series.

Unit 4: Basic definition and Properties of complex integration Complex integration as the sum of two line integrals, Inequality for complex integrals. Curves in complex plane, Cauchy-Goursat theorem, Connected regions, Indefinite integral (or Anti Derivative). Derivative of Single-valued functions F(z). Cauchy's integral formula, Extension of Cauchy's integral formula to multiconnected, regions, Cauchy's integral formula for the derivative of an analytic function, Successive derivative of an analytic function, Morera's Theorem. Liouville's Theorem, Poisson's integral formula.

Unit 5: Laplace Transforms and Inverse Laplace Transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Convolution theorem. Applications of Laplace Transform to the solution of differential equations.

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SUGGESTED BOOKS

Shanti Narayan: Real Analysis; S.Chand & Co., New Delhi.
G.N.Purohit: Real Analysis; Jaipur Publishing House, Jaipur.
Bhargava, Goyal: Real Analysis (Hindi Ed.); Jaipur Publishing House, Jaipur.
Gokhroo, Saini, Ozgha: Real Analysis (Hindi Ed.); Jaipur Publishing House, Jaipur.
Shanti Narayan: Theory of Functions of a Complex Variable; S.Chand & Co., New Delhi.
Gupta, K.P. : Complex Analysis; Pragati Prakashan; Meerut
Gokhroo, Saini & Yadav: Complex Analysis (Hindi Ed.); Navkar Publication, Ajmer
G.N. Purohit: Complex Analysis; Jaipur Publishing House, Jaipur.
S. Ponnusamy: Foundations of Complex Analysis, Narosa Publishing House, Bombay, New Delhi.
V. Karunakaran: Complex Analysis, Narosa Publishing House. Bombay, New Delhi (2002).
N.Levinson and R.M. Redheffer: Complex Variables, Tata McGraw-Hill Publ. Co. Ltd., New Delhi (1980).

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MATHEMATICS

Exam. Hours: 03:00 **Max. Marks: 60**

Paper II
Mechanics – II
(Dynamics of Rigid Bodies and Hydrostatics)

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: Moments and Products of inertia. D'Alemberts' principle, the general equations of motion of a rigid body, Motion of the center intertia and motion relative to the center of inertia. Motion about a fixed axis under finite forces.

Unit 2: The compound Pendulum. Reaction of the Axis of rotation. Motion of a rigid body in two dimension under finite forces.

Unit 3: Fluids and Fluid Pressure, homogeneous and heterogeneous fluids, Surface of equal pressure, fluid at rest under action of gravity, Fluid pressure on Plane surfaces.

Unit 4: Centre of pressure, resultant pressure on curved surfaces.

Unit 5: Equilibrium of floating bodies, Centre of buoyancy, Surface of buoyancy. Stability of equilibrium of floating bodies, Meta Centre.

SUGGESTED BOOKS

Loney, S.L. : Rigid Body Dynamics; Cambridge Univ. Press.

Gupta, P.P. : Rigid Body Dynamics, Vol.I; Krishna Prakashan, Mandir; Meerut

Bansal, J.L. : Rigid Body Dynamics; Jaipur Publishing House, Jaipur.

Prasad, B.N. : Hydrostatics; Krishna Prakashan, Mandir; Meerut

Mathur, S.M. : A Text Book of Hydrostatics; Ramesh Book Depot, jaipur.

Sharma, Gokhroo,kSaini, Agarwal.: Elements of Hydrostatics; Jaipur Publishing House, Jaipur.

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