

# FACULTY OF SCIENCES

## SYLLABUS

### FOR

## INTERDISCIPLINARY COURSE IN MATHEMATICS (UG)

Examinations: 2019 - 20



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## GURU NANAK DEV UNIVERSITY AMRITSAR

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Interdisciplinary Course in Mathematics (UG)

**NUMERICAL METHODS (MTL 001)**

**L T P**

**4 0 0**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Section – A**

Error Analysis: Relative error, Truncation error, Round off error, order of approximation, order of convergence, Propagation, solution of Non-linear equations, Bisection method, Method of false position, Newton Raphson Method, Secant Method.

**Section - B**

The Iteration Method and accelerated convergence, Solution of system of linear equations: Gaussian Elimination method, Gauss Jordan, Gauss-Seidel Method, Crout's Reduction method, Interpolation: Finite difference operators, Newton's Forward and backward difference interpolation, Lagrange's Method,

**Section – C**

Divided differences, Numerical Integration: Quadrature, Trapezoidal Rule, Simpson's Rules, Weddle's rule, Romberg Integration,

**Section – D**

Solution of differential equations: Picard's Method, Euler's method, Taylor Series method, Runge Kutta method, Milne's Simpson method.

**Books Recommended:**

1. Numerical Methods in Engineering and Science: B.S. Grewal
2. Introductory methods of Numerical Analysis, S.S. Sastry