# VIDYAVARDHAKA COLLEGE OF ENGINEERING
# DEPARTMENT OF MATHEMATICS

## COURSE OUTCOMES- NON CBCS Scheme
## ENGINEERING MATHEMATICS

**Sub. Name: Engg. Mathematics-I Sub. Code: 10MAT11**

**At the end of semester the students should be able to:**

**CO-1:** Generalize the derivatives and analyse polar curves. Evaluate radius of curvature and derivatives of arc length.

**CO-2:** To obtain Taylor's series expansion of function of single variable. Analyse and Evaluate indeterminate forms. Use partial derivatives to calculate rates of change of multivariate functions.

**CO-3:** Evaluate differentiation under the integral sign. Use Vector differential operator on scalar and vector point functions. Basic rules for tracing of curves.

**CO-4:** Evaluate definite integral by using reduction formulae. Recognize and solve first-order linear ODE and its applications to various fields.

**CO-5:** Use matrices techniques for solving systems of linear equations in the different areas of Linear Algebra. Diagonalize the given matrices. Reduction of Quadratic form to Canonial form.

**Sub. Name: Engg. Mathematics-I Sub. Code: 14MAT11**

**On completion of this course, students are able to:**

**CO-1: Apply** the successive differentiation to analyze polar curves, evaluate radius of curvature, derivatives of arc length and obtain Taylor's & Maclurin series, expansion of function of single variable.

**CO-2: Apply** the partial differentiation to find total derivative, Jacobians of a given multivariable function and to evaluate the integral using Leibnitz' rule.

**CO-3: Apply** the Vector differential operator on scalar and vector point functions and describe the general instruction of tracing of curve.

**CO-4: Apply** the reduction formula to evaluate definite integral. Apply various methods of the differential equation to solve first-order linear ODE and its applications to various fields.

**CO-5: Apply** the matrix techniques to reduce the quadratic forms to canonical forms, finding solutions of systems of linear equations in different areas of Linear Algebra.

**Sub. Name: Engg. Mathematics-II Sub. Code: 10MAT21**

**At the end of semester the students are able to :**

**CO-1:** Use ordinary differential equations to model engineering phenomena such as Electrical circuits, forced oscillation of mass spring and elementary heat transfer

**CO-2:** Use partial differential equations to model problems in fluid mechanics, Electromagnetic theory and heat transfer

**CO-3:** Evaluate double and triple integrals to find area, volume, mass and moment of inertia of plane and solid region.

**CO-4:** Use curl and divergence of a vector function in three dimensions and be familiar with the concept of orthogonal curvilinear coordinates.

**CO-5:** Use Laplace transforms to determine general or complete solutions to linear ODE

**Sub. Name: Engg. Mathematics-II Sub. Code: 14MAT21**

**At the end of semester the students are able to:**

**CO-1: Apply** ordinary differential equations to model engineering phenomena such as electrical circuits, forced oscillation of mass spring and elementary heat transfer

**CO-2: Identify** and **evaluate** the non-linear D. E. to find solution of different non-linear systems.

**CO-3: Apply** partial differential equations to model problems in fluid mechanics, electromagnetic theory and heat transfer

**CO-4**: **Apply** multiple integrals to find area, volume, mass and moment of inertia of plane and solid region.

**CO-5**: **Apply** Laplace transform to determine general or complete solutions to linear ODE

**Sub: Engineering Mathematics III sub code: 10MAT31**

**At the end of semester the students should be able to:**

**CO-1: Apply** Fourier series towards technical field and **Solve** integral equations using Fourier Transform.

**CO-2: Derive and obtain** the solutions of standard PDE. Find the solutions of numerous boundary value problems of engineering such as conduction of heat, transverse vibration of a string and etc.

**CO-3: Apply** least square method to fit various curves for the given data and interpret the relation, get familiar with the advent of high speed digital computers and increasing demand for numerical answers to various problems, numerical techniques.

**CO-4: Apply** various numerical techniques to obtain the solution of PDE.

**CO-5: Apply** Z-Transform to obtain the solution of difference equations.

**Sub: Engineering Mathematics IV sub code: 10MAT41**

**At the end of the semester student should know:**

**CO-1: Employ** different numerical methods to solve the ordinary differential equations of first and second order, simultaneous ODE of first order

**CO-2: Apply** the concept of function of complex variables in various fields. Develop problem solving skills using Cauchy-Reimann equation and apply of Cauchy – Reimann equation to solve flow problems in electric field. Understand Cauchy's theorem and Cauchy's integral formula to evaluate complex integrals.

**CO-3**: **Apply** special functions like Bessel function to solve the boundary value problems with axial symmetry and Legendre polynomial to solve boundary value problems with spherical symmetry.

**CO-4**: **Use** the knowledge of probability and be familiar with various probability distributions which enable to fit a mathematical model to the given data. **Apply** Baye's rule to find the posteriori probability when the apriori probability is known.

**CO-5**: **Employ** the concept of population, sample, Sampling and to draw inference about population based on numerical data obtained from the sample using Student's t- test and Chi-square test.