

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Petrochemical Engineering		
Semester		IV			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective form the batch Admitted in			July 2019	
Subject code		2BS4102		Subject Name		Mathematics For Mechanical And Mechatronics 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:									
Course Objective									
<ul style="list-style-type: none"> <li>To solve partial differential equations and evaluation of Integrals using Laplace Transform method</li> <li>To solve Z-Transforms: Properties of Z-Transforms, Inverse Z-Transforms.</li> <li>To solve One dimensional heat conduction equation in Cartesian co-ordinates and polar co-ordinates</li> <li>To understand Numerical solution of Partial Differential Equations .</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1	<b>Laplace Transforms:</b> 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	<b>Z-Transforms:</b> 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.								7
3	<b>Partial Differential Equations:</b> 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.								6
4	<b>Applications of Partial Differential Equations:</b> 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	<b>Numerical solution of Partial Differential Equations:</b> Numerical solution of parabolic, elliptic and hyperbolic Partial Differential Equations using finite difference technique Calculus of Functions of Complex variables : Analytic functions, Cauchy –Riemann								12

	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.	
<b>Practical content</b>		
<b>Text Books</b>		
1	Advanced Engineering Mathematics by H.K. Dass	
2	A T Book of Engineering Mathematics by N.P. Bali, Manish Goyal	
<b>Reference Books</b>		
1	Higher Engineering Mathematics by B.S. Grewal	
2	Higher Engineering Mathematics by B.V. Ramana	
<b>ICT/MOOCs references</b>		
1	<a href="https://nptel.ac.in/courses/111105035/22">https://nptel.ac.in/courses/111105035/22</a> 2.	
2	<a href="https://nptel.ac.in/courses/111105035/27">https://nptel.ac.in/courses/111105035/27</a> 3.	
3	<a href="https://nptel.ac.in/courses/111105035/30">https://nptel.ac.in/courses/111105035/30</a>	
<b>Course Outcomes</b>		
	Student will able to solve partial differential equations and evaluation of Integrals using Laplace Transform method Student will able To solve Z-Transforms: Properties of Z-Transforms, Inverse Z-Transforms. Student will able To solve One dimensional heat conduction equation in Cartesian co-ordinates and polar co-ordinates Student will understand Numerical solution of Partial Differential Equations .	