

PRASAD V POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

0Regulation- PVP14

Common to all branches

I B. Tech / I Semester

Engineering Mathematics – I

Course Code(s): CE1T1, ME1T1, CS1T1, IT1T1, EE1T1, EC1T1, AE1T1

Credits: 3

Lecture: 3 periods/week ,Tutorial: 1 period /week

Internal assessment: 30 marks

Semester end examination: 70 marks

COURSE OBJECTIVES:

- The main purpose of this course is to provide students with skills in solving differential equations, evaluating improper integrals using beta and gamma functions.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential integral and vector calculus.

COURSE OUTCOMES:

At the end of the course student will be able to

1. Solve ordinary differential equations of first ,higher order and solve problems of growth and decay also find orthogonal trajectories of given family of curves..
2. Recall mean value theorems to prove inequalities and able to find maxima, minima of functions of two variables.
3. Apply double integrals to find area of the given region, triple integrals to find volume of the three dimensional objects.
4. Determine gradient of scalar point functions and curl, divergence of vector point functions. Also able to apply Stoke's theorem, Gauss divergence theorem and Green's theorem to evaluate line and surface integrals.
5. Solve improper integrals using beta, gamma functions, able to find the curve of best fit for the given data by method of least squares.

SYLLABUS

UNIT-I

Exact equations, orthogonal trajectories, applications to Newtons Law of cooling, Law of Natural growth and decay.Non-Homogeneous linear Differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in X, $e^{ax} V(x)$, $x V(X)$.

UNIT-II

Differential calculus: Rolle's theorem, Lagrange's mean value theorem and Taylor's theorem (without proofs), Taylor's and Maclaurin's series for functions of one variable. Maxima and Minima of functions of two variables, Lagrange's method of multipliers.

UNIT III

Multiple integrals -double and triple integrals-change of variables-Change of order of Integration.

UNIT IV

Vector Differentiation: Gradient-Divergence-Curl and their related properties of sums -products- Laplacian and second order operators(proofs of identities not included)

Vector Integration -Line integral-work done-Potential function-area-surface and volume integrals

Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems

UNIT V

Curve Fitting- Fitting a straight line-Second degree curve- Exponential curve- power curve by method of least squares.

Gamma and Beta functions- properties- Evaluation of improper integrals(applications not included).

Text Books:

Higher Engineering mathematics by B.S. Grewal , khanna publishers

References:

1. Higher Engineering Mathematics, N.P. Bali. Laxmi Publications (P) Ltd.
2. Engineering Mathematics, B. V. Ramana , Tata Mc Graw Hill