ELECTRONIC MEDIA & OTHER DIGITAL COMPONENTS IN THE CURRICULUM OF
M.Sc/M.A in **MATHEMATICS** OFFERED BY DDE,B.U

MMATG 110
C Programming (marks-50)

Theory(marks:25)
Programming in C: Introduction,basic structures,character
set,keywords,identifiers,constants,variable-type declaration,
Operators: arithmetic,relational,logical,assignment,increment,decrement,conditional.
Operator precedence and associativity,arithmetic expression,evaluation and type
conversion,character reading and writing,formatted input and output,statements.
Decision making(branching and looping)-simple and nested if,if-else,switch,while,do-while,for
statements.
Concept of array variables,String handling with arrays-reading and writing,String handling
functions.
User defined functions,cell-by-value,cell-by-reference function and their uses, Return values and
their types,Nesting of functions,Recursion.
Structures: Declaration,initialization,nested structure,array of structures,array within structures.
Pointers: Declaration,initialization,Accessing variables through pointer,pointer
arithmetic,pointers and arrays.

Practical(marks: 25)
Sessional(Algorithm & Program with output): 5 marks
Viva Voce: 5 marks
Simple Problems: 1 5 marks(Algorithm:3,Program:8, Correct output:4)
List of Practical(using C programming)
1 . Finding roots of quadratic equations.
2. Sorting of numbers in ascending and descending order.
3. Finding the position of given number(s) from alist of numbers.
4. Check wheather a number is prime or not.
5. Find the prime numbers between two given numbers.
6. Fibonacci sequence.
7. Calculation of series sum,like,sinx,cosx,exp(x) or other series.
8. Finding value of a given polynomial at given point(s)
9. Mtrix multiplication.
1 0. Inversion of matrix.
1 1 . Solution of a system of linear equations.
1 2. Calculation of mean and standerd deviation.
1 3. Calculation of correlation coefficient.
1 4. Sorting of Strings.
1 5. Sorting of structure data.
1 6. Program by pointer.
1 7. Reading of data from a file and printing of data to a file.

MMATG 21 0
Numerical Methods (marks-50)

Theory(marks-25)
Polynomial approximations: Spline interpolation,Cubic spline,Hermite interpolation.
Numerical integration: Gauss; theory of quadrature,Gauss-Legendre formula,Euler-Maclaurin summation formula,Richardson extrapolation,Romberg integration.
Initial Value Problems: Solution of initial value problems nfor first order ODE by multi-step predictor-corrector method,Adams-Bashforth method,Adams- Moulton's method and Milne's method.
Boundary Value Problems: Boundary value problems for second order ODE and its solution by finite difference method, Shooting method for the solution of linear and non-linear equations,Largest eigen value and eigen vectors by Power method.
Numerical solution of partial differential equations by finite difference method: Explicit and implicit methods,Heat conduction equation: Discretization error,convergence & stability,Solution of wave equation: error,convergence & stability.
Practical(marks: 25)
Sessional(Algorithm and Program with output): 5 marks
Viva Voce: 5 marks
Numerical Problems: 1 5 marks(Algorithm:3,Program:8,result:4)
Problems:
1 . Solution of Initial Value Problem(IVP) for first and second order ODE using
(i) Milne's method(first order equation),
(ii) Fourth order Runge-Kutta method(second order)
2. Interpolation: Cubic-Spline interpolation and Hermite interpolation.
3. Integration by Romberg's method.
4. Largest eigen values of a real matrix by Power method.
5. Solution of Boundary Value Problem(BVP) for second order ODE by finite difference method(FDM) and Shooting method.
6. Solution of one dimensional heat equation using two layer explicit formulas.
7. Solution of one dimensional; wave equation by finite difference method.

DIGITAL PART OF MATHEMATICS SYLLABUS (up to 2018-20)
MCG204(GROUP-A)

COMPUTER PROGRAMMING(marks-30)

Structured programming in FORTRAN-77: subscripted variables,type declaration,DIMENSION,DATA,COMMON,EQUIVALENCE,EXTERNAL statements. Function and
sub-routine sub-programs; programs in FORTRAN-77
Programming in C: introduction,basic structures,character set, keywords,identifiers,constants,variable type declaration,
operators: arithmetic,relational,logical,assignment,increment,decrement,conditional, operator precedence and associativity,arithmetic expression,evaluation and type conversion,character reading and writing,formatted input and output,decision making(branching and looping)-simple

and nested IF,IF-ELSE,WHILE-DO,FOR. Arrays-one and two dimension,string handling with arrays -reading and writing,concatenation,comparision,string handling function,user defined functions .

MCGP205
COMPUTER AIDED NUMERICAL PRACTICAL(marks-50)
(Numerical practical using FORTRAN-77)
(Problem-25,Viva-1 0 & Sessional-1 5)

1 . Inversion of a non-singular square matrix.

2. Solutions of a system of linear equations by Gauss-Seidel method.

3. Integration by Romberg's method.

4. Initial Value Problems for first and second order ODE by

(i) Milne's method(First order)

(ii) 4_{th} order Runge-Kutta method(second order)

5. Dominant Eigen-pair of a real matrix by Power method(largest and least)

6. B.V.P. for second order ODE by finite difference method and shooting method.

7. Parabolic equation(in two variables) by two layer explicit formula and Crank-Nickolsonimplicit formula.

8. Solution of one dimensional wave equation by finite difference method.