GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology					Branch/Spec.	Computer Science & Engineering (CSE/BDA/CS/AI&ML)		
Semester	III					Version	1.0.0.1		
Effective from Academic Year			2026-27			Effective for the batch Admitted in			June 2025
Subject code	2HS306		Subject Name			APPLIED ENGINEERING MATHEMATICS			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	0	0	4	Theory	40	60	100
Hours	3	1	0	0	4	Practical	0	0	0

Pre-requisites:

Trigonometry, Continuity, Integration, Differentiation

Learning Outcome:

After successful completion of this course, students will be able to:

- Understand all basic fundamentals of numerical methods and transforms.
- Apply differential equations and transforms for various examples.
- Apply knowledge of transforms and numerical methods in various applications of Computer Science.
- Understand basics of Machine Learning.

Theory syllabus

Unit	Content	Hrs
1	**Finite Differences And Difference Equations :** Finite differences interpolation - Newton's Forward, Newton's Backward, Newton's Divided Difference and Lagrange's Interpolation. Difference equation with constants coefficient. Solution of ordinary and partial differential equations with boundary conditions by finite difference method.	8
2	**Numerical Methods:** Roots of algebraic equations - Bisection, Regula Falsi, Secant and Newton Raphson method, Solution of linear simultaneous equations - Jacobi and Gauss Seidel method, Numerical differentiation - Picard's, Taylor's, Euler's, Modified Euler's and RK method, Numerical Integration - Trapezoidal, Simpson's ⅓ and Simpson's ⅜ method.	12
3	**Laplace Transforms:** Definition, Laplace transform of elementary functions. Properties of Laplace transform, Inverse Laplace transforms. Transform derivatives, Transform of integration. Multiplication by □², Division by t, Convolution theorem. Unit step and Heaviside's unit function, Dirac-delta function. Periodic functions Solution of ordinary linear differential equations Simultaneous equations with constant coefficient applied to electrical circuits.	10
4	**Fourier Series:** Definition of periodic function, Euler's formula, Functions having points of discontinuity, Change of intervals, Odd and even functions, Expansion of odd or even periodic functions, Half range cosine and sine series, Elements of harmonic analysis..	10

5	**Difference equations:** First order, second order and nth order, with integer argument and their solutions; First order, second order, nth order, with continuous variables and their solutions; The state space form and Kalman-Bucy filter, Riccati Matrices (Equations) and applications	5

Mooc Course	
Course Name: Numerical Methods Link: https://onlinecourses.nptel.ac.in/noc22_ma21/preview Course Name : Engineering Mathematics II Link : https://onlinecourses.nptel.ac.in/noc22_ma08/preview	
Practical content	
Not Applicable	
Text Books	
1	Higher Engineering Mathematics by Dr. B. S. Grewal
2	A textbook for Higher Engineering Mathematics by N.P. Bali and Usha Paul
Reference Books	
1	Text book of engineering mathematics by A. B. Mathur and V. P. Jaggi
2	Higher Engineering Mathematics vol -3 by Dr. K.R. Kachot
3	Engineering mathematics by Srivastava
4	Applied Mathematics vol.-I and II by P.N.Wartikar and J. N. Wartikar
5	Applied Numerical Analysis by C.F. Gerald and P.O. Wheatley, Pearson Publication
Course Outcomes:	
COs	Description
CO1	Understand all basic fundamentals of numerical methods and transforms.
CO2	Apply differential equations and transforms for various examples
CO3	Apply knowledge of transforms and numerical methods in various applications of Computer Science.
CO4	Understand basics of Machine Learning..

Mapping of CO and PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	3	2	1	1	1	1	1	1	2
CO2	2	2	1	3	2	2	2	1	1	1	2	3
CO3	2	1	2	2	1	0	0	0	0	0	0	2
CO4	3	2	2	3	2	0	0	0	0	0	0	2