SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.Tech Part- II

CBCS PATTERN

Syllabus to be implemented from

June, 2019 onwards.

S.Y.B. Tech. (CIVIL ENGINEERING)- Semester – III
ENGINEERING MATHEMATICS-III

Teaching Scheme	Examination Scheme
Lectures : 3 hours/week	**ESE : 70 marks**
Tutorial : 1 hour/week	**CIE : 30 marks**
Credits : 4	**Term Work : 25 marks**

Course Objectives:
  1)To develop mathematical skills and enhance thinking power of students.
  2)To give the knowledge to the students of Statistics, Linear Differential Equations ,Vector Differential Calculus ,Laplace transforms ,Probability, Numerical Integration with an emphasis on the application of solving engineering problems
  3)To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:
Upon successful completion of this course, the student will be able to:
  1) Make use of Linear Differential Equations to solve the Civil Engineering problems.
  2) Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.
  3) Describe the statistical data numerically by using Lines of regression and Curve fittings.
  4) Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
  5) Find Laplace transforms of given functions and use it to solve linear differential equations.
  6) Calculate numerical Integration.

SECTION – I

Unit 1. Linear Differential Equations (LDE) and its Applications: **08**
1.1 Linear Differential equations with constant coefficients.
1.2 Rules to find complementary function.
1.3 Methods to find particular Integral (e^{ax}, sinax or cosax, x^m, $e^{ax}x^m$, $e^{ax}sinax$ or $e^{ax}cosax$)
1.4 Cauchy's homogeneous linear differential equations.
1.5 Applications of Linear Differential Equations to Cantilever , Strut , Beam.

Unit 2. Vector Differential Calculus: 07
2.1 Differentiation of vectors.
2.2 Gradient of scalar point function.
2.3 Directional derivative.
2.4 Divergence of vector point function.
2.5 Curl of a vector point function.
2.6 Irrotational, Solenoidal and Scalar potential function of a vector field.

      07

Unit 3. Correlation, Regression & Curve Fitting:
3.1 Introduction.
3.2 Karl Pearson's Coefficient of Correlation.
3.3 Lines of regression of bivariate data.
3.4 Fitting of Curves by method of Least-squares:
    3.4.1 Fitting of Straight lines.
    3.4.2 Fitting of exponential curves.
    3.4.3 Fitting of second degree Parabolic curves.

<center>**SECTION – II**</center>

Unit 4. Probability Distribution: 06
4.1 Random variables.
4.2 Discrete Probability distribution.
4.3 Continuous probability distribution.
4.4 Binomial Distribution.
4.5 Poisson Distribution.
4.6 Normal Distribution.

Unit 5. Laplace Transform and its Applications: **07**
5.1 Laplace transform of elementary functions
5.2 Properties of Laplace transforms(First Shifting , Change of scale property , Multiplication &
    Division by t)
5.3 Laplace transforms of derivatives and integral.
5.4 Inverse Laplace transforms by partial fractions & convolution theorem.
5.5 Solution of Linear differential equation with constant coefficients using Laplace transform

Unit 6. Numerical Integration: 07
6.1 Newton Cotes formulae
6.2 Trapezoidal Rule.
6.3 Simpson's 1/3 rd rule.
6.4 Simpson's 3/8 th rule.
6.5 Weddle's Rule.

Reference Books:
1) Advance Engineering Mathematics by Erwin Kreyszig (Wiley India.)
2) Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning.)
3) Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press.)
4) Engineering Mathematics by V. Sundaram (Vikas Publication.)
5) Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi.)
6) Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill)
7) Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication.)
8) Applied Mathematics by Navneet D. Sangle (Cengage Publication)

General Instructions:
1) For the term work of 25 marks, batch wise tutorials are to be conducted. The number of
students per batch per tutorial should be as per University rules.