JABALPUR ENGINEERING COLLEGE, JABALPUR (M.P.)

Scheme of Examination w.e.f. July, 2017 batch

SECOND SEMESTER (M.Sc. Applied Mathematics)

S.NO.	SUBJECT CODE	SUBJECT	Periods Per Week				Maximum Marks (Theory Slots)			Maximum marks (Practical Slots)		Total Marks	Remarks
			L	T	P	TOTAL Credits	End Sem. Exam	Mid Sem Exam	Assignment/ Quiz	End Semester Practical/ Viva	Practical Record/ Assignment/ Quiz/ Presentation		
1	AM2001	Numerical Analysis	4	1	...	5	70	20	10	...		100	
2	AM2002	Special Functions and Integral Transforms	4	1	...	5	70	20	10	...		100	
3	AM2003	Complex Analysis and Application	4	1	...	5	70	20	10	...		100	
4	AM2004	ELECTIVE-II	4	1	...	5	70	20	10	...		100	
5	AM2005	LAB-II (MATLAB)	....	...	8	8	...	...	...	90	60	150	
6	AM2006	Self Study & Group Discussion	...	...	4	4	...	...	...	...	100	100	
		TOTAL	**16**	**4**	**12**	**32**	**280**	**80**	**40**	**90**	**160**	**650**	

L-Lecture T-Tutorial P-Practical

Elective II: AM 2004A- Differential Geometry
Elective-II: AM 2004B- Graph Theory
Elective-II: AM 2004C- Elements of Computer Science

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

JABALPUR ENGINEERING COLLEGE, JABALPUR

M. Sc. II Semester (Applied Mathematics)

NUMERICAL ANALYSIS

Subject Code: AM2001

Max Marks-70
Min Marks-28

UNIT-I

SOLUTION OF ALGEBRAIC AND TRANSCENDENT EQUATION:- Bisection method, method of false position, secant method, iteration method, Aitken's del square method, Newton-Raphson method, Graffe's root squaring method, Newton's method for multiple roots.

SOLUTION OF LINEAR SIMULTANEOUS ALGEBRAIC EQUATION: - Gauss Elimination, Gauss jorden, Crout's triangularisation, partition, iterative method, Jacobi's, Guass seidal & relaxation methods.

UNIT-II

FINITE DIFFERENCES:-finite difference, difference of polynomial, factorial notation, difference operators, relation between the operators.

DIFFERENCE EQUATION:- Formation of difference equation, linear difference equation, different methods of finding complementary function & particular integral, difference equations reducible to linear form.

UNIT-III

INTERPOLATION:- Newton's forward and backward interpolation formulae, central difference interpolation formulae, Gauss forward and backward formulae, Stirling's, Bessel's, Everett's & Lagrange's interpolation formulae, divided difference, Newton's divided difference formula, inverse interpolation.

NUMERICAL DIFFERENTIATION: - Derivative using forward, backward and central difference formulae, maxima and minima of tabulated function.

UNIT-IV

NUMERICAL INTEGRATION:- Quadrature formula, Trapezoidal rule, Simpson's one-third rule, Simpson's three-eighth rule, Boole's rule, Weddle's rule, Euler-Maclaurin's formula, Numerical double integration.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIATIAL EQUATION: - Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge method, Runge-kutta method, simultaneous first and second order differential equation.

UNIT-V

NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATION:- Classification of second order equation, finite difference approximation to partial derivatives, solution of Laplace and Poisson's equation, solution of elliptic equation by relaxation method, parabolic equation, solution of one and two dimensional heat equation, solution of hyperbolic wave equation.

References:

1. B.S. Grewal, Numerical Analysis
2. S.S. Shastri ,Numerical Analysis

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JABALPUR ENGINEERING COLLEGE, JABALPUR
M. Sc. II Semester (APPLIED MATHEMATICS)
SPECIAL FUNCTION AND INTREGAL TRANSFORMS
Subject Code : AM2002

Max Marks-70
Min Marks-28

UNIT-I

HYPERGEOMETRIC FUNCTIONS:- Solution of Hyper geometric equation, differentiation of Hyper geometric function , an integral formula, Gauss theorem, Vandermonde'stheorem, Kuinmer's theorem linear relation between the solution of the hypergeometric equation, solution of confluent hypergeometric equation, Whittaken's confluent, hypergeometric function, differentiation and integral representation of the confluent hypergeometric functions, Kuinmer's relation, contiguous hypergeometric functions, Dixon's theorem

UNIT-II

LAGURRI POLYNOMIALS:- Lagurri equation and its solution, Lagurri polynomial of order n, generating function, orthogonality property, recurrence relation, Lagurri's associated equation and its solution, associated Lagurri polynomial, generating function for associated Lagurri polynomials, orthogonal property for $L_n(x)$, recurrence relation for $L_n(x)$,

CHEBYSHEV POLYNOMIALS:- Chebyshev polynomial, orthogonal property, recurrence relation generating function for Chebyshev polynomials.

UNIT-III

FOURIER TRANSFORM:- Fourier transform Fourier sine & cosine transforms, Fourier integral formula, complex Fourier transform, inversion formulae, linearity property, change of scale property & shifting property, Fourier transform of derivatives, modulation theorem, multiple Fourier transform, convolution theorem, Parseval's identity, relationship between Fourier & Laplace transform, definition and properties of finite Fourier , finite Fourier sine & cosine transform.

UNIT-IV

APPLICATION OF LAPLACE AND FOURIER TRANSFORM:- Application of Laplace transform to solution of ordinary differential equation with variable coefficient, simultaneous ordinary differential equation, partial differential equation, integral equation, application of electrical circuits, mechanics, boundary value problems, heat conduction equation, wave equation & application to beam application of infinite, Fourier & Finite Fourier transforms in the solution of initial and boundary value problems.

UNIT-V

HANKEL TRANSFORM:-Definition inversion, linearity property of finite and infinite Henkel transform, Henkel transforms of derivative, Parseval's theorem applications of Henkel transform in boundary value problem.

MELLIN TRANSFORM:- Definition, properties & inversion formula of Mellin transform falling theorem for Mellin transform.

Books Recommended:

1. A.R. Vashishtha, Integral Transform.
2. W.W. Bell, Special Functions for Scientists and Engineers

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JABALPUR ENGINEERING COLLEGE, JABALPUR

M. Sc. II Semester (APPLIED MATHEMATICS)

COMPLEX ANALYSIS AND APPLICATION

Subject Code : AM 2003

Max Marks-70
Min Marks-28

UNIT-I

ANALYTIC FUNCTIONS: - Algebra of complex numbers, continuity and differentiability of complex functions, analytic function, multi valued analytic function Cauchy – Riemann equations in Cartesian and polar coordinates, harmonic functions, Milne's theorem, power series,

TRANSFORMATION: - Conformal transformation, linear transformation, bilinear transformation, cross ratio, Schwarz – Christoffel's transformation, conformal mappings.

UNIT-II

COMPLEX INTEGRATION: - Line integral, Cauchy theorem, Cauchy formula, Morera's theorem, Liouville's theorem, classification of singularities zeros, poles maximum modules principle fundamental theorem of algebra, Taylors and Laurent's theorem.

UNIT-III

CALCULUS OF RESIDUE: - contour integration, uniform convergence, definite integral, improper integral, Jordan inequality, Jordan lemma, existence of poles of real axis, rectangle contour, indented- rectangular contours.

UNIFORM CONVERGENCE: -uniform convergence of series, Weiesutruss M-test, Handy's test, continuity of the sum of a series, term by term integration and differentiation.

UNIT-IV

INFINITE PRODUCTS: - Function and branches, inverse function and principle values.

ANALYTIC CONTINUATION:- Function and branches, inverse function and principle values notion of analytic continuation, theorem of uniqueness, complete analytic function and natural boundary, method of continuation, Riemann – Schwarz – reflection principle, continuation of factorial function.

UNIT-V

ENTIRE FUNCTION:- Weierstrass formula, factorization of integral function, Weierstrass theorem, factorization theorem, function of infinite order, canonical products, growth order and convergence, exponents, Hedamard three circle theorem, Hedamard factorization theorem, Borel's theorem.

Reference Book:

1. J.N. Sharma, function of complex variables
2. E. C. Tichmarsh, The theory of functions of a complex variables
3. H.C. Sinha, J.C. Sharma and L.S. Vaishney, The theory of function of a complex variables
4. L.V. Ahtfors, Complex Analysis.

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