

# GUJARAT TECHNOLOGICAL UNIVERSITY

## PDDC

Semester: 2

**Subject Name: MATHEMATICS II**

Sr.No	Course content
1.	<b>Beta and Gamma Functions :</b> Definition, Basic properties, Relation between Beta and Gamma functions, Use in evaluation of definite integrals, Duplication formula via Beta Gamma.
2.	<b>Laplace Transforms :</b> Definition, Linearity property, Laplace transforms of elementary functions, First shifting theorem, Differentiation and integration of Laplace transforms. Inverse Laplace transform , Laplace transforms of derivatives and integrals, Convolution theorem, Application of Laplace transforms to solve ordinary differential equations.
3.	<b>Fourier Series :</b> Periodic functions, Dirichlet's conditions, Fourier Series, Euler's formulae, Fourier expansion of periodic functions with period $2\pi$ , Fourier Series of even and odd functions, Fourier series of periodic functions with arbitrary periods, Half – range Fourier series.
4.	<b>Fourier Integrals and transforms:</b> Fourier integral theorem (Only statement), Fourier Sine and Cosine integrals, Fourier Transforms, Fourier Sine and Cosine transforms
5.	<b>Higher Order Differential Equation :</b> Linear differential equations of higher order with constant coefficient, Method of variation of parameter, Cauchy's homogeneous linear equation, Legendre's homogeneous linear equation, Simultaneous linear differential equations, Application of linear differential equations, Modeling: Mechanical vibration system, Electrical circuit system & Deflection of beams.
6.	<b>Partial differential equations :</b> Formation of partial differential equations, Directly integrable equations, Lagrange's equation, Solution of special types of non-linear partial differential equation of the first order, Equations reducible to the standard forms, Application of partial differential equations, Boundary value problems and method of separation of variables, Vibrations of a stretched Elastic string.
7.	<b>Z - transforms</b> Z transforms of the standard functions like $e^{kx}$ , $\lambda^n$ , $\sin hx$ , $\cosh x$ . Linearity property , Damping rule , Initial value and final value problem.

**Reference Books:**

1. Elementary Engineering Mathematics by Dr. B.S. Grewal,  
Khanna Publishers, New Delhi.
2. Higher Engineering Mathematics by Dr. B.S. Grewal,  
Khanna Publishers, New Delhi.
3. A Textbook of Engineering Mathematics by N.P. Bali, Ashok Saxena & Iyengar,  
Laxmi Publications (P) Ltd., New Delhi.
4. Advanced Engineering Mathematics by H.K. Dass  
S. Chand & Co. (Pvt.) Ltd., New Delhi.
5. Engineering Mathematics Vol. – I, II, III by G.V. Kumbhojkar, C.  
Jamnadas & Co., Bombay.