MAHARAJA SUHEL DEV UNIVERSITY, AZAMGARH
Choice Based Credit System (C.B.C.S.)

3 YEARS UG PROGRAMME

3 YEAR UG (HONS.) PROGRAMME

4 YEAR UG (HONS.) PROGRAMME

4 YEAR UG (HONS. WITH RESEARCH) PROGRAMME

COURSE STRUCTURE AND SYLLABUS
B.A./B.Sc.

MATHEMATICS (Minor)

[EFFECTIVE: 2024-25 ONWARDS]

Dr. Subhash Kumar

16 - 10 - 2024

SEMESTER WISE TITLES OF THE PAPER IN UGMATHEMATICS COURSE

YEAR	SEMESTER	COURSE CODE	PAPER TITLE	THEORY/PRACTICAL	CREDIT
CERTIFICATECOURSE IN APPLIEDMATHEMATICS					
FIRST YEAR	I	B030101T	Differential Calculus & Integral Calculus	THEORY	4
		B030102P	PRACTICAL	PRACTICAL	2
	II	B030201T	Matrices and Differential Equations &Geometry	THEORY	6
		B030202T	Calculus & Matrices (Minor Paper)	THEORY	6
DIPLOMA IN MATHEMATICS					
SECONDYEAR	III	B030301T	Algebra & Mathematical Methods	THEORY	6
	IV	B030401T	Differential Equation & Mechanics	THEORY	6
		B030402T	Differential Equation & Integral Transforms (Minor)	THEORY	6
		B030403R	Research Project	PROJECT	3
DEGREE IN MATHEMATICS					
THIRD YEAR	V	B030501T	Group and Ring Theory & Linear Algebra	THEORY	5
		B030502T	Any one of the following (i)Number theory & Game theory (ii) Graph theory & Discrete Mathematics (iii)Differential Geometry & Tensor Analysis	THEORY	5
	VI	B030601T	Metric Space & Complex Analysis	THEORY	4
		B030602T	Operations Research & Numerical Analysis	THEORY	4
		B030603P	PRACTICAL	PRACTICAL	2

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UGMATHEMATICS2

B.A./B.Sc.I (SEMESTER-II) Calculus & Matrices (Minor Paper)

Programme: Certificate	Year: First	Semester: First / Second
Class: B.A./B.Sc.		Subject: Mathematics
		Course Title: Calculus & Matrices(Minor Paper)

CourseCode:B030202T	

Course outcomes:

CO1: The subjects of the course are designed in such a way that they focus on developing mathematical skills in Calculus.

CO2: The student will be able to find the type, rank, Eigen values of matrices.

Credits:6	Minor
Max.Marks:25+75	Min. Passing Marks:

Calculus & Matrices (Minor Paper)

Unit	Topics	No. of Lectures
I	Definition of the limit of a function, Continuous functions and classification of discontinuities, Differentiability, Chain rule of differentiability, Rolle's theorem, Mean value theorems, Successive differentiation and Leibnitz's theorem., Expansion of functions (in Taylor's and Maclaurin's series), Indeterminate forms, Partial differentiation , Euler's theorem, Jacobians, Maxima and Minima (for functions of two variables), Tangents and normals.	25
II	Beta and Gamma functions, Quadrature, Rectification, Volumes and surfaces of solids of revolution, Pappus theorem, Double a and triple integrals, Change of order of integration, Dirichlet's and Liouville's integral formulae.	20
III	Vector differentiation and integration, Gradient, divergence and curl and their properties, Line integrals, Theorems of Gauss, Green and Stokes and problems based on these.	20
IV	Matrix, Determinant, properties of Matrices, Symmetric and skew-symmetric Matrices, Hermitian and skew-Hermitan Matrices, Orthogonal and Unit-ary Matrices, Triangular and diagonal matrices, Rank of a Matrix, Elementary transformations, Echelon and normal forms, Inverse of a Matrix, Characteristic equation, Eigen values and Eigen vectors of a Matrix, Cayley-Hamilton's theorem and its use in finding inverse of a Matrix.	25

Books Recommended

1 T.M.Apostal, CalculusVol.I, JohnWiley&SonsInc.

2 S.BalachandraRao&C.K.Shantha, DifferentialCalculus, NewAgePublication.

3. Rao G Shanker, Linear Algebra, 1st Edition, I. K. International Publisher

4. StephenH.Friedberg, A.JInsel&L.E.Spence, LinearAlgebra, Person

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UGMATHEMATICS15

Suggested Continuous Evaluation Methods: Max. Marks: 25	Max. Marks
Assessment Type	10
Class Tests	5
Online Quizzes/Objective Tests	5
Presentation/Research Orientation assignment	5
Assignment	
Course pre requisites :To study this course, a student must have subject Mathematics in class 12th	
Suggestedequivalentonlinecourses:	
FurtherSuggestions:	

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B.A./B.Sc.II (SEMESTER-IV)

Differential Equation & Integral Transforms (Minor)

Programme: Diploma	Year: Second	Semester: Third / Fourth
Class: B.A./B.Sc.		

	Subject: Mathematics	
Course Code:B030402T	Course Title : Differential Equation & Integral Transforms (Minor)	

Course outcomes:

CO1: The objective of this course is to familiarize the students with various methods of solving differential equations, partial differential equations of first order and second order and to have qualitative applications.

CO2: The object of the paper is to give students knowledge of Integral Transforms with applications.

Credits:4	Core Compulsory / Elective / Minor
Max. Marks:25+75	Min. Passing Marks:

Differential Equation & Integral Transforms (Minor)

Unit	Topics	No. of Lectures
I	Formation of a differential equation (D.E.), Degree, order and solution of a D.E., Equations of first order and first degree : Separation of variables method, Solution of homogeneous equations, linear equations and exact equations, Linear differential equations with constant coefficients, Homogeneous linear differential equation.	25
II	Differential equations of the first order but not of the first degree, Clairaut's equations and singular solutions, Orthogonal trajectories, Simultaneous linear differential equations with constant coefficients, Linear differential equations of the second order (including the method of variation of parameters)	20
III	Linear differential equations of the second order (including the method of variation of parameters). Order, degree and formation of partial differential equations, Partial differential equations of the first order, Solution of partial differential equations. Lagrange's equations, Charpit's general method,	20
IV	The concept of transform, Integral transforms and kernel, Linearity property of transforms, Laplace transform, Inverse Laplace transform, Convolution theorem, Applications of Laplace transform to solve ordinary differential equations. Fourier transforms (finite and infinite), Fourier integral, Applications of Fourier transform to boundary value problems, Fourier series.	25

Suggested Readings

1. G.F. Simmons, Differential Equations with Application and Historical Notes, Tata– McGraw Hill
2. B. Rai, D.P. Choudhary & H.J.Freedman, A Course of Ordinary Differential Equations, Narosa
3. IanN.Snedden,ElementsofPartialDifferentialEquations,DoverPublication
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.

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SN	Assessment Type	Max. Marks
1	Class Tests	10
2	Online Quizzes / Objective Tests	5
3	Presentation / Research Orientation assignment	5
4	Assignment	5
Course pre requisites: To study this course, a student must have Certificate Course in Applied Mathematics		
Suggested equivalent online courses:		

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