Faculty of Engineering(**affiliated engineering colleges**), Osmania University

(wef: Academic year 2025-2026)

Common to B.E. (Civil & Mechanical)

Course Code	Course Title						Core/Elective
BS205MT	Partial Differential Equations, Probability & Statistics						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4

Course Objectives.

1. To introduce the solution methodologies for first and second order Partial Differential Equations
2. Exploring random variables and probability distributions
3. Exploring regression analysis and correlation and applying statistical methods to real-world problems

Course Outcomes.

After completing this course, the students will be able to:

1. Solve field problems in engineering involving PDEs
2. Solution of boundary value problems involving PDEs
3. Evaluate statistical parameters of discrete and continuous probability distributions.
4. Perform regression analysis to compute the coefficient of correlation to interpret data.
5. Testing of hypothesis of few unknown statistical parameters using types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters.

UNIT-I: Formation of Partial Differential Equations, First order Partial Differential Equations, solutions of first order linear Partial Differential Equations, Lagrange's equation, Non-linear First Order equations, Charpit's method.

UNIT-II: Second-order linear equations and their classification, Method of separation of variables, vibration of stretched string wave equation, one dimensional heat equation, solution of Laplace's equation in Cartesian coordinates.

UNIT-III: Probability distributions: Uniform, Poisson and Normal distributions, Mean, variance, moment generating function, and evaluation of statistical parameters for these distributions, Moments.

Unit-IV: Curve fitting by the method of least squares- Fitting of straight lines, second degree parabolas and more general curves, Correlation, regression and rank correlation. Test of significance- Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Unit-V: Test for single mean, difference of means, and correlation coefficients, test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.

References

1. R. K Jain S.R.K Iyengar, Advanced Engineering Mathematics, Narosa Publication. 4Th Edition, 2014.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication 43rd Edition, 2014.
3. S.C Gupta and V.K Kapoor, Fundamental of Mathematical Statistics, Sultand Chand & sons, New Delhi, 2014.

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