PRASAD V POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)
Regulation- PVP12
Common to all branches
I B. Tech / I Semester
Engineering Mathematics – I
Course Code(s): CE1T2, ME1T2, CS1T2, IT1T2, EE1T2,EC1T1,EM1T2,AE1T1

Credits: 4

Lecture: 4 periods/week   Internal assessment: 30 marks

Tutorial: 1 period /week   Semester end examination: 70 marks

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Course objective:

To achieve skills in differential, integral, vector calculus which will enable them to solve engineering problems.

To get introduction to the concepts of Laplace transforms its applications to various problems.

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. Find Laplace transforms, inverse Laplace transforms of the given functions and able to apply Laplace transforms to solve differential equations with initial conditions.
3. Recall mean value theorems to prove inequalities and able to find maxima, minima of functions of two variables.
4. Apply double integrals to find area of the given region, triple integrals to find volume of the solids.
5. 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.
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 UNIT – I DIFFERENTIAL EQUATIONS - I:

Differential equations of first order and first degree – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

 UNIT – II DIFFERENTIAL EQUATIONS - II: 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), xV(x)

UNIT – III LAPLACE TRANSFORMS: Laplace transforms of standard functions –Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function.

UNIT – IV INVERSE LAPLACE TRANSFORMS: Inverse Laplace transforms– Convolution theorem - Application of Laplace transforms to ordinary differential equations Partial fractions. To achieve skills in differential, integral, vector calculus which will enable them• to solve engineering problems

UNIT-V FUNCTIONS: Generalized Mean Value theorem (without proof) Functions of several variables – Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT – VI INTEGRATION: Multiple integrals - double and triple integrals – change of variables – Change of order of Integration.

UNIT – VII VECTOR DIFFERENTIATION: Gradient - Divergence - Curl and their related properties of sums - products - Laplacian and second order operators.

UNIT-VIII VECTOR INTEGRATION: 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.

Learning resources Text books: 1. Higher Engineering Mathematics by Grewal, B.S. (42nd edition), Khanna Publications, New Delhi, 2012.

2.Textbook of Engineering Mathematics by Bali N.P., Bangalore University Science Press, 2012. 3. Engineering Mathematics by Ramana B.V. Tata McGraw-Hill, New Delhi, 2002.