

# 16HS101 BASIC MATHEMATICS - I

Hours Per Week :

L	T	P	C
3	1	2	5



## Course Description and Objectives:

In this course the fundamental concepts of mathematics are introduced. A treatise of Matlab is also introduced in the practical session.

The objective of the course is to impart knowledge on progressions, partial fractions and binomial theorem. This course also deals with elementary concepts in geometry, trigonometry, differential and integral calculus. Numerical methods are also introduced for finding approximate solutions of algebraic equations. Besides, interpolation techniques and MATLAB environment are emphasized.

## Course Outcomes:

Upon completion of the course, the student will be able to

- CO1: Understanding progression, partial fractions, binomial theorem, trigonometry and geometry.
- CO2: Evaluate limits, test the continuity and differentiability of functions.
- CO3: Evaluate integrals of functions.
- CO4: Apply numerical methods and interpolation techniques to find functional values.
- CO5: Apply software tools to obtain and verify the solutions.

## SKILLS:

- ✓ *Compute sum of terms of given progression.*
- ✓ *Differentiate the given function.*
- ✓ *Evaluate the integral of given function.*
- ✓ *Interpret interpolation techniques to estimate the functional values.*

## ACTIVITIES:

- *Compute the derivative and compare with Matlab output.*
- *Evaluate the integral and compare with Matlab output.*
- *Interpret the given data and estimate the functional values at a given point.*

UNIT - 1 L-9, T-3

MATHEMATICAL PRELIMINARIES: Progressions, partial fractions and binomial theorem.

UNIT - 2 L-9, T-3

TRIGONOMETRY AND GEOMETRY: Coordinate system, straight line, trigonometric functions and trigonometric identities.

UNIT - 3 L-9, T-3

DIFFERENTIAL CALCULUS : Limits, continuity and differentiability.

UNIT - 4 L-9, T-3

INTEGRAL CALCULUS: Concepts of integration - rules, integration by parts, integration by partial fractions and integration by inspection (standard forms).

UNIT - 5 L-9, T-3

NUMERICAL METHODS: Bisection method, Newton-Raphson method, finite differences, forward and backward difference tables, interpolation by Lagrange's method, Newton's forward and backward methods, Gauss forward and backward methods.

## LABORATORY EXPERIMENTS

### LIST OF EXPERIMENTS

Total hours: 30

Introduction to MATLAB environment.

Basic mathematical operations using MATLAB.

1. Solving simple expressions.
2. Trigonometric function values.
3. Limits.
4. Continuity.
5. Symbolic differentiation-1.
6. Symbolic differentiation-2.
7. Symbolic integration-1.
8. Symbolic integration-2.
9. Real roots of functions.
10. Newton-Raphson method.
11. Interpolation.

### TEXT BOOKS:

1. C. W. Evans, "Engineering Mathematics, A Programmed Approach", Stanley Thorne (Special Indian Edition) 2011.
2. P. S. Rao, "A text book of Remedial Mathematics", 1<sup>st</sup> edition, Parma Med Press, Hyderabad, 2008.

### REFERENCE BOOKS:

1. A. Jeffrey, "Mathematics for Engineers and Scientists", 6<sup>th</sup> edition, (Special Indian Edition), CRC Press, 2013.
2. R. Pratap, "Getting started with MATLAB", Oxford University Publication, 2009.