

# Modified syllabus for TDP(H) 6<sup>th</sup> Semester Examinations-2021

Name of Subject: Mathematics

Paper: 7<sup>th</sup> (Honours)

Original Syllabus	Modified Syllabus
<b>UNIT-I</b>	
<p>1. Error in numerical analysis, Gross error, rounding off error, truncation error, approximate numbers, significant figure. Absolute, relative and percentage error, General formula for error, <math>\Delta, \nabla, E, \delta, \mu</math> operators, their properties and interrelation. Equispaced arguments, difference table, propagation of error in difference table.</p> <p>2. Interpolation: Statement of Weierstrass' approximation theorem, polynomial interpolation and error term in polynomial interpolation, deduction of Lagrange's interpolation formula, inverse interpolation, finding root of an equation by interpolation method. Deduction of Newton's forward and backward interpolation formula. Statement of Gauss forward and backward interpolation formula. Starling's and Bessel's interpolation formulae. Error terms. Divided difference, General interpolation formulae, deduction of Lagrange's, Newton's forward and backward interpolation formula.</p> <p>3. Numerical Differentiation based on Newton's forward, Newton's backward and Lagrange's interpolation formula. Error terms. Numerical integration: Integration of Newton's interpolation formula. Newton-Cotes formula. Deduction of Trapezoidal rule and Simpson's 1/3 rule, statement of Weddle's rule. Statements of error terms. Euler Maclaurin's sum formula.</p>	<p>1. Error in numerical analysis, Gross error, rounding off error, truncation error, approximate numbers, significant figure. Absolute, relative and percentage error, General formula for error, <math>\Delta, \nabla, E, \delta, \mu</math> operators, their properties and interrelation. Equispaced arguments, difference table, propagation of error in difference table.</p> <p>2. Interpolation: Statement of Weierstrass' approximation theorem, polynomial interpolation and error term in polynomial interpolation, deduction of Lagrange's interpolation formula, inverse interpolation, finding root of an equation by interpolation method. Deduction of Newton's forward and backward interpolation formula. Divided difference, General interpolation formulae, deduction of Lagrange's, Newton's forward and backward interpolation formula.</p> <p>3. Numerical integration: Integration of Newton's interpolation formula. Newton-Cotes formula. Deduction of Trapezoidal rule and Simpson's 1/3 rule. Euler Maclaurin's sum formula.</p>

## UNIT-II

2.1 Numerical solution of non-linear equations: Location of a real roots by tabular method, Bisection method, secant / Regula-Falsi, fixed point iteration and Newton-Raphson method, their geometrical significance and convergency, order of convergence. Newton's method for multiple roots.

2.2 Numerical solution of system of linear equations: Gauss elimination, Gauss-Jordan method, Pivoting strategy in Gauss elimination. LU-Decomposition. Inversion of 3x3 non singular matrices by Gauss elimination and Gauss-Jordan method. Gauss-Siedel iteration method for system of linear equation.

2.3 Numerical solution of ordinary differential equation of first order: Euler's method, modified Euler's method, Picard's method, Taylor's series method, Runge-Kutta method, Milne's method.

2.1 Numerical solution of non-linear equations: Location of a real roots by tabular method, Bisection method, secant / Regula-Falsi, fixed point iteration and Newton-Raphson method, their geometrical significance and convergency, order of convergence. Newton's method for multiple roots.

2.2 Numerical solution of system of linear equations: Gauss elimination, Gauss-Jordan method, Gauss-Siedel iteration method for system of linear equation. Pivoting strategy in Gauss elimination. LU-Decomposition. Inversion of 3x3 non singular matrices by Gauss elimination and Gauss-Jordan method.

## UNIT-III

Algorithm and flow charts with simple examples, Branching and looping, Introduction to ANSI-C: Character set in ANSI-C. Key words: int, char, float, white etc. Constant and variables, expressions, assignment statements, formatting source files, Header files, Data types, declarations, different types of integers, different kinds of integer constants, floating-point types, initialization, mixing types, the void data type, Type defs. standard input outputs, finding address of an object, Operations and expressions, precedence and associativity, unary minus and plus operators, binary arithmetic operators, arithmetic assignment operators, increment and decrement operators, comma operators, relational operators, logical operators.

Algorithm with simple examples, Branching and looping, Introduction to ANSI-C: Character set in ANSI-C. Key words: int, char, float, white etc. Constant and variables, expressions, assignment statements, formatting source files, Header files, Data types, declarations, different types of integers, different kinds of integer constants, floating-point types, initialization, mixing types, the void data type, Type defs. standard input outputs, Operations and expressions, precedence and associativity, unary minus and plus operators, binary arithmetic operators, arithmetic assignment operators, increment and decrement operators, comma operators, relational operators, logical operators.

## UNIT-IV

Control flow, conditional and unconditional branching, looping, nested loops, if-else, do-while, for, switch, break, continue, goto statements etc, Infinite loops, Functions, Arrays and pointers.

Control flow, conditional and unconditional branching, looping, nested loops, if-else, do-while, for, switch, break, continue, goto statements etc, Infinite loops.

# Modified syllabus for TDP(H) 6<sup>th</sup> Semester Examinations-2021

Name of Subject: Mathematics

Paper: 8<sup>th</sup> (Honours) (Practical)

Original Syllabus	Modified Syllabus
<b>Numerical Analysis (Practical)</b>	
<ol style="list-style-type: none"><li>1. Problems on Newton's forward and Backward interpolation, Lagrange interpolation formula. Inverse interpolation. Finding root of an equation by interpolation method.</li><li>2. Differentiation formula based on Newton's forward and backward interpolation formula.</li><li>3. Numerical integration by Trapezoidal, Simpson's 1/3 rule and Weddle's rule.</li><li>4. Finding roots of an equation by Bisection method, Regula-Falsi method, fixed point iteration method, Newton-Raphson method.</li><li>5. Solution of linear equation by Gauss elimination method, Gauss-Jordan method and Gauss Siedel method.</li><li>6. Finding inverse of a third order matrix without finding its determinant.</li><li>7. Runge-Kutta Method</li></ol>	<ol style="list-style-type: none"><li>1. Problems on Newton's forward and Backward interpolation, Lagrange interpolation formula. Inverse interpolation. Finding root of an equation by interpolation method.</li><li>2. Numerical integration by Trapezoidal, Simpson's 1/3 rule.</li><li>3. Finding roots of an equation by Bisection method, Regula-Falsi method, fixed point iteration method, Newton-Raphson method.</li><li>4. Solution of linear equation by Gauss elimination method, Gauss-Jordan method and Gauss Siedel method.</li><li>5. Finding inverse of a third order matrix without finding its determinant.</li></ol>

## C-Programming (Practical)

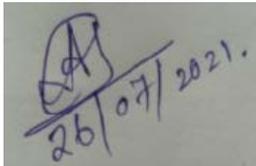
1. Ascending / Descending order. Finding Largest / smallest.
2. Sum of finite series.
3. Sum of Convergent series.
4. Bisection method.
5. Checking whether a number is prime or not. Generation of prime numbers.
6. Solution of Quadratic equation.
7. Newton's forward and Backward interpolation. Lagrange interpolation.
8. Bisection method. Newton-Raphson method. Regula-Falsi method.
9. Trapezoidal Rule. Simpson's 1/3 rule.
10. Value of Determinant.
11. Matrix sum, subtraction, product, transposition.
12. Cramer's Rule (upto three variables).
13. Solution of linear equation by Gauss elimination method, Gauss-Jordan method.
14. Runge-Kutta Method.
15. Mean, variance, correlation coefficient, equation of regression line.

1. Ascending / Descending order. Finding Largest / smallest.
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3. Sum of Convergent series.
4. Checking whether a number is prime or not. Generation of prime numbers.
5. Solution of Quadratic equation.
6. Newton's forward and Backward interpolation.
7. Bisection method. Newton-Raphson method. Regula-Falsi method.
8. Trapezoidal Rule. Simpson's 1/3 rule.
9. Value of Determinant.
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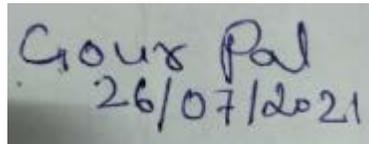
Signature of the Chairperson



Signature of Members



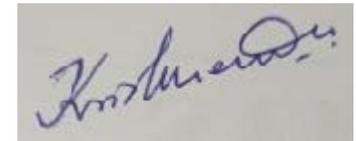
Sri Abhijit Pal  
Associate Professor



Sri Gour Pal  
Associate Professor



Dr. Suvadip Paul  
Assistant Professor



Dr. Krishnendu Das  
Assistant Professor