GANPATUNIVERSITY

FACULTYOFENGINEERING&TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Petrochemical / Chemical
Semester	III	Version	1.0.0.1
Effective from Academic Year	2025-26	Effective for the batch Admitted in	July 2025
Course code	2BS3106	Course Name	Mathematics for Petrochemical Engineering

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:

Basic knowledge of Differentiation, Integration and Differential Equations

Course Outcome:

CO1: Express physical phenomenon in Laplace Transforms and Z-Transforms.
CO2: Solve first order non-linear and higher order linear partial differential equations.
CO3: Apply knowledge of complex variables to cater various problems related the branch.

Theory syllabus

Unit	Content	Hrs.
1	**Laplace Transforms** Important Formulae, Properties of Laplace Transforms, Laplace Transform of Unit Step Function, Impulse Function, Periodic Function, Dirac Delta Function, Bessel Function, Error Function, Inverse Laplace Transforms, Important Formulae of Inverse Laplace Transforms, Properties of Inverse Laplace Transforms, Partial fraction method for Inverse Laplace Transforms, Convolution Theorem, Solutions of ordinary differential equations, simultaneous ordinary differential equations, partial differential equations and evaluation of Integrals using Laplace Transform method	**10**
2	**Z-Transforms:** Properties of Z-Transforms, Inverse Z-Transforms, Convolution, Convolution property of casual sequence, transforms of important sequences, Inverse of Z, Transforms by division, solutions of difference equations.	**07**
3	**Partial Differential Equations:** Solution of first order linear and non-linear Partial Differential Equations, Solution of higher order linear homogeneous Partial Differential Equations and linear non-homogeneous Partial Differential Equations.	**06**
4	**Applications of Partial Differential Equations** Method of separation of variables for Partial Differential Equations and its use in solving the Partial Differential Equations representing (i)One dimensional wave equation, (ii)One dimensional heat conduction equation in Cartesian co-ordinates and polar co-ordinates and (iii)Two-dimensional steady state heat conduction equation.	**10**
5	**Numerical solution of Partial Differential Equations:** Numerical solution of parabolic, elliptic and hyperbolic Partial Differential Equations using finite difference technique	**05**

6	**Calculus of Functions of Complex variables** Analytic functions, Cauchy –Riemann conditions in Cartesian co-ordinates and polar co-ordinates, methods for finding conjugate functions, Integration of function of complex variables, Cauchy's integral theorem and integral formula, Residue theorem and its use for evaluating Integrals of function of complex variables, evaluation real definite integrals by contour integration; Conformal transformations and bilinear transformations.	**07**

Text Books:	
1.	Advanced Engineering Mathematics by H. K. Das
2.	A Text Book of Engineering Mathematics by N. P. Bali, Manish Goyal
Reference Books:	
1.	Higher Engineering Mathematics by B. S. Grewal
2.	Higher Engineering Mathematics by B. V. Ramana
ICT/MOOCS:	
1.	https://nptel.ac.in/courses/111105035/222.
2.	https://nptel.ac.in/courses/111105035/273.
3.	https://nptel.ac.in/courses/111105035/30

Mapping of CO-PO and CO-PSO:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1	1	1	1	1	1	2	1	2	1	2	1	2	2	1
CO2	2	2	1	2	2	1	3	1	2	1	2	1	3	2	1
CO3	2	1	1	1	2	1	2	2	1	1	1	2	2	2	1