

Faculty Name :				Academic Year: 2026-2027 (ODD SEMESTER)			
Department: Mathematics							
Course Code	Course Title	Core/ Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
1BMATME301	Transforms and Statistics	Core	Differentiation, Integration, Partial Fraction, Differential Equation	3	2	-	-
Objectives	- Learn to use the Fourier series to represent periodical physical phenomena in engineering analysis. - To enable the students to study Fourier Transforms and concepts of infinite Fourier Sine and Cosine transforms and to learn the method of solving difference equations by the z-transform method. - To develop proficiency in solving ordinary and partial differential equations arising in engineering applications, using numerical methods. - Interpret engineering data using statistical tools, measures of central tendency, dispersion, and data visualization techniques for informed decision-making.						
Topics Covered as per Syllabus							
Module-1: Fourier series Definition, Periodic functions, Dirichlet's conditions, Fourier series of periodic functions of period 2π and arbitrary period, half range Fourier series. Complex form of Fourier Series. Practical harmonic analysis.							
Module-2: Fourier Transform & Z-Transform Infinite Fourier transform, Fourier sine and cosine transforms, properties, Inverse Fourier transform, integral equations and related problems. Z-Transform: Definition, standard Z-transforms, damping rule, shifting rule, initial value and final value theorems (statements only). Inverse Z- transforms, Problems on difference equations.							
Module-3: Partial differential equations Partial Differential Equations: Definitions, Formation of PDE by eliminating arbitrary constants and arbitrary functions, Solution of non-homogeneous PDE by direct integration and Lagrange's multiplier method.							
Numerical solution of PDE: Classification of second order PDE. Finite difference approximation to derivatives, Numerical solution of One-dimensional Heat and Wave equations. Numerical solution of two-dimensional Laplace equation.							
Module-4: Statistics-1 Measures of central tendency: mean, median and mode for grouped and ungrouped data. Measures of dispersion: range, variance, standard deviation, quartile deviation, moments and coefficient of variation. Concept of Skewness and Kurtosis.							

Module-5: Statistics-2

Principles of least squares, Curve fitting by the method of least squares in the form: $y = a + bx$
 $y = a + bx + cx^2$ and $y = ax^b$.

Correlation and Regression: Karl Pearson's coefficient of correlation and rank correlation (with repetition and without repetition) -problems. Regression analysis- lines of regression –problems.

Title of the Book Name of the Author/s Name of the Publisher Edition and Year

Textbooks

1. S.C.Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand Publishing.
2. R. K. Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publishing House.
3. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers.

List of Reference Books

1. B.V. Ramana, Higher Engineering Mathematics, Mc Graw-Hill Education, 11th Ed., 2017
2. M.R.Spiegel, J. Schiller, and R.A. Srinivasan, Schaum's Outline of Probability and Statistics, McGraw Hill.
3. S. C. Gupta, Statistical Methods, S. Chand Publishing.
4. V. K. Rohatgi and A. K. Md. Ehsanes Saleh, An Introduction to Probability and Statistics, Wiley.

List of URLs, Text Books, Notes, Multimedia Content, etc

- <http://academicearth.org/>
- VTUe-ShikshanaProgram
- VTUEDUSATProgram
- <https://nptel.ac.in/courses/111105160>
- <https://nptel.ac.in/courses/127106019>
- <https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/>
- <https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2012/pages/syllabus/>

Course Outcomes

On completion of this course, students are able to:

- CO1:** Apply Fourier series techniques to represent periodic functions and perform harmonic analysis relevant to engineering applications.
- CO2:** Utilize Fourier Transforms and Z-Transforms to analyze engineering systems and solve difference equations arising in mechanical and allied engineering problems.
- CO3:** Formulate and solve partial differential equations and apply numerical methods for the solution of heat, wave, and Laplace equations encountered in engineering practice.
- CO4:** Analyze and interpret engineering data using statistical tools, measures of central tendency, dispersion, and data visualization techniques for informed decision-making.
- CO5:** Analyze relationships between variables using correlation and regression models.

Internal Assessment Marks: 50 (A minimum of two Internal Assessment Tests(IA) shall be conducted, carrying a total of 25 marks. In addition, Continuous Comprehensive Assessment (CCA) shall be conducted for a total of 25 marks.).



ATME

College of Engineering



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The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	1BMATME301	TITLE: Transforms and Statistics						Faculty Name:				
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
	CO-1	2	1	-	-	2	-	-	3	-	-	-
	CO-2	2	2	-	-	2	-	-	3	-	-	-
	CO-3	2	2	-	-	2	-	-	3	-	-	2
	CO-4	2	1	-	-	2	-	-	3	-	-	1
CO-5	2	2	-	-	2	-	-	3	-	-	1	

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution