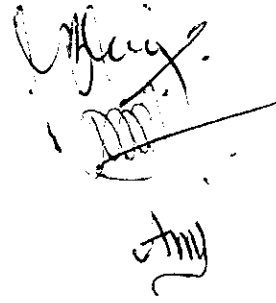


• 5. E. Kreyszig – Advanced Engineering Mathematics

Books for References:

1. S.C Malik –Real Analysis
2. Murray R Spiegel – Laplace Transforms
3. S.C.Malik and Savita Arora, *Mathematical Analysis*, 2nd ed. New Delhi, India: New Age international (P) Ltd.,
4. Richard R Goldberg, *Methods of Real Analysis*, Indian ed.
5. Asha Rani Singhal and M .K Singhal, *A first course in Real Analysis*
6. E.Kreyszig- *Advanced Engineering Mathematics*, Wiley India Pvt. Ltd.
7. Leadership project - Bombay university- Text book of mathematical analysis
8. S. S. Bali – Real analysis.



P. Anu
ಕುಲಸಚಿವರು
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ - 577002.

10. Verification of Convolution Theorem

Text Books:

2. B Spain, *Vector Analysis*, ELBS, 1994.
3. D E Bournesand, P C Kendall, *Vector Analysis*, ELBS, 1996.
4. B. S. Grewal - Higher Engineering Mathematics

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ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ - 577002.

Paper VIII - BSM 6.2T (MATHEMATICAL METHODS - I)

4 Lecture Hours/ Week + 3 Hrs Practical's/Week, One batch cannot exceed 25

Students

Total: 56Hrs

Unit 1 : Integral Theorems: Green's theorem (with proof) - Direct consequences of the theorem. The Divergence theorem (with proof) - Direct consequences of the theorem. The Stokes' theorem (with proof) - Direct consequences of the theorem. **(12Hrs)**

Unit 2 : Improper Integrals: Improper Integrals (definition only) - Gamma and Beta functions and results following the definitions - Connection between Beta and gamma functions - applications of evaluation of integrals - Duplication formula. **(12Hrs)**

Unit 3 : Laplace Transforms: Definition and basic properties - Laplace transforms of e^{at} , $\cos kt$, $\sin kt$, t^n , $\cosh kt$ and $\sinh kt$ - Laplace transform of $e^{at} F(t)$, $t^n F(t)$, $F(t)/t$ - problems - Laplace transform of derivatives of functions - Laplace transforms of integrals of functions - Laplace transforms of α -functions - Inverse Laplace transforms - problems. Convolution theorem - Simple initial value problems - Solution of first and second order differential equations with constant coefficients by Laplace transform method **(20Hrs)**

Unit 4 : Fourier Series: Trigonometric Fourier series of functions with period 2π and period $2L$ - Half range Cosine and sine series **(12Hrs)**

PRACTICALS - VIII BSM 6.2P (MATHEMATICAL METHODS-I)

Total: 42 Hrs

**Mathematics practical with Free and open Source Software (FOSS)
tools for computer programs (3 hours/ week per batch of not more than 15 students)**

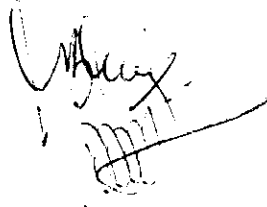
LIST OF PROBLEMS

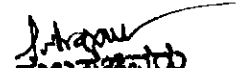
1. Verifying Green's theorem.
2. Verifying Gauss divergence theorem.
3. Verifying Stokes' theorem 1. To plot periodic functions with period 2π and $2L$.
4. To find full range trigonometric Fourier series of some simple functions with period 2π and $2L$
1. F B Hildebrand, *Methods in Applied Mathematics*.
5. Plotting of functions in half-range and including their even and odd extensions.
6. To find the half-range sine and cosine series of simple functions.
7. To find the half-range sine and cosine series of simple functions.
8. Finding the Laplace transforms of some standard functions.
9. Finding the inverse Laplace transform of simple functions.

P. Kumar
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ಶಿವಮೊಗ್ಗ, ದಾವಣಗೆರೆ - 577002.
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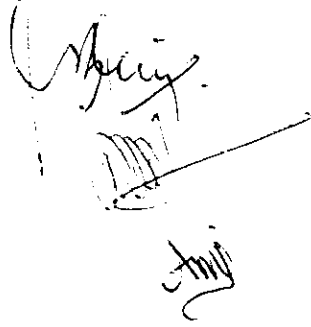
Reference Books:

1. B. D Gupta - Numerical Analysis
2. H. C Saxena - Finite Difference and Numerical Analysis
3. S. S. Shastri - Introductory Methods of Numerical Analysis
4. B. S. Grewal - Numerical Methods for Scientists and Engineers
5. E. Ksreyszig - Advanced Engineering Mathematics.


AMJ


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3. Solving algebraic equation (Bisection method).
4. Scilab/Maxima programs to evaluate integrals using Simpson's rule.
5. Scilab/Maxima programs to evaluate integrals using Simpson's rule.
6. Solving algebraic equation (Regular-Falsi and Newton-Raphson methods).
7. Solving ordinary differential equation by modified Euler's method.
8. Solving ordinary differential equation by Runge-Kutta method of 4th order.
9. Solving algebraic equation (Bisection method).
10. Solving system of equations (Jacobi and Gauss-Seidel methods).
11. i) Vector space, subspace-illustrative examples.
ii) Expressing a vector as a linear Combination of given set of Vectors.
iii) Examples on Linear Dependence and independence of vectors.
12. i) Basis and Dimension-illustrative examples.
ii) verifying whether a given transformation is linear.
13. i) Finding matrix of a Linear Transformation.
ii) Problems on rank and nullity.



J. Anur
ಕುಲಸಚಿವರು
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
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VI Semester

Paper VII - BSM 6.1T (ANALYSIS – III, ALGEBRA-IV)

4 Lecture Hours/ Week + 3 Hrs Practical's/Week, One batch cannot exceed 25

Students

Total: 56Hrs

NUMERICAL ANALYSIS

NUMERICAL METHODS - I

Unit 1 : Finite differences – Definition and properties of Δ , ∇ D and E, the relation between them – The nth differences of a polynomial, Factorial notations, separation of symbols, divided differences and related theorems. Newton –Gregory forward and backward interpolation formulae – Lagrange's and Newton's interpolation formulae for unequal intervals - Inverse interpolation. Numerical Integration: Quadrature formula – Trapezoidal rule -Simpson's 1/3 and 3/8 rule,weddle's rule (without proofs) and problems.

Unit 2 : Numerical solutions of algebraic and Transcendental equations – By method of successive bisection - method of false position – Newton-Raphson method. Numerical solutions of non-Homogeneous system of linear algebraic equations in three variables by Jacobi's method and Gauss-Seidel method. Computation of largest Eigen value of a square matrix by power method.

Unit 3 : Solutions of initial value problems - ordinary linear first order differential equations by Taylor's series, Euler's and Euler's modified method and Runge-Kutta 4th Order method.

(42 Hours)

ALGEBRA-IV

Unit 4 : Linear algebra: Vector Spaces, examples, Properties-subspaces-criterion for subset to be a Subspace – Linear span of a set-Linear combination-Linear independent and dependent subsets-Basis and Dimensions-standard properties-examples illustrating concepts and results.

Linear transformations:- Properties-Matrix of a Linear Transformation- change of basis-Range space, null space, rank and nullity of a linear transformation-rank nullity theorem-Examples.

(14Hrs)

PRACTICALS – VII BSM 6.1P (ANALYSIS - III)

Total: 42 Hrs



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tools for computer programs (3 hours/ week per batch of not more than 15 students)

LIST OF PROBLEMS

- 1.Scilab/Maxima programs on Interpolations with equal intervals.
2. Scilab/Maxima programs on Interpolations with unequal intervals.

D. K. RAO
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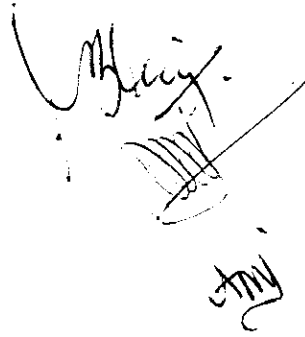
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ಶಿವರಂಗನಗರ, ದಾವಣಗೆರೆ - 577002.







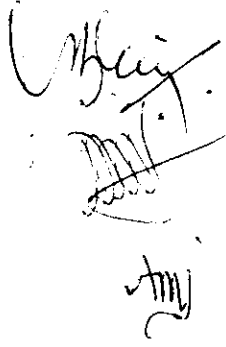
Books for References:


1. L. V. Ahlfors - Complex Analysis
2. Bruce P. Palica - Introduction to the Theory of Function of a Complex Variable
3. Serge Lang - Complex Analysis
4. Shanthinarayan - Theory of Functions of a Complex Variable
5. S. Ponnuswamy - Foundations of Complex Analysis
6. R. P. Boas - Invitation to Complex Analysis.
7. R V Churchil & J W Brown, Complex Variables and Applications,
5th ed.:McGraw Hill Companies., 1989.
8. A R Vashista, Complex Analysis, Krishna Prakashana Mandir, 2012.




ಕುಲಸಚಿವರು
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೀಶ್ವರಿ, ದಾವಣಗೆರೆ - 577002.

7. Illustrating Translation, rotation, magnification and inversion - examples.
8. Illustrating the angle preserving property in a transformation.
9. Illustrating that circles are transformed to circles by a bilinear transformation.
10. Examples connected with Cauchy's integral theorem.
11. Examples on different types of rings.
12. Examples on integral domains and fields.
13. Examples on subrings, ideals and subrings which are not ideals.
14. Homomorphism and isomorphism of rings-illustrative examples.




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Paper VI - BSM 5.2T (ANALYSIS – II, ALGEBRA-III)

4 Lecture Hours/ Week + 3 Hrs Practical's/Week, One batch cannot exceed 25

Students

Total: 56Hrs

Complex Analysis

Unit 1 : Complex numbers-Cartesian and polar form-geometrical representation-complex- Plane- Euler's formula- $e^{i\theta} = \cos \theta + i \sin \theta$.Functions of a complex variable-limit, continuity and differentiability of a complex function. Analytic function Cauchy- Riemann equations in Cartesian and Polar forms-Sufficiency conditions for analyticity (Cartesian form only)

Unit 2 : Harmonic function-standard properties of analytic functions-construction of analytic function when real or imaginary part is given-Milne Thomson method. Complex integration -the complex integration -properties-problems.

Unit 3 : Cauchy's Integral theorem-proof using Green's theorem- direct consequences. Cauchy's Integral formula with proof-Cauchy's generalized formula for the derivatives with proof and applications for evaluation of simple line integrals - Cauchy's inequality with proof - Liouville's theorem with proof. Fundamental theorem of algebra with proof.

Unit 4 : Transformations - conformal transformation - some elementary transformations namely Translation, rotation, magnification and inversion - examples. The bilinear transformation (B.T.)-cross ratio-invariant points of a B.T.-properties- (i) B.T. sets up a one to one correspondence between the extended z-plane and the extended w-plane. (ii) Preservation of cross ratio under a B.T. (iii) A B.T. transforms circles onto circles or straight lines. Problems on finding a B.T., and finding images under a B.T. and invariant points of a B.T. Discussion of transformations $w = \frac{az+b}{cz+d}$, $w = \sin z$, $w = \cosh z$ and $w = \cos z$

.(42 Hours)

ALGEBRA-III

Unit 5 : Rings, Integral domains and fields:

Rings, Types of rings, Properties of rings, Rings of integer modulo-n, Integral Domains, fields, examples and properties following the definition, subrings, Ideals, Principal, Prime and maximal ideals in a commutative ring, examples and standard properties following the definition, homomorphism, Isomorphism, properties of homomorphism of rings, quotient rings.

(14hours)

PRACTICALS – VI BSM 5.2P (ANALYSIS - II)

Total: 42 Hrs

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tools for computer programs (3 hours/ week per batch of not more than 15 students)

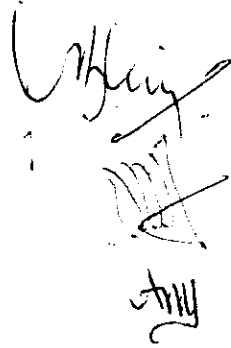
LIST OF PROBLEMS

1. Some problems on Cauchy-Riemann equations (polar form).
2. Implementation of Milne-Thomson method of constructing analytic functions(simple examples).
3. Illustrating orthogonality of the surfaces obtained from the real and imaginary parts of an analytic function.
4. Verifying real part of an analytic function being harmonic (in polar coordinates).
5. Verifying imaginary part of an analytic function being harmonic (in polar coordinates).
6. Verifying Cauchy Integral formula

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ಶಿವಮೊಗ್ಗ, ವಾಪಸಗರೆ - 577002.**

Books for References:

1. G. Stephenson - An introduction to Partial Differential Equations.
2. B. S. Grewal - Higher Engineering Mathematics
3. E. Kreyszig - Advanced Engineering Mathematics
4. E. D. Rainville and P E Bedient - A Short Course in Differential Equations
5. D. A Murray - Introductory Course in Differential Equations.
6. G. P. Simmons - Differential Equations
7. F. Ayres - Differential Equations (Schaum Series)
8. Martin Brown - Application of Differential Equations.
9. N. Herstien - Topics in Algebra.
10. G. D. Birkhoff and S Maclane - A brief Survey of Modern Algebra.
11. T. K. Manicavasagam Pillai and K S Narayanan - Modern Algebra Volume 2
12. J B Fraleigh - A first course in Abstract Algebra.



D. Anand
ಕುಲಸಚಿವರು
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ - 577002.

Maths

V Semester

Paper V - BSM 5.1T (DIFFERENTIAL EQUATIONS -II AND CALCULUS - III)

4 Lecture Hours/ Week + 3 Hrs Practical's/Week, One batch cannot exceed 25

Total: 56Hrs

Students

DIFFERENTIAL EQUATIONS Differential Equations: Solution of ordinary second order linear differential equation with variable coefficients by the methods: (1) When a part of complementary function is given (2) changing the independent variable (3) changing the dependent variable (4) when a first integral is given (exact equation) (5) variation of parameters.

Unit 2 : Total and Simultaneous Differential Equations: Necessary condition for the equation for the equation $P.dx+Q.dy+R.dz=0$ to be integrable -problems there on. Solutions of equation of the $dx/P=dy/Q=dz/R$.

Unit 3 : Partial Differential Equations: Formation of partial differential equation - Lagarange's linear equation: $Pp+Qq+R$. Four standard types of first order partial differential equations **(28 Hours)**

INTEGRAL CALCULUS

Unit 4 : Line And Multiple Integrals: Definition of line integral and basic properties examples evaluation of line integrals. Definition of double integral - its conversion to iterated integrals

.Evaluation of double integrals by change of order of integration and by change of variables - computation of plane and surface areas ,volume underneath a surface and volume of revolution using double integrals. Definition of triple integral and evaluation - change of variables - volume as a triple integral.

P. Srinivas
ಕುಲಸಚಿವರು
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ - 577002.

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C. Srinivas
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